



Abstract book
15th BCSWomen Lovelace Colloquium
Host University: University of Sheffield
12th April 2023

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Note: this year, for environmental reasons, we're going pdf with the programme, so you won't find a printed version of this at the event.

If you want to find a particular student's abstract, check out the [index at the end](#).

Welcome

Welcome to the BCSWomen Lovelace Colloquium 2023. This is our first in-person event since Salford in 2019, and we're really happy to be back. For some of our student attendees this year it'll be their fourth event, and their first one in-person, which feels very strange. But good.

The event is a single-track event which means there's basically one place everyone should be at any one time. This makes it easy for you to work out what you should be doing - just check the [Programme](#).

Talks are happening in Lecture Theatre 3, and the rest of the event is happening around and about in the same building - either the atrium or some workshop rooms. You'll find prayer rooms, quiet space and general chatting-to-other-people space around the venue. You'll also find lots of companies here with interesting projects, friendly people and maybe even jobs so be sure to talk to our sponsors and stallholders.

I hope you all have a great day. We've been really impressed by the work we've seen, I hope you will be too!

Hannah Dee and Safia Barikzai
Colloquium chair and deputy 2023

Programme

0930+ registration, posters up

1000-1015 welcome

1015-1115 Keynote from Gillian Arnold, incoming BCS President and CEO of Tectre

1115-1145 coffee break

1145-1215 Tech / Careers talk from Mariana Fonseca

1215-1245 Tech / Careers talk from Tristi Tanaka

1245-1400 Poster session 1 (lunch)

1400-1515 Poster session 2 (coffee)

1515-1545 Tech / Careers talk from Diana Maynard

1545-1645 Panel

1645-1700 Prizes .

1700 + Social, and a wind-down after the day.

Speaker bios

Keynote speaker: Gillian Arnold

Gillian Arnold is the current president of the BCS, and has been a supporter of the BCSWomen Lovelace Colloquium since the start. She gave our keynote in Bath, in 2012, when she was chair of BCSWomen, but as it's been more than 10 years and she's now president of the entire BCS organisation we thought we'd invite her back.

Gillian founded and runs her own IT Training and Diversity Recruitment company, Tectre, which helps women find technology roles. Before this she worked at IBM where she held senior tech, marketing, sales and consultancy roles. As well as being president of BCS, she currently leads the CEPIS (Council of European Professional Informatics Societies) Women in Tech Taskforce, working across greater Europe. She has won numerous accolades for her work on Women in Tech including the 2012 Cisco/Everywoman In Technology award; Inclusion Inspiration of the year, an entry in the Computer Weekly Hall of Fame, and an honorary doctorate from the University of Bath.

Mariana Fonseca - Robotics Research Engineer from Ocado Technology How robots can help humans? Focus on warehouse applications

Mariana received her BS degree in Control and Automation Engineering from the Universidade Federal de Minas Gerais (UFMG), Brazil, in 2013. She participated in an exchange program at the Universidade do Porto (UP) in Portugal, attending an Integrated Master Degree in Electrical and Computer Engineering, in 2012. She completed her master's and Ph.D. degrees with an emphasis on Control, Automation, and Robotics in 2017 and 2021, respectively, also at UFMG. Her master's focused on whole-body modeling and hierarchical control of a humanoid robot based on dual quaternion algebra and her Ph.D. thesis was focused on closed-loop admittance and motion control strategies for safe robotic manipulation tasks subject to contacts. During her Ph.D. she also spent 1 year at LIRMM, in Montpellier, France, as an assistant engineer from the CNRS. Besides her experience in academia, she also has experience as a software engineer. Mariana worked mostly with development in C++ at Jasper Design Automation and at Cadence Design System from 2013 to 2017, but also with web technologies at DTI Digital from 2020 to 2021. She moved to the UK in 2021 and is currently a Robotics Research Engineer at Ocado Technology.

Tristi Tanaka - Head of the Chief Medical Office, NHS Black Country ICB and BCSWomen Committee

Tristi is the BCSWomen Membership Secretary, BCS Digital Divide Specialist Group Inclusion Officer and currently working in the NHS Black Country ICB enabling the portfolio of the Chief Medical Officer. She has worked over 20 years in and with technologists on transformation and change across US NGO, UK public sector organisations and global private sector firms. She is

humbled to be named in Computer Weekly's 2022 UKTech50 longlist and the 2022 "Top 50 Most Influential Women in UK Tech".

Passionate about equity, diversity, inclusion and belonging (EDIB), Tristi is focused on opportunities to give and share platform to the voices unheard and/or unseen. In her current role, she supports the design, development and delivery of the Chief Medical Officer's portfolio including Clinical Strategy, Leadership, Clinical Policy and Medicines. Tristi adapts her multi-disciplinary experience – health and care, public services, education and technology – using knowledge and experience in design and systems thinking. She is keen to apply ethics-centred techniques to advise, design, adapt and deliver impactful products and services to reduce the avoidable, unintended negative impacts of digital transformation. Tristi connects her purpose with like-minded professional networks – the BCS, AnitaB, AnalystX and All4Health&Care to bring together allies seeking to develop new leaders and solutions that seek to tackle both health and digital inequalities.

Diana Maynard - Senior Research Fellow from Sheffield University
Misogyny and Disinformation: Online Violence Towards Women Journalists

Dr Diana Maynard is a Senior Research Fellow in the Computer Science department at the University of Sheffield. She has a PhD in Natural Language Processing (NLP) and has more than 30 years of experience in the field. Since 2000 she has been one of the key developers of the GATE NLP toolkit, leading work on Sheffield's open-source multilingual text analysis tools. Her main research interests are in practical, multidisciplinary approaches to text and social media analysis, in a wide range of fields including cultural heritage, human rights, law, journalism, sustainability and the environment, geography, politics, and natural disasters. She is currently working on various projects based around the detection and analysis of online hate speech, including methods for removing bias in Machine Learning, and for early warning detection of abuse escalation.

Thanks to sponsors, partners and supporters

There are a lot of organisations to thank - putting on an event of this size takes a lot of time, effort and money, particularly as we pay for student travel in many cases.

The following companies have contributed funds to support the event:

Our gold sponsor is [Ocado Technology](#), who have been a great help with the event and have also provided a superb speaker for the second year running.

Our silver sponsor this year is The Alan Turing Institute.

Other major sponsors include:

- DARE (Lunch sponsor),
- SUMO digital (social sponsor),
- Zoo digital (social the night before sponsor)
- Prize sponsors:
 - JP Morgan,
 - STFC,
 - Oxford University's AIMS CDT,
 - Amazon
- Stallholders

These University Partners have contributed towards the running of the day financially or in-kind at Platinum (£3500), Gold (£2500), Silver (£1000) or Bronze (£500) levels:

- London South Bank University (Platinum)
- Aberystwyth University (Gold)
- The University of Sheffield (Gold)
- The University of Bath (Gold)
- City University (Silver)
- University of Manchester (Silver)
- University of Warwick (Silver)
- Aston University (Bronze)
- Lancaster University (Bronze)
- University of Edinburgh (Bronze)
- University of York (Bronze)

Additionally these supporter universities have pledged to cover the travel of their own students:

- Aberystwyth University
- Aston University
- Brunel University
- The University of Buckingham
- Durham University

- Edinburgh Napier University
- Kings College London
- London South Bank University
- Loughborough University
- Manchester Metropolitan University
- Nottingham Trent University
- University of Glasgow
- University of Leeds
- University of Liverpool
- University of Salford
- University of Stirling
- University of Surrey
- University of Warwick

Thanks are also due to the following individuals

Sheffield organising team

Aline Villavicencio, Heidi Christensen, Nafise Moosavi

National organising team

Safia Barikzai, Amanda Clare, Hannah Dee, Lucy Hunt

Local Organisation and Communications

Max O Rowlands, Robert P Langley, David McCourt, Kimberley Matthews-Hyde

Speakers

Gillian Arnold, Mariana Fonseca, Diana Maynard, Tristi Tanaka

Sheffield Women in Computer Science Society

Hayley Young, Christina Wilson, Esther Wachuchu Mbugua, Tomoko Miyakoshi, Lailayan Alajilan, Hend ElGhazaly, Anna Prokop, Jasmine Hui Ping Tay, Tanishka Landge, Olivia Aurora

The poster judges: Alexandra Stanhope, Munira Raja, Rebena Sanghera, Edel Sherratt, Olga Korenyak, Key Paul-Fitton, Benedetta Mussati, Kelsey Doerksen, and Tristi Tanaka again

BCS

Mandy Bauer, Olivia Wolfheart, Jon Jeffery

All the other helpers including Sue Black, Jonathan Kettleborough, Teodora Dinca

Poster session information

First years - in workroom 05

Abstract title	Name and affiliation	Poster session
How will AI prosthetics impact our future? (1.01)	<i>Abby Newman Aberystwyth University</i>	1
Technology in sports: Swimming (1.02)	<i>Bucge Altunbek Manchester Metropolitan University</i>	2
Making things more accessible--- Reaching out to digital refugees. (1.03)	<i>Chengai Piao University of Bath</i>	1
Deafblind people and the internet (1.04)	<i>Daniela Large Aberystwyth University</i>	2
Removing the barriers to studying/working in CS (1.05)	<i>Deborah Assibey-Mensah Middlesex University</i>	1
<i>Deborah Assibey-Mensah Middlesex University</i>	<i>Diana Alexandra Vargas Pelaez University of Stirling</i>	2
Will AI ever completely replace human translators? (1.07)	<i>Elizabeth Rigby University of Bath</i>	1
Will my Doctor become a Robot? (1.08)	<i>Erin Watson University of Stirling</i>	2
Could IoT Solve the Care Crisis? (1.09)	<i>Genevieve Georgiades Lancaster University</i>	1
The Power of Neuromorphic Computing: A New Era in AI and Robotics (1.10)	<i>Gopika Yedlapalli Brunel University</i>	2
Algorithmic Methods: Exploring the Nature of Consciousness and Sentience (1.11)	<i>Haoyun Zhang University of Birmingham</i>	1
Social Media: Integration or segregation of society? (1.12)	<i>Jivanthika Venkatakishnan The University of Sheffield</i>	2
“Not a victimless crime”: Emerging technologies in the fight against online child exploitation (1.13)	<i>Joanna Jeevaruban Aberystwyth University</i>	1

Have you thought about the ethical implications of what you're doing? (1.14)	<i>Kirsty Mellon The Open University</i>	2
Could social media data be the future of mental health? (1.15)	<i>Leah Whiston Aston University</i>	1
Will artificial intelligence remove the need for web developers? (1.16)	<i>Lucky Hussein Muse Aston University</i>	2
Escaping Uncanny Valley: Can Artificial Agents Truly Imitate Humans? (1.17)	<i>Lydia Webber University of Bath</i>	1
Artificial Intelligence and Quantum Computing – a perfect match? (1.18)	<i>Madison Lardner Lancaster University</i>	2
What Are The Reasons For The Gender Balance In STEM And Should We Fix It? (1.19)	<i>May Metwaly London South Bank University</i>	1
Qubits for climate change! - How quantum computing can better the climate crisis (1.20)	<i>Molly Howkins-Griffiths Lancaster University</i>	2
The future of Gesture-Controlled User Interfaces (1.21)	<i>Omosunmisola Lawal University of Bath</i>	1
Can AI help more students to AI-m for greatness? (1.23)	<i>Polina Markova Lancaster University</i>	2
Waste isn't Waste until we Waste it: An examination of the Agboglobloshie e-waste landfill site and its potential future. (1.24)	<i>Rose Howie University of Glasgow</i>	1
Cyber Forensics (1.25)	<i>Tharuni Chandra Srilaya Eadara Venkata Brunel University</i>	2
Are Smartphones physically healthy for us? (1.26)	<i>Tung Jasmine Kam Aberystwyth University</i>	1

Second years - in workroom 04

Abstract title	Name and affiliation	Poster session
AI Generated Artwork and the Future of the Artist (2.27)	<i>Alexandra Cooper Aberystwyth University</i>	1
Capturing motion under the waves (2.28)	<i>Boo (Bethany) Smith Lancaster University</i>	2
Linear B: How cryptanalysis helped unravel the secrets of an ancient civilisation (2.29)	Daisy Eilbeck Lancaster University	1
Developers vs. The Really Good Gaming Chair: Can cheaters in video games ever truly be stopped? (2.30)	<i>Ellie Farrar Lancaster University</i>	2
ChatGPT: Plagiarism's Worst Nightmare (2.31)	Georgina Parker The University of Sheffield	1
'Plenty there that needs to be done' – On How to Get Girls Into Computing (2.32)	<i>Haleena Hussain University of Wolverhampton</i>	2
How computers will help us save the planet (2.33)	<i>Inma Ordóñez-Marvizón The Open University</i>	1
Why Gen Z digital natives do not care about cybersecurity. (2.34)	<i>Joanne Varughese University of Bath</i>	2
Facial Recognition: Friend or Foe (2.35)	Kelly Lam Manchester Metropolitan University	1
How Should We Categorise Hackers? (2.36)	Lyka Ada Rhodes Aberystwyth University	2
The 5 "Rings" of Tech Career Accessibility (2.37)	Maddy McMurray The Open University	1
Artificial intelligence and its role in almost every industry (2.38)	<i>Naima Mohamed London South Bank University</i>	2
The Metaverse: Beyond Gaming - Its Impact on Retail Business (2.39)	<i>Omolade Grace Salaam Manchester Metropolitan University</i>	1
Can Artificial Neural Networks Learn like Brains? (2.40)	Can Artificial Neural Networks Learn like Brains? (2.40)	2
All Hail The Screens (2.41)	Rachel Giffard Aston University	1

Being Neurodivergent & Pursuing a Career in Computer Science (2.42)	Saima Durrani London South Bank University	2
Navigating the Risks: Securing Artificial Intelligence in the Face of Cyber Threats (2.43)	<i>Saxon Partridge-Smith University of Wolverhampton</i>	1
Can Genetically Modified Crops Solve World Hunger? (2.44)	Seungmin Kim Manchester Metropolitan University	2
An Outline and Comparison of Different Tools for Introducing Programming Creatively. (2.45)	<i>Sofia Marijuan Carreno London South Bank University</i>	1

Third years - in workroom 05

Abstract title	Name and affiliation	Poster session
Sentiment-Driven Music Recommendation Based on Preferences of Multiple Users (3.46)	<i>Bianca-Cristina Sandu University of Warwick</i>	1
The rabbit hole of diversification in recommender systems (3.47)	<i>Chloe Gilmour The University of Edinburgh</i>	2
A consideration of the impact design has on user experience for a MERN application, exploring the use of eye tracking data to inform design choices. (3.48)	<i>Claire Storey Sheffield Hallam University</i>	1
Smart Hydroponics – a data visualisation case study (3.83)	<i>Cynthia Ikerionwu London South Bank University</i>	2
Pysgodyn Wibli Wobli – Can a Robot Do “wibbly wobbly” Like a Fish? A Look into Fish Robotics and its Ability to Mimic Fish Movement (3.49)	<i>Darya Koskeroglu Aberystwyth University</i>	1
Movie review sentiment analysis application using a hybrid approach with the Naïve Bayes Classifier and Vader (3.50)	<i>Davni Pithiya University of Greenwich</i>	2
Identifying cakes in a coffee shop using CNN networks and deep learning (3.51)	<i>Diana Alexandra Castillo Bareno London South bank University</i>	1
Biased AI: identifying and mitigating biased machine learning algorithms (3.52)	<i>Francesca Mirandola University of Stirling</i>	2
Meet RACED: The solution we need for road debris. (3.53)	<i>Hannah Laidlaw Aberystwyth University</i>	1
MOSAIC: Metaverse Geophysical Visualisation and Interaction (3.54)	<i>Hanyu Jin The University of Liverpool</i>	2
Digital Escape Rooms for Museum Engagement (3.55)	<i>Helen Harmer University of Bath</i>	1

An e-monitoring system for patients with Non-Communicable Diseases in rural areas (3.56)	<i>Heri Josiane University of Stirling</i>	2
The power of randomness (3.57)	<i>Inés Blanco Rivas University of Bath</i>	1
Is AI a teacher's best friend or worst enemy? (3.58)	<i>Iphrah Shahkeel Asif Manchester Metropolitan University</i>	2
Tappyography: Generating Tap Dance Choreography using Artificial Intelligence (3.59)	<i>Jasmine Brown University of Warwick</i>	1
Dementia at home – a smart approach to a growing problem (3.60)	<i>Jenny Thyer Aberystwyth University</i>	2
Beauty is in the AI of the Beholder (3.61)	<i>Karolina Kowalska Durham University</i>	1
Humans Vs Robots: The Robotic Goalkeeper (3.62)	<i>Lisa Petry University of Strathclyde</i>	2
Empowering underrepresented groups in society by mitigating data bias (3.63)	<i>Marzena Jagoda Brunel University</i>	1
Sowing Success: Enhancing Kenyan Agricultural Productivity and Resilience with IoT Sensors (3.64)	<i>Melanie Cope Manchester Metropolitan University</i>	2
Musical Key: A New and Improved Method for Music Genre Classification (3.65)	<i>Mia Borgese University of Warwick</i>	1
Tweet the Rich! Using Tweets to Predict Forex Market Movements (3.66)	<i>Natasha Coia University of York</i>	2
How can AR/VR be used effectively with young people (3.67)	<i>Nour Ghandour London South Bank University</i>	1
Facial Recognition To Record Student Attendance (3.68)	<i>Omamoke Efadue London South Bank University</i>	2
Design and Deployment of Swarm Dispersion Strategies for Indoor Robotic Applications (3.69)	<i>Omma Habiba London South Bank University</i>	1

Mastermind: How well can an RL agent play and win the game? (3.70)	<i>Pooja Leelodharry University of Bath</i>	2
Personal Memory Game (3.71)	<i>Reem Khider Canterbury Christ Church University</i>	1
How inclusive are Recommender Systems? (3.72)	<i>Roshni Vachhani Durham University</i>	2
Low Earth Orbit satellite tracking robot (3.73)	<i>Sheung Hei Camilla Tseh The University of Liverpool</i>	1
Quantitative Approaches and Constraint Satisfaction of Gene Regulatory Networks (3.74)	<i>Simran Aggarwal University of Warwick</i>	2
Can Antidepressant Side Effects Be Predicted Using Modern Technology? (3.75)	<i>Sophie Dillon The University of Sheffield</i>	1
Impact of User Experience Website Design Principles (3.76)	<i>Stephanie Gelder University of Stirling</i>	2
Modelling and Solving Real-World Problems using Temporal Graphs (3.77)	<i>Tala Eagling-Vose Durham University</i>	1
A secure system architecture for learning technology that supports the right to object to data collection in schools (3.78)	<i>Taurinta Nazarova The University of Winchester</i>	2
How emerging technology is improving inclusivity in the makeup industry (3.79)	<i>Tomilola Adedewe Manchester Metropolitan University</i>	1
AI idols and virtual influencers' effect on the music and entertainment industry (3.80)	<i>Wing Yung Miyuki Fung Lancaster University</i>	2
Indoor Localisation and Asset Tracking Using 5G Networks (3.82)	<i>Zoe Sweetman London South Bank University</i>	1

MSc - in workroom 04

Abstract title	Name and affiliation	Poster
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		session
An investigation into the use of universal authentication methods and whether they are benefiting or restricting the vulnerable community. (4.84)	<i>Aimee Robinson The University of Winchester</i>	1
Residue identity prediction from an amino acid residue's atomic-environment with equivariant graph machine learning (4.86)	<i>Antonia Boca University of Cambridge</i>	2
Mobile Messaging Phishing (4.87)	<i>Aqsa Sarwar University of Strathclyde, Glasgow</i>	1
Mind Games: Cognitive Bias in Cybersecurity Expert's Decision making (4.88)	<i>Arohi Naik Lancaster University</i>	2
“SMART DETECTION, SMARTER PREVENTION: The Power of AI in Credit Card Security Online” (4.89)	<i>Augusta Obidinnu University of Wolverhampton</i>	1
1, 2, 3 ... Can you detect my breathing? Use of Machine Learning to classify respiratory breathing types. (4.90)	<i>Elizabeth Aladejare Brunel University</i>	2
Cloud-Based Water Quality Monitoring System for Marine Hatchery Using IoT (4.91)	<i>Eva Chowdhury Middlesex University</i>	1
Visualizing personal finance management UX for users with ADHD (4.92)	<i>Farah Dianputri City, University of London</i>	2
Machines Can Only Be Fair When Humanity is Finally Equal: How Explainable Artificial Intelligence is Exposing Bias Within Artificial Intelligence Models. (4.93)	<i>Petra (Georgina) Lundy University of Strathclyde</i>	1
FamtamAI: a Fusion of AI-MoCap Technology in Augmenting the Human Motions (4.94)	<i>Gowthami Rasanayagam King's College London</i>	2
Predictive analysis of covid-19 pneumonia using deep learning and CT scans (4.95)	<i>Habibat Giwa Sheffield Hallam university</i>	1

Speaking in Tongues : Achieving Multilingual Multi-intent Detection for Dialogue Systems (4.96)	<i>Hrichika Nag The University of Edinburgh</i>	2
"This Body May Not Be Mine". Can Digitisation help prevent Stereotype induced dysphoria in kids? (4.97)	<i>Jane Ezumezu Sheffield Hallam University</i>	1
Automating Task Reports (4.98)	<i>Jasleen Kaur University of Stirling</i>	2
Barriers to a Career in Technology (4.99)	<i>Kiranjit Kaur Shergill University of Warwick</i>	1
Economic Freedom through the lenses of the Gender Wage Gap (4.100)	<i>Luisa Fernanda Estrada Plata University of Warwick</i>	2
Implementing Blockchain to Optimize Waste Management Cost (4.101)	<i>Megang Nkamga Junile Staures University of Stirling</i>	1
Reducing Mental Health Inequalities among the BAME Residents of Herefordshire & Worcestershire Communities (4.103)	<i>Oluwatimilehin Olabamiyo University of Wolverhampton</i>	2
DISCRIMIN”AI”TORY ROBOTS (4.104)	<i>Opemipo Mariam Otaiku Brunel University</i>	1
Tracking and Early Diagnostics of Endometriosis Empower HER (4.105)	<i>Radina Kraeva University of Strathclyde</i>	2
The New age of child's play. (4.106)	<i>Sarah Clowe Keele University</i>	1
Artificial Swarm Intelligence in space debris clearance (4.107)	<i>Srimoyee Ghosh University of Bath</i>	2
Impact of Artificial Intelligence on Legal Systems (4.108)	<i>Sweta Patra The University of Sheffield</i>	1
The Role of Artificial Intelligence in Enhancing Student Learning Experience in Higher Education Institutions. (4.109)	<i>Titilope Adewuyi University of Dundee</i>	2
Explainable AI for Cyber Security Applications (4.110)	<i>Ukamaka Nkechi Oragwu Brunel University</i>	1
Modeling Air Pollution and Source Inference (4.111)	<i>Zinia Tasnim The University of Sheffield</i>	2

Poster abstracts

First year or foundation year

How will AI prosthetics impact our future? (1.01)

Abby Newman *Aberystwyth University*

The number of amputees is rising, due to vascular diseases and an aging population. In the US alone, these numbers are predicted to double by 2050. This means that prosthetics are desperately needed, and that there is a higher demand for prosthetics of a certain calibre. AI prosthetics are promising to deliver the required capability. Prosthetics in medicine today require physical movement to function, which is not only physically taxing but difficult to grasp, because the movement isn't normal. AI prosthetics remove this need entirely, by making it possible for people to use brain waves to manoeuvre their false limbs. How do they work? Firstly, your brain signals the relevant peripheral nerve in the limb you want to move. A neural decoder implanted in the prosthetic detects this signal and moves based on the input, using machine learning algorithms. Although its primary use would be in the medical field, the brain's plasticity can support up to eight additional limbs. I wonder, could you see a future when humans walk around with four arms, and no one bats an eye? This poster will be discussing the advantages and disadvantages of AI prosthetics, as well as steps that some researchers have taken to make this development commonplace. These steps include a research study with an AI prosthetic hand and how academics have made an adaptive ankle using sensors and a microprocessor. I will also discuss what I believe will happen in the future to integrate AI prosthetics into society, including developing countries.

Technology in sports: Swimming (1.02)

Bucge Altunbek *Manchester Metropolitan University*

Swimming despite being an Olympic sport often overlooked by majority of the world. From its rules to type of technological advances used in this sport many does not know about it. Compared to one of the most popular sport, football where it is a known fact what type of technology is used in it as fans are eager to learn and know about VAR as recently witnessed during World Cup 2022. It might surprise some people how and where technology can be or is used in swimming. At the end of day, swimming is solo sport where individuals dive into the water, starts swimming and the finishes the race. You might think couple of cameras would do it. However, that would be very wrong to assume. Touch pad sensor is an electronic device placed in the pool, against to the wall and as simply put and as it can be understood from its name is a sensor to record the swimmers timing when a swimmer touches it. This simple yet crucial device is a step for improvement for some swimmer like me or a road to victory for some other swimmers like Olympians. Swimmers, compete for a difference of milliseconds. Where in our everyday life we would not even care about waiting in the queue for couple of seconds – in a swimmer’s world a millisecond determines the winner. Therefore, this poster will talk about the way the technology is used such as touch pads and its cruciality in swimming.

Making things more accessible---Reaching out to digital refugees. (1.03)

Chengai Piao *University of Bath*

With the development of modern technology, an increasing number of countries around the world are now trying to progress towards a digital lifestyle for all residents. In general, this is the future trend because it is an efficient way of saving labour and improving work efficiency most of the time. However, there are some people who are not able to comply with this development trend. They are caught up in this digital wave, becoming the "digital refugees" of the new era. "Digital refugees" refers to those who are unable to comprehend rapidly evolving products. The vast majority of them are senior citizens who distributed their youth to make it possible for the country to make those improvements but were left behind by the rapidly growing era. This has become a social problem. Social media with complex functions, booking websites with fancy but sophisticated pages, and mobile phones with rapid iteration are too overwhelming for people who have gotten older and whose learning ability declines due to physiological changes. As designers and developers, someone needs to pay attention to these groups at technical levels. This does not imply reversing the trend, but rather thinking more deeply during the design process, allowing them to follow a clear path in an otherwise complex and intertwined path. Scientific and technological progress is for human beings. People should not put the cart before the horse by eliminating some of us in order to adapt to development.

Deafblind people and the internet (1.04)

Daniela Large *Aberystwyth University*

The internet is a valuable resource- from education to entertainment to finance and business, it can make day to day life simpler. However, computers represent the internet visually using a screen and audibly using speakers. So, where does this leave people who can neither see nor hear? Certain technology exists that can convert text into braille and display it on a “screen” comprised of groups of 6 flat pins that can be raised to represent different braille characters. This is typically part of a braille keyboard which has, instead of a key representing each different character, 6 keys that represent each pin, and characters are comprised by pressing them in combination. Braille eBooks take this idea further and are comprised of screens made of wax with thousands of pins that each work as a pixel. Not only can these be used to represent braille characters, but they can also show maps, graphs and some even show pictures, allowing for a more complete online experience. However, braille is not the standard way in which most deafblind people communicate, in fact a 2015 study showed that only 7% of its blind and visually impaired participants use braille. Many deafblind people use tactile signing to communicate and thus rely heavily on interpreters. A robot hand, TATUM, has been developed and can use tactile ASL to communicate with people who are deafblind. This could make using a computer far easier for deafblind people. This poster will show different challenges that deafblind users face as well as the solutions that could be implemented.

Removing the barriers to studying/working in CS (1.05)

Deborah Assibey-Mensah *Middlesex University*

"I can't study CS because I am not good at math." "I am too scared to pursue a career in IT." "I am not good enough to work/study IT." "I am not good with technology." These are some of the phrases that I hear from female friends and peers about studying Computer Science or pursuing a career in IT. Being a female student in CS still feels like an exception, even though there have been many women that have led the way, e.g. Grace Hopper (1906-1992), the creator of computing techniques and tools such as the compiler, Megan Smith became the first woman to hold the position of chief technology officer in the United States (2014), the CEO of the free online design tool Canva Melanie Perkins and many more. In this poster, I will explore ways to remove some of these barriers, whether they are phrases that we just use to sabotage ourselves, or real barriers (e.g. lack of equipment).

The uses we give technology and how this impacts our society. (1.06)

Diana Alexandra Vargas Pelaez *University of Stirling*

Most of us make use technology on a daily basis, whether it's to stay in touch with our loved ones, for work or for educational purposes, etc. There's no doubt that these appliances make our lives easier in a certain way but with a moderate and conscious use of them. Younger generations are given access to these devices and the number keeps increasing, this is concerning because same as the internet has many benefits it can be dangerous. An example of this would be videogames, such as Roblox which has become quite popular between younger generations 67% of users are under the age of 16 and only 14% users are over 25 years old. In this game, your children run the risk of forming relationships with people they think are their age but who could be anyone out to harm them due to anonymity of chosen usernames that hide their true identities. Children are given tablets, computers, and phones as entertainment, earning the nickname "iPad kids." Children between the ages of 8 and 12 spend 4 to 6 hours a day watching or using screens and teens spend up to 9 hours or more. According to numerous studies, screen addiction causes issues with focus, vision, sleep, low tolerance for frustration, and, in certain cases, low self-esteem. I think we should encourage the younger generations to decrease their screen time by doing things to expand their knowledge and keep their minds occupied, for example: doing physical activities, reading books, or learning a new language.

Will AI ever completely replace human translators? (1.07)

Elizabeth Rigby *University of Bath*

To learn a new language, in addition to learning the vocabulary, it is essential to understand the grammatical rules. Because of the large number of exceptions, 'teaching' a machine a language in this way, which is known as a rule-based approach, is extremely complex. Instead, statistical machine translation algorithms were introduced, which relied on machines 'learning' the rules by analysing patterns in previously translated texts and applying these rules to new texts. Google Translate initially used this technique – in this case the language would first have to be translated into English and then into the target language. This approach was less effective if there were few existing translated texts between English and the given language or the sentences had completely different word orders. Google Translate currently uses a Neural Machine Translation approach. Now translating to English in an intermediary step is unnecessary and a whole sentence is translated before rearranging it into a natural order, rather than translating by word or by phrase, meaning the whole context is considered leading to a more accurate translation. Despite these developments, machine translation still struggles to pick up style and nuances. In creative work, language rules are often broken for effect, and machine translators have difficulty translating idioms, slang, humour and register. They may inaccurately translate words which do not have a direct translation. Machine translation is still not accurate enough in medicine, where high quality translation is essential to prevent confusion. Whilst human translators now use machine translators to help, proofreading is still vital. This poster explores in greater detail different machine translation techniques and discusses whether it will ever be possible to create high quality machine translations for all purposes without human involvement.

Will my Doctor become a Robot? (1.08)

Erin Watson *University of Stirling*

Artificial Intelligence (AI) has rapidly advanced the field of medicine and is changing the way healthcare is delivered. With its ability to process vast amounts of medical data, AI has the potential to revolutionize disease diagnosis, treatment, and prevention. By analysing medical images, genetic information, and electronic health records, AI algorithms can help healthcare professionals make more accurate diagnoses, predict patient outcomes, and develop personalized treatment plans. One of the major benefits of AI in medicine is its ability to improve the speed and accuracy of diagnoses. For example, AI algorithms can analyse medical images and identify patterns that would be difficult for a human to detect, leading to faster and more accurate diagnoses. Additionally, AI can assist healthcare professionals in making predictions about patient outcomes and identify patients who are at high risk for certain conditions, allowing for earlier intervention and improved patient outcomes. The advantages of AI in medicine continue in its ability to automate routine tasks and free up time for healthcare professionals to focus on more complex and important tasks. This allows healthcare professionals to focus on providing high-quality patient care and improving patient outcomes. Despite these advancements, it is important to consider the ethical implications of relying too heavily on AI in medicine. There are concerns about the accuracy and fairness of AI-generated diagnoses and treatment plans, as well as the possibility of bias in the algorithms used. Additionally, the use of AI in medicine may lead to job losses for healthcare professionals.

Could IoT Solve the Care Crisis? (1.09)

Genevieve Georgiades *Lancaster University*

It has long been known that social care provisions are often oversubscribed, inadequate, and ineffective. In the UK, over 900,000 people currently receive NHS home care and an estimated 6 million people provide unpaid home care. My poster will discuss possible applications of Internet of Things technology in maximising resources in the care sector, improving people's independence and wellbeing in their home, and reducing the negative impacts on friends and relatives who provide unpaid care. The use of sensors around the home can perform numerous tasks that would normally require the attendance of a carer. Sensors could automatically dispense medication, especially useful for people with reduced vision, motor function, or mental capacity. Heating can be adjusted automatically using data collected from sensors. Frequent in-person welfare checks could be replaced by monitoring of an individual's activity around their home. If they haven't opened the fridge or switched on the kettle for a period of time, a carer could be alerted to visit. Sensors could detect if someone has fallen or is having a medical emergency, and the IoT could unlock the front door for emergency services. As well as positives of IoT in home care, my poster will also assess possible negative implications. With an entire home controlled by IoT, potential security threats are paramount to consider. What about the environmental impacts of numerous sensors and the e-waste they create? Could IoT ever really replace the human interaction of face-to-face home care?

The Power of Neuromorphic Computing: A New Era in AI and Robotics

(1.10)

Gopika Yedlapalli *Brunel University*

“The Power of Neuromorphic Computing: A New Era in AI and Robotics” Neuromorphic computing is an innovative field of computer science that seeks to replicate the structure and function of the human brain in computing systems. This type of computing aims to overcome the limitations of traditional computing systems and provide a new approach to solving complex problems in areas such as robotics, image and speech recognition, and decision-making. In traditional computing systems, data is processed through a central processing unit (CPU) and stored in a separate memory unit. They require pre-programming and are limited by their algorithms. However, this architecture has limitations in terms of processing large and complex data sets. Neuromorphic computing, on the other hand, is modelled after the structure and function of the human brain. It consists of artificial neurons and synapses that communicate with each other in a way that is similar to biological neurons. Another unique aspect of neuromorphic computing is its ability to learn and adapt in real-time. Neuromorphic computing systems can learn and adjust their behaviour based on the data they receive. This ability to learn and adapt makes neuromorphic computing an ideal solution for a wide range of problems, including those that require complex decision-making and pattern recognition. One of the key advantages of neuromorphic computing is its efficiency. Neuromorphic systems are highly energy efficient, as they are designed to process information in real-time, without the need for large amounts of storage or data transfer. This makes them well suited for applications in areas such as robotics, autonomous systems, and edge computing. Another advantage of neuromorphic computing is its ability to process complex and diverse information in real-time, including visual, auditory, and sensory data. This makes it well suited for applications in fields such as computer vision, speech recognition, and natural language processing. However, despite its potential, neuromorphic computing is still in its infancy, and there are several challenges that need to be addressed before it can become a mainstream technology. These include the need for better hardware and software tools, more robust algorithms, and a deeper understanding of how the human brain works. In conclusion, neuromorphic computing represents a new and exciting field of computer science that has the potential to change the way we think about computing. By replicating the structure and function of the human brain in computing systems, neuromorphic computing aims to provide innovative solutions to complex real-world problems and overcome the limitations of traditional computing systems. It has the potential to power the next generation of AI and robotics systems.

Algorithmic Methods: Exploring the Nature of Consciousness and Sentience (1.11)

Haoyun Zhang *University of Birmingham*

The question of whether the human consciousness is algorithmic is a complex and controversial one. In 'The Emperor's New Mind', Roger Penrose explores the brain as a quantum-mechanical structure: he represents neuron-firing as an electronic computer construction, via logic gates, which suggests that systems of neurons are capable of simulating a universal Turing machine — or vice versa, should the number of transistors in computers match the number of brain neurons in the future. This sets the basis for non-intuitive modelling of biological sentience. On the other hand, Gödel's theorem asserts that there are limits to what can be proven using mathematical reasoning, indicating that even the supposed logical process of human judgement is not entirely formal. Nevertheless, research in fields such as cognitive science and machine learning continuously aim to emulate the optimisation of the human mind. Perhaps due to market demand for big data, the most pre-eminent turning points of artificial intelligence (AI) in recent years are those that make use of deep learning: neural networks made up of multiple layers of interconnected nodes. For example, artificially generated art often draws from generative models that learn the underlying structure of the training dataset and create new images similar to those in it. The inauguration of the open source ChatGPT also saw a new milestone in natural language processing. Yet, the ethical complications of these innovations and attendant challenge to our orthodox understanding of consciousness inevitably evoke apprehension, which prompts the inquiry: could computers ever be conscious?

Social Media: Integration or segregation of society? (1.12)

Jivanthika Venkatakrishnan *The University of Sheffield*

On February 4th 2004, an app that would forever change societal interactions was launched. Facebook's purpose was to allow users to connect with people across the world and have a platform to share their lives and thoughts. As people with like-minded views connected, this type of interaction encouraged individuals to neglect a more inclusive, diversified community with different opinions. These incidents led to increased isolation of users whose opinions contrasted. Society progresses when we are constantly challenged to reflect on our views and opinions. However, through social media, the intention of meeting people with contrasting views can be ignored and can create a polarising effect on people's mindset. Through the rapid growth of social media, there has been a growing trend where the definitions of free speech and hate speech are blurred. A vital event where this is evidenced was the removal and reinstatement of former president Donald Trump from Twitter. The standards set by the two owners of the platform differed; rendering opportunities to create requirements that address how a violation of boundaries can be defined. The potential of using algorithms to ensure this could be fruitful and therefore eliminating human bias. Where must the line be drawn when expressing an opinion that does not agree with someone else's is condemnable? This poster will aim to discuss the possible solutions using artificial intelligence algorithms that can monitor the online environment.

“Not a victimless crime”: Emerging technologies in the fight against online child exploitation (1.13)

Joanna Jeevaruban *Aberystwyth University*

There is no doubt that child exploitation happens online, but with the scale of some of the more popular social media platforms, and with grooming-related crimes alone rising by 80% in the past 4 years, what is actively taking place to combat online child exploitation? Child exploitation is often dealt with retrospectively, with the significance of preventative measures in reducing online child exploitation being undeniable, but will it ever be enough? The poster discusses different forms of online child exploitation including the use of end-to-end encryption to transfer explicit images of minors, the documentation and non-consensual sharing of children's lives for financial or personal gain, grooming of minors in anonymized chatrooms and the increase of harmful content created for and consumed by children. Several academics have proposed different methods of combatting online child exploitation, such as the online safety bill and regulation of social media sites. Some believe that it is impossible to regulate the internet, but individual social media platforms could be more responsible and take accountability for the content and exchanges they permit on their sites. A term of service or vague policy will not fix this problem, real consequences and preventative measures will help reduce it, such as GCHQ developing an AI to analyze chatrooms for evidence of grooming or informative applications being developed to teach children about internet safety, such as Tilli, or Talk2U which is a chat bot that informs users on strategies and general information on online safety.

Have you thought about the ethical implications of what you're doing? (1.14)

Kirsty Mellon *The Open University*

Barbara Grosz, a computer science professor at Harvard University, once imagined a world where each time a computer scientist began to write code, a message would appear on their screen asking, "Have you thought about the ethical implications of what you're doing?" Why is this the question Grosz's pop up would ask every computer scientist? Computers and technology are integrated into every area of modern society, and the decisions that computer scientists make can have far reaching consequences. There are many ethical implications: for the environment; on our privacy; of machine bias etc. Look to the various ways in which Facebook has impacted elections around the globe for an example of the complex cascading effects that can occur due to decisions made in development processes. In order to create technology which is of the greatest good to individuals, societies, and the environment; it is the responsibility of everyone involved to apply ethical consideration to their decision making. I will outline benefits of integrating ethics into computing, as well as exploring design fiction as a method for doing so. Design fiction is a speculative design which uses fictional media as it's source material. This fictional world is used as the information to explore a possible future; in these futures we can project forward, considering ethical decisions and their implications. I present this as a creative means to identify the ethical issues present in future technology; as well as developing discussions around emerging ethical issues in the wider field of computing.

Could social media data be the future of mental health? (1.15)

Leah Whiston *Aston University*

Gen Z have grown up with social media and phones, information, influence and entertainment on tap. But can we predict mental health decline and more importantly, can this aid prevention? Research is emerging on the use of linguistic analysis to predict mental health issues. Analysing this data can provide insight to health care providers to potentially target "ads" to sufferers of mental health issues, encouraging them to get help and pushing resources. Analysis of data to build targeted algorithms is a double edged sword, social media often shows you what you want to see. The link between social media and poor mental health can be devastating, from cyber bullying to body image issues - algorithms and advertisements will promote what they think you want to see, this could be weight loss apps and medication or upsetting/graphic content. Even if social media sites try and limit this, these videos and posts will still circulate somehow. If algorithms are already negatively affecting our mental health, by showing us media we interact with, regardless of the type, using it to have a positive impact on social media users' mental wellbeing could help outweigh the negative impact. A study done between October 2020 and July 2021 showed promising results of targeted ads to support youth mental health, aimed at youth and their caregivers, this study also expresses the gap in positive advertising which benefits mental health [1]. <https://tinyurl.com/4t4e9dps>

Will artificial intelligence remove the need for web developers? (1.16)

Lucky Hussein Muse *Aston University*

One of the biggest questions that many working in the modern world of technology have is whether or not their position will be automated using Artificial Intelligence (AI). Recent studies carried out in the USA indicated that a significant percentage of people in technological based roles, believed that their employability prospects and job security will significantly decrease over the next few years, as result of the rapid development of AI. This fear might be stemming from the fact that Artificial Intelligence has shown on multiple occasions that it is able to outperform human capabilities. Whether the measurement being used is voice recognition or the imitation of art, AI has outperformed the opposing human. However this might not be the case for the application of AI in web development. This poster will examine how AI operates differently to the human brain and how it has been developed to imitate the behaviour of humans. The poster will highlight the key advantages and limitations that both human and artificial intelligence have in web development. Further exploring how AI should in fact be used in conjunction with human intelligence, and why this will maximise efficiency. Finally concluding with predictions of what the future of web development could entail as technology continues to advance further.

Escaping Uncanny Valley: Can Artificial Agents Truly Imitate Humans? (1.17)

Lydia Webber *University of Bath*

In 1950, Alan Turing proposed a hypothesis of how to test a machine's ability to exhibit intelligent behaviour equivalent to that of a human. The Turing Test - originally named the Imitation Game - requires a machine to engage in a text-based conversation with a human without being detected as a computer to pass. Although this was a defining idea in the development of AI, we are now trying to make autonomous agents mimic not only human behaviour, but human appearance, movements, and speech. Whether it is grandiose developments such as robots being deployed in the hospitality sector to compensate for the increasing aging population in Japan or small-scale as seen in entertainment where human game characters navigate and emote realistically, adding to the player's immersion; such advancements are innovative and provoke the possibility that agents may be able to completely imitate humans. What is the "uncanny valley"? Coined by Masahiro Mori, it is the descent into eeriness as a robot appears to be lifelike yet has some off-putting features making us aware that it is not human. More specifically, he observed that robots become increasingly appealing as they become more human-like until it reaches a dip, where our affinity descends into a feeling of strangeness - a sense of unease. However, can this "valley" be overcome; if artificial agents become even more humanoid, will they delve deeper into the uncanny valley or can they escape and thus become indistinguishable from humans? This poster explores this question, examining the psychology behind this 40 year old concept, whether it is outdated due to the advances in technology or has it become even more relevant today, what current breakthroughs are being made in the fields of CGI, AI and robotics and questioning whether a machine could ever pass a modified Turing Test examining physicality and speech, or if the human brain will always allow us to distinguish a difference.

Artificial Intelligence and Quantum Computing – a perfect match? (1.18)

Madison Lardner *Lancaster University*

Artificial Intelligence (AI) is the ability of computer systems to emulate human intelligence. The last decade has seen significant progress in development and implementation of AI systems, but we are only just scratching the surface of the potential for the use of AI. Currently, we use AI computer systems to perform functional tasks normally requiring human intelligence, such as speech and face recognition and rudimentary decision-making. The next stage for AI is to develop systems with more cognitive capabilities, and ultimately get to a state where computer systems will be able to tackle an increased number of complex problems through the processing and analysis of extremely large data sets. Despite the exponential growth in AI, it is limited to the capabilities of classical computing, which may lead to the plateauing of its development. Thus, combining Quantum Computing (QC) with AI will provide a greater computational improvement. QC takes advantage of the ability of subatomic particles, to exist in more than one state simultaneously. However, in classical computing this is limited to two (binary) states. Quantum computers, using the principles of superposition and entanglement, can manage huge amounts of data and can uncover patterns and spot anomalies extremely quickly, which would take years using classical computing. There are still significant challenges with QC, specifically with the hardware and environmental requirements, but given the impact QC could have on AI, Quantum Computing Artificial Intelligence(QCAI) must be the way forward. This poster will explore the challenges and opportunities of QCAI.

What Are The Reasons For The Gender Balance In STEM And Should We Fix It? (1.19)

May Metwaly London *South Bank University*

This poster is going to explore the gender imbalance with STEM/Engineering uptake. Engineering, as we all know, is the backbone of technology, and we all know how strongly technology and engineering are connected, and how they both drive our world. Gender roles have taken root between men and women, and these roles influence the workplace and at home. There are, however, several drawbacks to both. In this project I will be discussing the reasons for the gender balance to take place, and how we should fix it. Women and ethnic minorities must be included as active participants in the scientific enterprise. Why fewer women choose to study engineering subjects and pursue a career in this field? What are the barriers and how can they be addressed. Why is this issue even bigger within ethnic monoritised groups? This paper takes the form of a review and will present the arguments for and against lack of gender balance. We are constantly bombarded with information about what it means to be a woman or a man. This information is twisted into the stories told by the media, it is continued with positive and negative reinforcements, and it is solidified through our interactions with others. This poster will provide some practical guidelines on how we can address the gender gap and create workplaces where both genders have equal chance to thrive.

Qubits for climate change! - How quantum computing can better the climate crisis (1.20)

Molly Howkins-Griffiths *Lancaster University*

Climate change is an ever-growing worldwide issue, that not only affects future generations but our current day to day lives. From the spread of wildfires, increasing global temperatures, and the contamination of environment around us- air, oceans, and the land we live upon- we as the human race are destroying the planet. Whilst there is progress in reversing and repairing the damage we have caused; Richard Feynman's ideas and his use of quantum computers could be key in fully restoring the earth to its former glory. Where even supercomputers fall short, quantum computers use of Qubits allows for a greater number of configurations, therefore allowing more complex simulations as well as taking advantage of the 'tunnelling effect' where regular computers cannot. The application of qubits and quantum computers is used across many fields of industry, but most importantly in the fight against climate change. Quantum modelling, for example, facilitates the ability for simulations based in fluid-dynamics for weather and climate modelling allowing us to fully understand biogeochemical cycles and the impact of specific harmful chemicals within them such as CFCs, as well as improving designs for new resources such and wind or solar farms. Furthermore, the optimisation of quantum computers could help to develop and derive new sources of energy, as well as new ways to improve strategies for climate mitigation such as carbon capture technologies. This poster will expand on the benefits of quantum computing, and specifically the use of qubits, in combatting of the climate crisis for a better planet and future.

The future of Gesture-Controlled User Interfaces (1.21)

Omosunmisola Lawal *University of Bath*

Gesture-Controlled User Interfaces refer to interfaces in which hand gestures are represented as inputs. It is already used in modern technology with the use of touch screen technology and gestures including shipping, pinching, scrolling and tapping. The first touch screen technology was invented in 1965 at the Royal Radar Establishment (RRE) in Malvern England and was then integrated into smartphones first in 1992 with the IBM Simon and then was popularised in the mid-late 2000s. In just 40 years the way we use gesture-controlled user interfaces has changed and advanced so much. I will be exploring how gesture-controlled interfaces may be used in the future and their advantages to our everyday life both in the present and future. Additionally, I will be making a gesture-controlled Bluetooth-powered speaker compatible with a smartphone using Arduino Uno micro-controller technology. You will be able to hand swipe in order to change songs or turn on the speaker and raise and lower your hands to adjust the volume. This project will show a glimpse of the different ways gesture-controlled user interfaces are used both in the present and potential future.

Is advancing technology making aiding humans more or creating more issues? (1.22)

Osaze Ighodaro *Aston University*

As technology has been advancing, it has brought multiple solutions, ease to everyday life and allowing people to have the power to deal with disabilities. Innovative technology like Alphabet's Wing's food delivery can allow others to gain food and light deliveries from a window instead of leaving a room. This remarkable technology allows people with different mobility issues, from straining themselves to leave even their rooms if it is inconvenient. However, this technology can possibly cause able people to move less. CDC (Centres for Disease Control and prevention) recommends 30 minutes a day of walking but a poll demonstrates that adults walk less than 15 minutes a day on average and with this technology, physical activity would be reduced. One major argument for technology creating issues is automation and the progression of automation in transportation in particular. With the constant strikes occurring, automation of trains are becoming a pressing problem for the UK government. Automation of trains will prevent delays and the disruptions currently occurring within London. However, automation will cause all the current drivers to be jobless, unless an alternative job would be given instead. In conclusion, technology has both advantages and disadvantages when it comes to accessibility and employment. This poster will explore the current and future issues of innovating technology, exploring these areas.

Can AI help more students to AI-m for greatness? (1.23)

Polina Markova *Lancaster University*

Education is undoubtedly one of the pillars of modern society, so its quality matters. Unfortunately, overcrowded classrooms are still a widespread reality: in 2019, the pupil-teacher ratio in UK nursery schools jumped to 22.9 - a number high enough to put a strain on the teachers. AI technologies are nowhere close to taking on the essential and complex job of a teacher due to their lack of understanding of social cues. However, they could be introduced to classrooms as teaching assistants, helping to increase interactivity. In Finland, while unable to carry out vital teacher tasks such as maintaining discipline or solving disputes, the robots trialled in mathematics and language classes performed successfully as teaching aids. The adorable visual design combined with advanced AI systems and extensive access to data creates an effective learning tool, which can be used by teachers to increase student engagement in the lessons. Such robots can easily be programmed to be fluent in multiple languages, and since they possess the virtue of endless patience, they could be perfect for helping out struggling students. Public AI-powered online learning platforms could help bridge the education inequality gap; students could get personalised support without the need for an expensive tutor. The poster aims to explore and evaluate the existing cases of classroom robots across the globe and discuss whether increased reliance on AI in education would be viable and effective in the near future.

Waste isn't Waste until we Waste it: An examination of the Agbogbloshie e-waste landfill site and its potential future. (1.24)

Rose Howie *University of Glasgow*

We often don't think about where our waste ends up - the same goes for our old computer hardware. The Agbogbloshie landfill site in Accra, Ghana is one of the biggest destinations in the world for used electronic goods, importing millions of tonnes of e-waste each year for its nearly 10,000 workers to wade through. Spread across 20 acres, workers search for lead, mercury, cadmium, gold and copper to resell. The main method used to extract these valuable materials is burning the plastic sheathing that encases them - resulting in plumes of dark, toxic smoke. This hazardous working environment means workers and inhabitants of the adjoining slum endure ailments such as infected wounds, burns and headaches daily as well as more serious, long term health effects. There is also a severe ecological cost to the surrounding environment. Additionally, this site sees criminal activity whereby data on hard drives is exploited for nefarious purposes. However, there are some positives which have emerged as a result of the landfill site - although extremely informal, there is a system in place whereby a limited amount of reusing and recycling occurs: certain electronic items that can be repaired are bought and sold at Accra's second-hand electronics market. The repair shops allow for locals to learn skills they would not otherwise have had access to as well as giving buyers of the repaired goods the opportunity for technological fluency. Computer training centres are also abundant in the city. Many think Agbogbloshie should be closed down, but others see that as a *waste* of potential. This poster aims to explore the e-waste site as a destination for old computer hardware and the full effects it brings to the surrounding area.

Cyber Forensics (1.25)

Tharuni Chandra Srilaya Eadara Venkata *Brunel University*

Cyber Forensics Advancement in technology has made a drastic impact on society. At this point, the world works with the aid of technology. This has not only been an advantage for society but also brought in a lot more cons. The increased number of users has led to a superfluity of cybercrime. In order to overcome such risks, cyber forensics focuses on shreds of evidence found online, including instant chats, emails, and other computer-related communications. Cyber forensics is the discipline of preserving, identifying, extracting, and documenting digital evidence for use in legal proceedings to support criminal investigations. To guarantee that original evidence is unaltered, all probative information is recovered and no data are added to or removed from the original collection. The techniques utilised must be technologically resilient. A cyber forensic expert is capable of retrieving lost data and accidentally deleted files. This position examines digital evidence and looks into computer security occurrences in order to gather knowledge that may be used to mitigate system and network vulnerabilities (“Cyber Defense Forensics Analyst | CISA”). All tools used are to work for the need. This is a crucial area of technology since crime has sharply expanded in the modern world. To combat cybercrimes against the innocent, a cyber forensics team works effectively to seize the guilty who get involved in disruption, interception, infringement of third-party rights, and falsification. In a nutshell, the goal of cyber forensics is to combat cyber breaches and defend society from those who abuse technology. The problem is that commercial intrusion analysis technologies can't deal with today's networked, dispersed settings. However, this will be studied in the future and more effective tools will be created or outfitted. References o “Cyber Forensics: Part One | Office of Justice Programs.” www.ojp.gov, www.ojp.gov/ncjrs/virtual-library/abstracts/cyber-forensics-part-one. Accessed 27 Jan. 2023. o Wikipedia Contributors. “Computer Forensics.” Wikipedia, Wikimedia Foundation, 30 Apr. 2019, en.wikipedia.org/wiki/Computer_forensics. Accessed 27 Jan. 2023. o “Cyber Defense Forensics Analyst | CISA.” www.cisa.gov, www.cisa.gov/cyber-defense-forensics-analyst#:~:text=This%20role%20analyzes%20digital%20evidence.

Are Smartphones physically healthy for us? (1.26)

Tung Jasmine Kam *Aberystwyth University*

We all know smartphones are a part of modern-day technology. Most people, if not everyone has one. Every day we use it, whether it's for alarms, scheduling events or just socialising with friends. Phones catch us up on the latest trends and news. We use it so much in fact that it has been engrained within our daily routines with people having an average of nearly 7 hours of screen time per day on a global scale. With someone sending a message, sites having new items or even the weather getting updates; there's no denying that these general notifications make it hard for people to just dismiss their phone. Despite having positive reinforcements such as fitness apps, phones impact our bodies far more than we think; from retinas damaged by blue light exposure or poor posture affecting the growth of our back muscles' strength. It would only be a matter of time before they affect us permanently. So, are smartphones physically healthy for us? At the rate it's going, the human body's physical development will change, especially with countries implementing systems that promote the usage of smartphones. However, these devices also shine a light on improving physical activities such as tracking steps, notifying us of medication consumption timings and motivating us to take that extra step to become a better person than yesterday. This tight yet freeing grip they have hold of in our lives can only make us think, can the benefits and drawbacks of having one be balanced? 1 / 1

We all know smartphones are a part of modern-day technology. Most people, if not everyone has one. Every day we use it, whether it be for alarms, scheduling events or just socialising with friends. It catches us up on the latest trends and news. We use it so much in fact that it has been engrained within our daily routines, averaging nearly 7 hours of screentime per day on a global scale. With someone sending a message, sites having new items or even the weather getting updates; there's no denying that these general notifications make it hard for people to just dismiss their phone. Despite having positive reinforcements such as fitness apps, phones impact our bodies far more than we think. From retinas damaged by blue light exposure or poor posture affecting the growth of our back muscles' strength. It would only be a matter of time before they affect us permanently. So, are smartphones physically healthy for us? At the rate it's going, the human body's physical development will change, especially with countries implementing systems that promote the usage of smartphones. However, these devices also shine light on the improvement of physical activities such as tracking steps, notifying us of medication consumption timings and motivating us to take that extra step to becoming a better person than yesterday. This tight yet freeing grip they have hold of in our lives can only make us think, can the benefits and drawbacks of having one be balanced?

Second year (or third year for 4- year BSc courses)

AI Generated Artwork and the Future of the Artist (2.27)

Alexandra Cooper *Aberystwyth University*

AI systems are ubiquitous, and their use continues to evolve. Recently AI artwork generation tools have become available to the public. These tools are, to some, an exciting leap forward in AI research and, to others, of grave concern. AI art is often made by training models on datasets. Some of these datasets appear to have been compiled by academics under a non-commercial license using copyrighted images, but these datasets can and often are reused by companies to train models which will likely be used in commercial products. Sometimes these companies even fund the initial academic research. A court may find the initial gathering of data to be acceptable since it is non-profit, but then the future commercialization of that research is a free for all which some describe as “data laundering”. Furthermore, not all AI art generation comes with a content filter which makes it possible to generate pornographic and violent images of real people. The datasets themselves can contain inappropriate imagery as well as scraping from art portfolio websites. It is possible to query some image generators to “make ‘x’ in the style of artist ‘y’” which can cause impersonation. Additionally, there is always the fear that artists will lose their jobs due to it being cheaper to generate the images, perhaps even ‘in their style’. Some artists think there is a future where human and AI artist can co-exist, but many artists agree that more needs to be done to protect their work.

Capturing motion under the waves (2.28)

Boo (Bethany) Smith *Lancaster University*

For years we have been rapidly advancing technologically in the film industry, specifically the use of simulation to create the illusion of any reality. However, it has only been in recent years that we have begun to capture that imitated realism under water. With the size and popularity of animated and live-action films with Computer-generated imagery (CGI) increasing constantly, especially since the lockdowns of covid-19, the industry is rapidly evolving. In recent years the focus has shifted to the expansive capabilities of motion capture, the ability to create computer generated characters whilst using an actor as a focus. This means that the generated characters can retain realistic movements and detailed facial expressions as they are taken from the real world. The development of “mocap” technology has changed the way film is produced and is predicted to continue to do so with the motion capture industry expecting to be a \$266 million industry by 2025 according to global market forecasts. Motion capture in conjunction with the development of AI and quantum computing presents a vast array of new possibilities. The recently released Avatar film, *Avatar: The Way of Water*, presents the latest breakthrough in the world of motion capture – addressing the problem of using motion capture underwater. Before now this was an impossible venture but with the use of the right equipment and software has been proven to be possible. This poster will explore how avatar achieved underwater motion capture and what the future might hold for this technology.

Linear B: How cryptanalysis helped unravel the secrets of an ancient civilisation (2.29)

Daisy Eilbeck *Lancaster University*

The advancements of cryptanalysis have contributed greatly to the decipherments of ancient texts, and by extension our knowledge of ancient history. Although ancient languages differ from ciphers in that there was no deliberate attempt to hide the meaning of the text, the same principles of cryptanalysis can be applied, and many a codebreaker has taken on the challenge of decoding an ancient, unknown language. One of the most impressive decipherments is that of Linear B, an ancient Minoan script dating from 1450 to 1375 BC on the island of Crete. Clay tablets bearing the script were first discovered in the early 1900s, by British archaeologist Sir Arthur Evans in Knossos. Evans was unable to decipher the script before he died in 1941, so the task therefore fell to Alice Kober, Michael Ventris and John Chadwick, who used cryptanalysis techniques such as frequency analysis to finally crack the code of Linear B. Deciphering Linear B radically changed our understanding of this ancient civilisation – it was eventually discovered to be a written form of ancient Greek, not a language native to the Minoans, showing that the Greeks had at some point invaded the Minoans and imposed their language upon them. My poster will explain how cryptanalysis has helped us with the decipherment of ancient scripts and our understanding of the ancient world, with a focus on Linear B as perhaps the most impressive of all archaeological decipherments, describing in detail how the script was eventually decoded.

Developers vs. The Really Good Gaming Chair: Can cheaters in video games ever truly be stopped? (2.30)

Ellie Farrar *Lancaster University*

Cheating in video games can take many forms in both single player and multiplayer games. Some cheats are purposeful, such as cheat codes implemented to make development more efficient. An iconic example of this being the Konami Code (“up, up, down, down, left, right, left, right, B, A”), which was added by Hashimoto during his work porting the arcade version of Gradius to the Nintendo Entertainment System. The code gave the player a full set of power-ups, and was intended to be removed before publishing. Ultimately it wasn’t, and the Konami Code is now used in multiple well-known titles (sometimes modified slightly), both for a similar purpose as the original and for adding “Easter eggs” to the game. Third party cheats arose at a similar time as cheat codes, beginning with modifying loaded game memory before launching using POKE statements on 8-bit computers. Nowadays cheats are becoming increasingly intensive, as are the software designed to detect them. An increasingly common type of anti-cheat is the kernel level anti-cheat, a popular example being Epic Games’ Easyanticheat, which is used by roughly 137 titles, many of which are not owned by Epic Games. These anti-cheats work at the lowest level, and could leave the user vulnerable to cyber attacks. This poster aims to discuss the controversy surrounding the use of kernel level anti-cheats and how they work, as well as consider whether cheating in video games can ever become– if not eradicated– a “once in a blue moon” occurrence.

ChatGPT: Plagiarism's Worst Nightmare (2.31)

Georgina Parker *The University of Sheffield*

In the world of large language models, ChatGPT is an industry leader. Created by OpenAI, ChatGPT is a free and accessible program that generates text in response to user prompts. Whilst for many it functions as a novelty chatbot, to others it poses a credible threat to academic integrity. Detecting content generated by AI is challenging. While new methods are constantly being innovated, there has yet to be a stable and reliable approach. OpenAI have been proactive in releasing a tool to detect work generated by ChatGPT, but have admitted the tool is imperfect. Though OpenAI has discouraged the use of the tool as a sole method of plagiarism detection, it is still valuable in educating the public on the capabilities and limitations of AI. OpenAI is one of many companies currently laying the groundwork for detecting AI generated content, however many of these methods are incomplete or perform poorly on shorter generated texts. Despite these limitations, there is a significant drive to improve current methods of recognising artificially generated content. This poster will explore a selection of existing approaches to detecting AI generated content. It will also consider whether current definitions of plagiarism need to be redefined in the context of artificial intelligence and large language models.

‘Plenty there that needs to be done’ – On How to Get Girls Into Computing (2.32)

Haleena Hussain *University of Wolverhampton*

The title quote by Alan Turing is concerning the ‘challenge of developing machines that think’ in the year 1950– however it is also applicable to the challenge of getting more girls into computing presently. In fact, according to recent statistics in the UK, there are six times more boys than girls in computer science classes, and in computer science degrees male students outnumber female ones by 4.2 to one. While only three per cent of women decide on tech careers as a first choice, and women make up only twenty-six per cent of the tech workforce. While there are organisations that seek to increase the number of girls, and women, in computing – Girls Who Code, InnovateHer, etc. – more must be done. This can be begun by questioning why there is such a gender gap in computing, and what these organisations are missing. This poster will discuss ideas such as; why girls tend to lose interest in STEM subjects, how the work that is already being done can be improved and why women are more likely to leave the computer industry. Most crucially, how can we reduce the gender gap in computing? After all, to quote the late, great bell hooks ‘the classroom is the radical space of possibility’.

How computers will help us save the planet (2.33)

Inma Ordóñez-Marvizón *The Open University*

We are living through a global biodiversity crisis, unprecedented in human history both in its scale and anthropic origin. According to the latest IPBES Report on Biodiversity and Ecosystem Services, around one million species are at risk of extinction as a result of human activity. Despite this situation, there is currently a data gap on biodiversity and ecosystem services status and trends at a temporal or spatial scale that is sufficient to support sound decision-making. The role that technologies can play in assisting humans in the monitoring and conservation of biodiversity will be increasingly relevant. We will explore those technologies that already exist and those which are being tested for the capture, processing, storage, transmission and interpretation of data on biotic systems and their trends in time and space. We will analyse current technical limitations for the application of these technologies — mainly related to the management and storage of large amounts of data and the actual degree of autonomy of sampling and tracking devices. We will focus on the potential of AI- and machine-learning-based approaches, and the solutions that Computer Science can bring to improve biodiversity knowledge and conservation at a time when accurate and fine-grained information is needed more than ever. Finally, we will explore the commercial possibilities of automated biodiversity monitoring solutions in a post-2020 era, where the Global Biodiversity Framework that was recently agreed by the Convention on Biological Diversity will likely promote mandatory disclosure of impacts on biodiversity for large companies.

Why Gen Z digital natives do not care about cybersecurity. (2.34)

Joanne Varughese *University of Bath*

Parents teach their children how to keep themselves safe outside as they grow up. Children are taught these essential skills to protect themselves in the physical world, whether it be “stranger danger” or looking both ways before crossing a road. However, what about the online world, with numerous platforms where you interact with accounts rather than people, most of whom are strangers? Various published research and reports show that contrary to popular belief, older generations like Gen X and Baby Boomers have a more secure online presence than younger ones like Gen Z. This poster presents an important topic as Gen Z is either in or will soon be joining the workforce. Over time and due to recent circumstances, the workforce has become increasingly integrated with technology. Suppose Gen Z cannot see the purpose of cybersecurity in their personal lives; this has the potential for adverse outcomes for businesses as cybercrime continues to run rampant in both private and public job sectors. Understanding why and the barriers towards engaging in more cybersecure behaviour can be vital in developing more personalised initiatives that promote cybersecurity in their personal and work lives. This poster looks at the different attitudes and behaviours Gen Z hold towards cybersecurity. Do they believe they are adequately protecting themselves online? Do their behaviours reflect their beliefs?

Facial Recognition: Friend or Foe (2.35)

Kelly Lam *Manchester Metropolitan University*

Facial recognition is a prevailing technology that has been used to analyse a persons' facial feature for personal identification. First established in the 1960s, the technology have advanced to become more powerful than ever. In London, Live Facial Recognition is commonly used to scan the public, where it can be compared to the Polices' 'watchlist'. Numerous criminals have been caught because of the technology in the UK. This tool is also used in the US to prevent passport impersonation. Facial recognition technology is used in the hospitality industry e.g. The Marriott Hotel, to ensure check in is more efficient. Although proven useful, facial recognition comes with its unique set of challenges. Earlier in 2022, in China, a database containing millions of high-resolution images of peoples' faces were leaked on the internet. This database was intended to develop China into a Smart City through monitoring the public to help fight crime. However, is it morally correct to store data belonging to law abiding citizens indiscriminately? The main controversy of the use of facial recognition in the UK stems from the infamous case at Notting Hill Carnival 2018, where the Met Police were protested using the surveillance to monitor suspected troublemakers. Attendees accused the Police of being 'institutionally racist' as it's known to be the African-Caribbean Festival. In our presentation, we will take a deeper dive into the potential and challenges of facial recognition technology.

How Should We Categorise Hackers? (2.36)

Lyka Ada Rhodes *Aberystwyth University*

The goal of the poster is to compare how hackers are categorised from a Computer Science perspective with a humanities approach. A cyber/techno crime is a criminal act involving the use of computers and the internet. The computer misuse act defines the act of hacking in the UK as 'Unauthorised access to computer material'. Computer scientists have traditionally categorised hackers by 'hats'. The colour of a hacker's hat indicates their motive and methodology. Black Hats are typically malicious and/or criminals, while White Hats are legal or permitted, often employed to do penetrations testing. Grey Hat hacking is in between white and black, this mean it's usually illegal but not malicious. Hacker Hats have racial connotations, as the terminology uses 'black' as a metaphor for criminality, while White Hat acts are considered permissible and perhaps even noble. A state sponsored hacker(s) are given resources or legal protection by a government. Hacker's hat don't account for these groups as they can exist on a spectrum from hacker that are purposely not investigated to hacker that are direct government employees. There is plenty of current research into hackers from the fields of Psychology, Sociology and Criminology. For example looking at the type of person who is likely to become a malicious hacker. Perhaps redefining the terminology used to describe hacking by taking a more holistic approach to defining these terms would help us understand the socio-psychological factors involved in creating a hacker.

The 5 "Rings" of Tech Career Accessibility (2.37)

Maddy McMurray *The Open University*

Starting a career in the world of tech can be tough, and there can be additional accessibility hurdles that can make it even tougher. Removing these barriers would make for a more diverse workforce, and ultimately, more diverse tech products. But how can we address these issues? Like Gaia and Captain Planet did for their planeters, we can break accessibility issues into 5 categories: social, financial, disability, education and digital inequality. Social accessibility is making sure resources, such as social media or published materials, are available to everyone, regardless of social status or ability. It also involves addressing barriers such as cultural and gender expectations. Financial accessibility involves removing financial barriers to training and resources, including providing support for retraining. Disability accessibility ensures that everyone has the same level of access, regardless of ability or accessibility requirements. Education accessibility involves bridging the education gap between school, university and the professional world. This also involves assisting the “forgotten market”: those who have not gone into further education and have instead taken a different route, such as boot camps or self-led training. Finally, addressing digital inequality is ensuring that everyone has access and training to use the technology they need in order to achieve their tech dreams. Each category of tech accessibility relies on the others, and cannot purely be solved on its own. For example, addressing financial inequality will help solve digital inequality issues. Only by working together can tech become a more accessible place, after all, “the power is yours”!

Artificial intelligence and its role in almost every industry (2.38)

Naima Mohamed *London South Bank University*

Artificial intelligence is a topic that, in its most basic form, combines computer science and substantial datasets to facilitate problem-solving. Additionally, it includes the branches of artificial intelligence known as deep learning and machine learning, which are commonly addressed together. Today, artificial intelligence is making an impact in every industry from medicine to entertainment. These industries now utilise the tools and techniques from artificial intelligence to better their research and products. For example, the medical field has benefitted from AI since it required assistance with a data reading, scheduling and other aspects to improve the patient care experience. Additionally, AI techniques are now being implemented in medical research to advance the clinical trials for vaccinations further. Although there is a positive impact of AI, people seem to question the ethics of AI. Recently, a new AI-powered chatbot was introduced into the web called ChatGPT. It has gained many users from around the world since its release. This AI chatbot provides answers to any question given, it's like an encyclopaedia that has endless information. A university professor declared that this AI-generated bot could pass the MBA. With the growing use of AI, a lot of weariness will always surround it as people will fear for the security of their jobs. This implies that although artificial has positive impacts in industries it also has its negatives for others.

The Metaverse: Beyond Gaming - Its Impact on Retail Business (2.39)

Omolade Grace Salaam *Manchester Metropolitan University*

The concept of the metaverse is held by many in the tech industry as the future evolution of the internet. It is envisioned as a shared, ongoing, and immersive three-dimensional virtual environment where individuals can engage in experiences beyond what is possible in reality. The metaverse's success is closely tied to advancements in industry 4.0 technology like Augmented Reality (AR), Virtual Reality (VR), Artificial Intelligence (AI), and Internet of Things (IoT). In recent years, significant progress has been made in the gaming industry, where metaverse content enables players to fully immerse themselves in the digital world and collaborate with other gamers. However, the metaverse is not just limited to gaming. It is also becoming a popular business tool in the retail sector. According to Gartner, 30% of the global business are expected to have products and services in the metaverse by 2026. Retail businesses are adapting their models to tap into this market, such as Ocado Group, which is fast-paced in developing the building blocks for the metaverse concept, such as the creation and use of IoT-powered digital twins of their warehouse. Fashion retailers are also investing in the metaverse, integrating AR and VR technologies to enhance the shopping and event experience for customers. However, the metaverse also brings up ethical concerns such as privacy, fairness, and equality. This poster aims to explore the development of the metaverse for retail business, its potential, and ethical challenges.

Can Artificial Neural Networks Learn like Brains? (2.40)

Qiuye Zhang *The University of Edinburgh*

Studies in neuroscience have shown that the brain has plasticity, meaning that the strength and size of its neural networks can change as we learn. One of the most well-known theories of functional plasticity is Hebb's rule, which states that "cells that fire together wire together." In other words, when one cell consistently activates another cell, the connection between them becomes stronger. This learning rule can be applied to artificial neural networks to improve their performance by increasing the weight between interconnected neurons that are both activated at the same time. Hebbian learning is one of the earliest and simplest learning rules for neural networks and has been found to be particularly useful in pattern classification. In a random recurrent neural network model of working memory, Hebbian learning has been shown to significantly increase the length of time memory can be maintained. In recent years, researchers have been developing and applying more bio-inspired learning algorithms to improve the accuracy of artificial neural networks. These learning rules aim to capture the key aspects of brain learning and apply them to artificial neural networks. Although the exact mechanism of the change in the brains when we learn is still unknown, we are making progress with the computational models. Now, all of these learning rules are over-simplified models of human brains, but we need to start somewhere. The poster will explore some bio-inspired learning rules, the connections between artificial intelligence and neuroscience, and the potential for artificial neural networks to surpass human brain performance.

All Hail The Screens (2.41)

Rachel Giffard *Aston University*

Abstract, from a person in history poetically describing how the future of human culture is distorted from technology and they are completely unaware.

I can't even begin to explain the scenes,
 A new revolution, you won't believe these machines,
 The time is spent on them, turning us into has-beens,
 Our new source of light, from day to night, no respect for our kings and queens,
 And we'll say, all hail the screens.

First off, it'll start by affecting our teens,
 Beauty trends online, so out of reach as it seems,
 Anxious, depressed, stressed, because I don't have Kim K's new jeans,
 And mysteries lie around potential lifesaving vaccines.
 And we'll say, all hail the screens.

Brains turned to mush, shrinking to the size of beans,
 Is all this new ADHD diagnosis, or just in our genes,
 Completely emerged in content like submarines,
 Endless scrolling, diminishing humanity's greatest skills, and no longer knowing what life really means.
 And we'll say, all hail the screens.

Lack of jobs as the devices take over, and just endless dead end schemes,
 Water doesn't flow when we mention streams,
 Living in a grey concrete world where we miss the greens,
 And in the darkest corners lie the horrid extremes.
 And we'll say, all hail the screens.

Waiting for what, someone who intervenes,
 No daily physical talks, all just on Microsoft teams,
 No uniqueness, all just similar beings,
 We are captive to the endless fun, ruining our dreams.
 Alas, we'll say, all hail the screens.

Being Neurodivergent & Pursuing a Career in Computer Science (2.42)

Saima Durrani *London South Bank University*

Regardless of educational level or industry, those with neurodiversity in computer science and IT do not feel included. The study looked at previous research to assess the difficulties neurodiverse people encounter in education and career pathways in the computer science and IT field. The study outlined current problems and provided ideas and instructions on how organisations might foster an inclusive workplace for neurodiverse individuals. Despite how much organisations would want to believe they have advanced in this area, neurodiversity is still a problem, according to the (BCS, 2022), despite low employment rates and enduring stigma. Despite the fact that one in seven people are believed to be neurodiverse, there is a significant lack of knowledge and awareness of neurodiverse employees in the workplace, according to the research paper *Workplace Neurodiversity: The Power Of Difference 2020* by the Institute of Leadership and Management. The computer science industry employs many neurodiverse people, and they find that it makes use of their strengths. Most neurodiverse people thrive in obtaining degrees in computer science, IT, engineering, physics, and mathematics. According to (Austin and Pisano, 2017), “because neurodiverse people are wired differently from “neurotypical” people, they may bring new perspectives to a company’s efforts to create or recognize value.” The inclusion of neurodiverse people is a great step that tech businesses are currently making in the rapidly evolving computer science and IT fields, and many neurodiverse job seekers are looking for chances that will support them and provide them the framework they need to develop and perform well. This paper discusses the challenges of neurodiverse people within the workplace and will offer insights into current practices.

Navigating the Risks: Securing Artificial Intelligence in the Face of Cyber Threats (2.43)

Saxon Partridge-Smith *University of Wolverhampton*

As the utilisation of Artificial Intelligence (AI) in cyber attacks and defence systems continues to grow, it is expected that the sophistication and difficulty of detection of these threats will also increase. This emphasizes the need for the development of robust security measures to safeguard AI-enabled systems from malicious use. With the growing incorporation of AI in critical infrastructures such as healthcare, finance, and transportation, the potential impact of these threats is of particular concern. It is essential for the security industry to stay abreast of the evolution of AI and devise effective methods for securing these systems and mitigating these threats. This poster will delve into the dangers posed by the rapid integration of AI into society, examining both its beneficial uses in industry and the malicious intentions of cyber offenders. This abstract has been written completely using the open AI ChatGPT. The dialogue format makes it possible for the AI to answer follow up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests. I will therefore attempt to test its robustness as a technology, and demonstrate the depth and self-awareness that it possesses.

Can Genetically Modified Crops Solve World Hunger? (2.44)

Seungmin Kim *Manchester Metropolitan University*

People around the world suffer from hunger. The world hunger has been steadily declining over the last decade. However, it is on the rise from 2019 to 2022. Approximately 10% of people globally are undernourished, due to the recent circumstances such as the COVID-19 pandemic, climate change, and conflict including Russian invasion of Ukraine. The number of people suffered from hunger rapidly rose to as many as 828 million in 2021, increased by 46 million since 2020 and increased by 150 million since the pandemic. Nearly 98% of the malnourished people live in developing countries such as Yemen, Central African Republic, Niger, etc. The solution for world hunger has not been found yet, however, genetically modified (GM) crops can be an important component of the solutions. GM crops are created using genetic engineering which is a biotechnology that alter their DNA sequences. Nowadays, GM crops have become very widespread. For example, countries like the United Kingdom (UK), Australia, Brazil, Germany, United States (US), South Korea, France, Japan, China, and many more approve GM crops. While US is the leading GM crops producing country based on acreage, almost 92% of corn and 94% of soybeans grown in the US came from GM seeds. Can GM crops be a viable solution for world hunger? In the poster, I will investigate pros and cons of GM crops as well as to what extent GM crops can or cannot solve the world hunger.

An Outline and Comparison of Different Tools for Introducing Programming Creatively. (2.45)

Sofia Marijuan Carreno *London South Bank University*

In my case study, which outlines my journey of developing different tools for learning programming from Kilobot programming to LEGO robotics, I observed that they struggled with programming in first and second semester and grade results show this. To help them, I have been deploying different tools mentioned, to make them learn about different programming concepts and make them more confident when programming. These tools consisted of teaching in different creative ways such as creating a self-distancing program using C for Kilobots and recently, developing programs using Scratch for the LEGO EV3 Mindstorm robots but then slowly introducing micro-python so that they get a taste of actual programming. What I concluded in the case study is that teaching through Kilobots was harder because the Kilobots were very fragile and expensive but the LEGO EV3 Mindstorm robots were more robust so it doesn't break easily and since they are LEGO pieces, it can be built into other robots, so it is more entertaining. After doing this for first years, I led sessions with children from local secondary schools such as Notre Dame School, teaching them how to create their own story with scratch and using LEGO robotics to expand their programming interest from a young age. With this, I am sure that more students will be more confident when programming!

Final year undergraduate (or third
year for integrated masters
courses)

Sentiment-Driven Music Recommendation Based on Preferences of Multiple Users (3.46)

Bianca-Cristina Sandu *University of Warwick*

As music streaming services have risen in popularity, recommendation systems have become a fundamental aspect influencing the way listeners experience music. While recommendation engines for single users are continuously investigated and improved, such systems for groups of users have not been studied as extensively, despite being of great importance in everyday situations. This paper presents a general pipeline to find similarities between user preferences – with particular emphasis on cases where listening histories do not intersect – as well as two distinct implementations of the proposed pipeline. The user and song data are gathered using the Spotify API – users are represented by their listening history and songs are described through 15 relevant audio features. The first approach performs user profiling through a semi-supervised process, using Positive-Unlabelled learning algorithms to learn from only positive examples (users’ listening history) and unlabelled ones (the rest of the songs available on the streaming platform). Models are trained for every user in the group and tested on the other users’ listening history, thus finding preference intersections. Songs that are similar to such intersections will be recommended. The second approach follows an unsupervised process – it performs feature reduction on songs’ features, clusters each user’s songs separately and plots the clusters into the same space. Cluster overlaps are identified, representing the preferences of a single “virtual” user. Song recommendations are therefore tailored for the virtual user that encompasses the group’s similarities. A comparison between the two models is drawn, highlighting the effectiveness of the different approaches.

The rabbit hole of diversification in recommender systems (3.47)

Chloe Gilmour *The University of Edinburgh*

Today we see recommendation systems on every social media, online shop, and streaming platform alike. Recommenders tailor your experience to make it more personalised for you, by showing you products you may enjoy based on your history. At some point this was used to give companies a leg-up over their competition, however it has since become the norm. So how do we now alter these systems to beat out competition? Many companies have begun introducing recommenders that have increased diversity properties. However, what does this look like to users? A list of recommendations that has “maximum” diversity is likely to lose a lot of personalisation as users interests tend to centre around similar topics. On the other hand, without diversifying our list of recommendations, the content we recommend could begin to bore users. Furthermore, we could fail to introduce them to products that could possibly become a new favourite, given time. Where is the sweet spot? Too far in either direction is disastrous for any recommender system. One useful method is to combine the accuracy of the system (usually measured with click-through rates) with the diversity of the system into one measurable metric. This removes the need to introduce a trade-off between the two measures. But what do we need to consider when building something like this?

A consideration of the impact design has on user experience for a MERN application, exploring the use of eye tracking data to inform design choices. (3.48)

Claire Storey Sheffield Hallam University

Since the invention of the internet in 1989 by Tim Berners-Lee and the public launch of the world wide web in 1993 consideration has been made to how information is displayed to users – especially after the invention of CSS in 1994. Almost 30 years later, we still use CSS to style and design our websites, and web applications, but the conventions, templates and methods have changed along with fashions and trends. This has also affected the available “premade” designs created using tools such as Bootstrap and Material UI. I propose to consider and evaluate why certain design patterns are considered more effective in terms of user experience and behavioural psychology and consider whether users are simply conditioned to expect certain design features on modern web applications. I shall be looking at how research into human behaviours used in marketing strategies, can be applied to modern front-end design, including my own research using eye-tracking software to generate heatmaps from users trialling a MERN (Mongo, Express, React, Node) stack web application. This should provide both quantitative and qualitative data that can give further insight into how websites can keep up with the needs of users today.

Pysgodyn Wibli Wobli – Can a Robot Do “wibbly wobbly” Like a Fish? A Look into Fish Robotics and its Ability to Mimic Fish Movement (3.49)

Darya Koskeroglu *Aberystwyth University*

Fish Robotics is a rapidly advancing field that seeks to enhance underwater exploration and research by designing robots that imitate the movements of fish. The underwater environment is a complex and dynamic habitat that is difficult for humans to fully explore without the help of autonomous robots. Fish Robotics offers a unique solution to this problem by allowing researchers to "spy" on marine life and collect valuable data without disrupting the ecosystem. This technology provides a way to monitor the underwater environment, collect intelligence on marine life, and uncover hidden underwater archaeological sites. The majority of fish robots are built with Body-Caudal Fin (BCF) propulsion, which mimics the swimming motion of marine life. Material engineering is critical for creating robots that effectively mimic fish. This entails using biologically inspired materials, such as flexible fins and skin, to improve the robots' agility and efficiency. Furthermore, control algorithms that mimic fish movement patterns are being developed to improve the robots' robustness and adaptability. While previous studies focused on fishtail movement and its effect on swimming speed and acceleration, recent fish studies have shifted the focus to the role of head movement in improving swimming performance. Previously, head movement was not thought to be a significant factor; however, new research shows that it may contribute more to thrust production than previously thought. With this newfound knowledge, control algorithms can be created to control the head movement of fish robots and test the hypothesis that it does, in fact, improve their acceleration. I will be looking at developing a multi-segment fish robot controller and determine the control parameters for actuating segments, to enable it to perform different swimming patterns to support the hypothesis above. This poster will discuss the observation of the head movement, its effect on acceleration, controller strategy and the exciting potential of incorporating this information into Fish Robotics technology.

Movie review sentiment analysis application using a hybrid approach with the Naïve Bayes Classifier and Vader (3.50)

Davni Pithiya *University of Greenwich*

The movie industry is a multi-billion-dollar industry with the global box office reaching a revenue of \$26 billion in 2022 (Frater, 2023). This has led to the creation of many movie review websites and applications which rate movies and shows based on reviews they receive from viewers, for example IMDb and Rotten Tomatoes. Sentiment analysis is a technique used to analyse people's opinions and sentiments towards entities based upon their written text (Liu, 2015). In the past, sentiment analysis has been utilized in many fields, for example, online reviews (Jain, Pamula and Srivastava, 2021), stock price predictions (Mehta, Pandya and Kotecha, 2021) and social media cyber bullying detection (Naf'an et al., 2019). Methods like machine learning, deep learning and lexicon tools have been used for sentiment analysis. This paper is proposing an application where sentiment analysis is used to analyse movie reviews and determine if they are positive or negative through a hybrid model of Naïve Bayes and VADER (Valence Aware Dictionary and sEntiment Reasoner). This hybrid model is a combination of the machine learning Naïve Bayes classifier and the lexicon analysis tool VADER. A dataset of non-labelled IMDb reviews will be used to train the model, then a dataset of 5,000,000 IMDb reviews is used as the main search dataset for the application.

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Identifying cakes in a coffee shop using CNN networks and deep learning (3.51)

Diana Alexandra Castillo Bareno *London South bank University*

Today, even with all the technology around us, there are many labor sectors that still do many tasks manually. These tasks could benefit from current technology to reduce human error and deliver efficiency. This project addresses the challenges associated with a coffee shop where I work. Currently, every time employees at the coffee shop receive delivery of cakes, due to company policy, they must record the expiration date of each product on a list. This is done by hand; however, a web application would allow employees to take a picture of the product, write down the expiration date and have the CNN classify the product type. This would make the process faster, as well as to have a digital record of all the products with the corresponding picture. CNN is a type of deep learning neural network widely used in image classification and computer vision tasks. The project develops an application to take better control of that list and enter product information with the help of a CNN to detect the product and using a database to store our information using a mobile device. The project will bring significant value, particularly to the labour sector. As an employee, I understand that this tool will greatly simplify our work and save time. Additionally, working on this project will allow me to gain valuable knowledge and skills in data science, including machine learning and neural networks, which will prepare me for the job market and the demands of the data science industry. CNN is used in several areas of data science industry, including: 1. Image classification and object recognition 2. Image segmentation and detection. 3. Computer vision and autonomous systems. 4. Natural language processing (NLP) and sentiment analysis. 5. Recommender systems and content-based filtering. Finally, the score of the project is to be able to create a first version of this product, to evaluate the benefits it can generate.

Biased AI: identifying and mitigating biased machine learning algorithms (3.52)

Francesca Mirandola *University of Stirling*

Artificial Intelligence (AI) has become an integral part of our everyday life. While it helps our society to make the most diverse decisions, there have been several episodes where the adoption of AI in contexts that directly affect people has proved harmful. On these occasions, it was found that when a model uses sensitive data for its predictions, the outcome is prone to show biases against one or more stakeholders, reinforcing existing societal biases and status. One very notorious episode was Amazon's recruiting tool, which was systematically rejecting women's resumes. This occurred because Amazon's workforce had been historically mostly male-dominated, information which was initially assimilated during the algorithm's training and later perpetuated in its decisions, making it a biased and discriminating tool. Instead, AI could be used to help people make better, more objective decisions. To be of such help, it is of vital importance to develop and adopt a critical point of view when evaluating the use of AI algorithms and to apply adequate techniques to mitigate societal biases reflected in these powerful tools. In this scenario, this poster wants to show an approach to creating, evaluating and correcting algorithms that can closely affect humans. To do so, it uses the database created by ProPublica to examine the reliability of the COMPAS algorithm, a recidivism risk assessment tool used across some courts in the US. Specifically, the analysis starts by identifying key ethical issues via a context and stakeholder analysis. With these in mind, a fairness metric is chosen. Then two different algorithms based on the above-mentioned database -one of which is state-of-the-art - are evaluated and checked for bias according to the chosen fairness metric. Lastly, both quantitative and qualitative bias-correction techniques are applied to the models and evaluated.

Meet RACED: The solution we need for road debris. (3.53)

Hannah Laidlaw *Aberystwyth University*

Imagine a world where all cars are autonomous; debris on roads causes accidents and damage to vehicles on a daily basis, leading to a need for a solution that can keep roads clear and safe for all. Meet RACED (Robot for the Autonomous Collection of Environmental Debris), an autonomous vehicle which is comprised of: a compartment which can open and close, and a robotic arm. We envisage that all autonomous vehicles can be linked to the RACED system allowing automatic coordinated reporting of debris. Once RACED receives a report, it can immediately deploy to the area. RACED would be equipped with a combination of sensors and cameras, allowing it to detect and locate the debris within the given coordinates. The robotic arm would pick up and place the debris within its compartment allowing for safe disposal. With a fully integrated system, the location of RACED could also be linked to autonomous vehicles preventing accidents. Not only can this technology be utilised on the road network, but can also be transferred to many different environments such as railways, tunnels, and mines. This poster will consider the advantages and disadvantages of RACED, covering the ability to handle all weather conditions, debris size and weight, and safety. Autonomous robots can be costly in both development and deployment, with a high upfront cost, so is RACED worth the potential costs? Could RACED cause job losses? and if so, are the benefits worth it?

MOSAIC: Metaverse Geophysical Visualisation and Interaction (3.54)

Hanyu Jin *The University of Liverpool*

In the last 20 years, the increasingly widespread utilization of geoscience technologies ameliorates the quality and quantity of the geophysical information collection, specifically boreholes as focused in this project. Additionally, the acquisition of underground 3-dimension borehole models is improved by advanced computing, storage and visualization techniques. However, the demonstration of the collected data is typically simplified from 3D to 2D static graphs in practice, decreasing the potential of communication based on the data. Therefore, demonstrating 3D data with the aid of virtual reality (VR) technology is feasible to enhance the communication and sharing experience of borehole geoinformation in the geophysical field. VR produces an immersive environment in a head-mounted display (HMD) for geophysicists to evaluate boreholes, label and annotate interested positions of the borehole models. Furthermore, the extension of 3D VR borehole visualisation to the metaverse offers many possibilities such as multi-user interaction and collaborative exploration, analysis and annotation of the datasets. The major activities of the project are stated as follows. The initial step is to set-up the Meta Quest II with Unity. This is followed by coding in Unity to load the models along with performing functionalities of user-network and interaction between users and models, including setting up a database to store the models and user information. The programming language is mainly C#. The poster will illustrate details of the methods described above and demonstrate the results visually. It is hoped this approach can herald a new paradigm in the visualisation and analysis of complex 3D geophysical datasets.

Digital Escape Rooms for Museum Engagement (3.55)

Helen Harmer *University of Bath*

The title is investigated through the design, and creation of a digital escape room to be integrated into the Period Rooms at the American Museum and Gardens. The aim of this is to attract and engage young adults aged from 18 to 25, which are underrepresented among museum visitors today and have a large number of people who engage in playing video games. It is important to attract young adults to ensure as many people as possible are engaging with the history museums have to offer and that stories and narratives displayed can be shared as widely as possible. The Period Room exhibition displays furniture set up in rooms as it would have been in America between 1718 to 1850, which covers a large and important period in their history including their gaining of independence from the UK. The narrative of the game asks the player to find scraps of an important historical document that has been hidden over the Period Rooms, the player then moves through each room and solves puzzles focused on the content to find the pieces. This should provide an engaging experience for museum visitors and should attract young adults in particular due to its 'gamified' nature. This is being done with the support of the American Museum and Gardens.

An e-monitoring system for patients with Non-Communicable Diseases in rural areas (3.56)

Heri Josiane *University of Stirling*

Non-Communicable Diseases (NCDs) are the leading causes of morbidity and mortality globally, causing more deaths than all other causes combined. Eighty percent (80%) of these deaths occur in developing countries whose fragile health systems are still grappling with a heavy burden of communicable diseases resulting in a duo burden of disease. While early detection increases the survival rate and ensures a favorable prognosis of most NCDs, about 80% of reported cases are detected at an advanced stage when very little can be achieved in terms of treatment. Some of the challenges include low awareness of NCDs' signs and symptoms, poor treatment, and inadequate early detection and monitoring services. Chronic Diseases in low- and middle-income countries have often been neglected despite their huge burden of mortality. Efforts to decrease population-level risks for NCDs need to be accompanied by action to improve the delivery of primary care interventions for people with NCDs. The management of chronic diseases, irrespective of cause, is needed in primary health care. The lack of proper and timely follow-up of NCDs patients can worsen their situation and even lead to premature death. This project proposes an analytical application software that applies correlation and regression analysis techniques to analyze patients' vitals. This is to be used by community health workers/volunteers, administrators in health care facilities, and medical doctors to support the implementation of early interventions to prevent NCDs from getting worse at an avoidable rate.

The power of randomness (3.57)

Inés Blanco Rivas *University of Bath*

When we think of cryptographic security, algorithms like RSA or El Gamal come to mind. However, these algorithms would not be executable, and hence secure, without the random number generators that create the bit chains we use to encrypt. True random number generators are computationally challenging, and most derive from physical phenomena, that is why modern cryptography relies on the use of pseudorandom number generators (PRNG). In essence what PRNGs do is generate an unpredictable chain of numbers based on a (much shorter) true random number seed. Yet there are different ways in which these PRNGs generate their output. Through this poster we will explore different PRNG algorithms and their cryptographic strength, and evaluate their suitability to be used in modern cryptographic models.

Is AI a teacher's best friend or worst enemy? (3.58)

Iphrah Shahkeel Asif *Manchester Metropolitan University*

Artificial Intelligence (AI) is the creation of human intelligence in which machines are designed to think like humans and mimic their actions. This functions by combining training intelligent algorithms with large amounts of data in a fast and iterative way, which allows the software to function autonomously in a desired way, for instance, text detection (plagiarism), speech recognition (autogenerated closed caption), and text generation (creative writing). AI has been used in the education industry in many positive ways. For example, it can be seen as an accessibility feature, giving universal access to students to study online, and offering access to real-time subtitles. Also, allows people with hearing disabilities to better understand videos and study materials. AI also benefitted the education sector by allowing the automation of repetitive tasks. This allows educators to manage tasks more efficiently, enabling them more time to concentrate on their core tasks. However, students could misuse AI to cheat as it will be done in a way that will not be detected as plagiarism, which weakens the whole purpose of the assessment. Additionally, it can be difficult to adapt to different learning styles. Therefore, it might not be tailored to all students. As we can see from the above, this may influence the education industry both positively and negatively. In our poster, we will discuss both aspects in further detail and outline the way forward for using AI in the education sector.

Tappyography: Generating Tap Dance Choreography using Artificial Intelligence (3.59)

Jasmine Brown *University of Warwick*

In recent years, artificial intelligence has increasingly been used to generate creative works, from images (Ramesh et al., 2022) to music (Dhariwal et al., 2020). One emerging application of AI and machine learning is in the generation of dance choreography, which refers to the creation and arrangement of dances. Projects by researchers at Google, NVIDIA and Meta have recently developed generative models which compose creative body movements. This approach works for many dance styles including contemporary, jazz and hip hop. However, tap dance differs from these styles due to its heavy focus on footwork and rhythms; instead of inventing new movements, tap choreography is formed by amalgamating existing steps to the beat of the music. It therefore presents an interesting challenge which cannot be solved by existing AI choreography systems. This project explores the possibility of using AI to generate tap choreography. The aim is to develop a system to analyse the rhythms within music, then choreograph a sequence of tap steps to fit the identified rhythms. The proposed system will be a knowledge-based AI combined with reinforcement learning, which will improve the quality of sequences generated over time. The system will act as a tool to aid and inspire choreographers. By generating the steps, the AI system should allow human choreographers to focus their time and creative energy on storytelling, dynamics and stylisation. Ultimately, using AI should make the process of choreographing a tap dance quicker and easier while resulting in more visually engaging performances.

Dementia at home – a smart approach to a growing problem (3.60)

Jenny Thyer *Aberystwyth University*

By 2040, it is projected that 1.6 million people in the UK will have dementia. With an increasing care load, and an ageing population, how can we keep people with dementia safe within their own homes, and identify when they cannot be? In people with dementia, their gait changes in quantifiable ways due to their cognitive decline. This provides an opportunity to predict fall risk in patients with dementia. By using conventional cameras and computer vision algorithms, gait analysis can be performed within a patient's home in a non-invasive and continuous manner. This monitoring can provide valuable insight into progression of the disease, and allow for better tailoring of care to the patient's needs without subjecting them to additional testing. It also reduces the burden on caregivers to perform these tests, which will improve other aspects of patient care. Furthermore, integrating this with other technological innovations in dementia care into a central monitoring system could provide deeper insight into an individual's condition, allowing carers to accurately identify when additional interventions are needed. This poster will examine the potential of combining dementia research with technology to create a protective environment that integrates active care with passive tracking, while addressing ethical considerations related to monitoring vulnerable individuals. In people with dementia, their gait changes in quantifiable ways due to their cognitive decline. This provides an opportunity to predict fall risk in patients with dementia. By using conventional cameras and computer vision algorithms, gait analysis can be performed within a patient's home in a non-invasive and continuous manner. This monitoring can provide valuable insight into progression of the disease, and allow for better tailoring of care to the patient's needs without subjecting them to additional testing. It also reduces the burden on caregivers to perform these tests, which will improve other aspects of patient care. Furthermore, integrating this with other technological innovations in dementia care into a central monitoring system could provide deeper insight into an individual's condition, allowing carers to more accurately identify when additional care is needed, and when a person is no longer safe at home. This poster will investigate the ways research into dementia can be combined with technology to provide a protective environment that integrates active care with tracking of disease progress in patients, and considers the ethical considerations of monitoring vulnerable people in this way.

Beauty is in the AI of the Beholder (3.61)

Karolina Kowalska *Durham University*

While the title may sound cheesy, the recent boom in AI is not – increasingly proliferating our daily lives, computational intelligence is slowly infiltrating all types of industries, be it the financial world with fraud detection, retail with recommender systems, controlling our very vehicles with autonomous driving systems, and, for some, having a lovely chat about how their day went with ChatGPT. Currently, image generation has taken centre stage - with the release of DALL-E in 2021, a deep learning model that can generate almost any image through natural language prompts, the development and popularity of generative models has skyrocketed. Today, the stage is dominated by a number of models accessible to all, such as Midjourney, DALL-E 2, Stable Diffusion and the like, and all are continually improving. Meanwhile, users find more creative ways to find a common language with the AI (also called ‘prompt engineering’) to get what they want and the network of truly unique creations shows no signs of stopping. A model that can generate anything, from surreal mindscapes in a combined style of MC Escher and Salvador Dali, to a Henry Hoover in the style of Hatsune Miku, surely can only be a positive for mankind. However, I would like to use my poster to educate about the structure of generative models, why they are a great tool, what this may mean for the collective value of art and also why they pose a huge danger to many, such as through propagating biases and causing human redundancy.

Humans Vs Robots: The Robotic Goalkeeper (3.62)

Lisa Petry *University of Strathclyde*

"How do robots see the world?" This seemingly simple question may soon be asked by many children globally as robots are becoming increasingly present in our lives. Some areas already have robots delivering groceries and soon they will be found venturing to places where no human has set foot. Robots are traversing complex and constantly changing environments autonomously, yet few people know how they are able to navigate and respond to their surroundings. To answer this surprisingly complex question, a STEM activity was created targeting curious children and adults alike. The poster presents the robotic goalkeeper, a tabletop football goalie able to see and attempt to catch any balls from entering its goal. In an interactive way, the goalkeeper is able to show how computer vision works and how it differs from our human vision. To demonstrate how robots perceive the world, the goalie is equipped with a standard webcam, which streams video footage of the football pitch in front of it. The goalie is also able to show how we humans perceive the world, as it features a neuromorphic camera. This camera's functionality corresponds to a certain type of cells in the human eye, which makes it closely related to human vision. Traditional image processing techniques such as template matching are compared with brain-inspired neural networks allowing the goalkeeper to recognise and move towards the ball. The poster discusses the robotic goalkeeper in more detail, elaborating on the functionalities and differences of the technologies used.

Empowering underrepresented groups in society by mitigating data bias (3.63)

Marzena Jagoda *Brunel University*

Data bias can have a significant impact on minorities by perpetuating and amplifying existing disparities in society. When algorithms and AI systems are trained on biased data, they can make decisions and produce outcomes that discriminate against certain groups such as racial and ethnic minorities. For example, a biased training dataset could result in a machine learning model that underrepresents gender in certain professions, thereby preserving the existing gender stereotypes. This can lead to discriminatory outcomes in areas, such as hiring, loan approval, and criminal justice. Organizations should address and eliminate data bias to ensure fair and equitable outcomes for all individuals. In this work, we present the implementation of an easy-to-use application that mitigates bias in different datasets. Our aim is to introduce the problem to a larger audience. In the proposed application, the user chooses a dataset with a possible unrepresented group, checks for bias, and receives an unbiased dataset. Using different techniques to achieve the desired outcome allows users to interact with the application to draw conclusions. The application supports several state-of-the-art techniques for bias mitigation, including reweighting and bootstrapping. We have evaluated and compared these techniques on several datasets. It is important to mitigate bias in datasets, as discrimination in training data influences the ability of AI systems to overcome bias. Computer applications can help solve many of the most challenging problems in the world by utilizing the power of technology for the benefit of society. Both the application user and the poster reader should feel that they have contributed to fairness and equality—essential ingredients for a successful society, including all its members.

Sowing Success: Enhancing Kenyan Agricultural Productivity and Resilience with IoT Sensors (3.64)

Melanie Cope *Manchester Metropolitan University*

Droughts consistently affect Kenyan farmers, negatively impacting productivity and income. Persistent droughts have led to declining crop yields, reduced soil moisture levels, and increased risk of crop failure. Reduced water for irrigation places crops under strain, reducing yields and damaging crops, whereas high temperatures linked to droughts lead to increased spread of plant-based diseases. This negative effect is compounded by Kenya's limited water resources, and its heavy reliance on agriculture as a primary food source. 69% of Kenyans suffer from moderate or severe food insecurity, and 27% are undernourished (WorldBank, 2020). Agriculture is also a major employer in the country, with 54% of employed Kenyans working in agriculture (Statista, 2022). It further contributes 22% of Kenya's GDP (WorldBank, 2021; Statista, 2022). Beyond the immediate effects of drought, decreased agricultural output and revenue causes reduced investment in infrastructure and technology, hampering farmers' long-term ability to become resilient to its effects. This poster will explore how Internet of Things (IoT) technology can increase agricultural productivity and resilience to drought in Kenya through soil moisture monitoring, weather predictions, and crop management. Although the Kenyan government have made progress in expanding Wi-Fi coverage nationwide, we will explore the use of communication technology, such as cellular networks, to distribute IoT across the region as some rural farming communities still suffer from limited access to high-speed internet. Furthermore, not every farmer will have access to computer equipment, so effective data sharing across communities must also be explored. This poster will investigate an accessible, technology-driven solution to increase agricultural resilience to drought in Kenya. Word Count excl. citations: 249

Musical Key: A New and Improved Method for Music Genre Classification (3.65)

Mia Borgese *University of Warwick*

We all spend hours a week using Spotify, Apple Music and other music sharing platforms due to the growing number of music tracks being created and uploaded to the Internet and the flourishing industry of digital music. Therefore, the need of an automated and efficient way to classify this music has become increasingly prevalent. One of these classifications is of music into genres; in order to remain competitive and provide the best service they can to numerous users, it is a necessity for these music platforms to automate this process not only efficiently, but also effectively. But what makes an effective music genre classification algorithm? We are going to present a new music genre classification algorithm which exploits an idea rarely used before – the use of key. Previous investigations into effective musical feature sets for machine learning algorithms have utilised features such as lyrics, timbre, pitch and rhythm, but key is an area that has been left to explore. This naturally sparks interest as people with any musical knowledge can see that the key of music is heavily linked to its genre. Thus, this new and exciting inclusion of key boosts the accuracy of classification systems compared to those which don't use key. To finally show this, we will dive into the feature extraction and classification algorithms behind this novel and exciting contribution to the research area of music genre classification.

Tweet the Rich! Using Tweets to Predict Forex Market Movements (3.66)

Natasha Coia *University of York*

The foreign exchange market (forex) is the largest financial market in the world, consisting of a global network of financial institutions trading in currency pairs. Many factors affect forex rates including a country's political status and their economic performance, but more significantly, public opinion of these subjects. In September of 2022 Great Britain saw this come into effect when Truss' mini-budget led to outrage amongst the nation, causing the pound sterling to hit an all time low against the US dollar. Forex's huge influence on the financial world has meant that accurate predictors of market fluctuation are highly sought after, and equally difficult to attain. Many investors have turned to social media for these predictions, and Twitter - the micro-blogging social networking platform - is an incredibly strong contender. Its limited tweet length of 280-characters leads to concise discussions on subject matters, and various hashtags and "cashtags" allow users to search for tweets relating to specific topics and stocks. This project aims to examine the use of Twitter as a predictive tool for the movement of the GBP/USD rate, with the US dollar as a base to compare the pound sterling's fluctuation against. Natural language processing (NLP) will be performed on tweets, particularly discussion relating directly to Great Britain and its leader over the selected time period, using a pre-trained BERT sentiment analysis model, the results of which will then be passed through a neural network to determine the extent to which predicting forex market movements is possible. Forex's huge influence on the financial world has meant that accurate predictors of market fluctuation are highly sought after, and equally difficult to attain. Many investors have turned to social media for these predictions, and Twitter - the micro-blogging social networking platform - is an incredibly strong contender. Its limited tweet length of 280-characters leads to concise discussions on subject matters, and various hashtags and "cashtags" allow users to search for tweets relating to specific topics and stocks. This project aims to examine the use of Twitter as a predictive tool for the movement of the GBP/USD rate, with the US dollar as a base to compare the pound sterling's fluctuation against. Natural language processing (NLP) will be performed on tweets, particularly discussion relating directly to Great Britain and its leader over the selected time period, which will then be passed through a pre-trained neural network to determine the extent to which predicting forex market movements is possible.

How can AR/VR be used effectively with young people (3.67)

Nour Ghandour *London South Bank University*

Over the past few years, AR and VR is affecting our lives but why and how?. This poster will explore the arguments for and against AR/VR within in an education context and is aimed at a younger audience. AR is a real-life environment, however VR involves a headset device that uses them to move in a comprehensive world, while AR is involves users that are in contact with real situations. VR can be used to experience situations that you may not have come across, that may be challenging such as learning how to conduct health and safety inspections or conduct lab experiments. Augmented reality is used in our everyday social lives as an individual, from Instagram to snapchat, when using snapchat, filters you will use on your face our digital objects used on the face to tell the user that there is something real on your face. Augmented reality has affected many young people from Gaming, for example playing Pokémon GO app where the character of that game becomes a virtual, physical environment. Can AR help young learners learn about everyday environmental factors such as pollution, air quality, littering etc? I will provide scenarios where AR & VR can assist with environmental issues impacting young people. This paper will give an overview of advantages and disadvantages as perceived within an education context and recommendations and guidance on creating AR/VR environments for young people.

Facial Recognition To Record Student Attendance (3.68)

Omamoke Efadue *London South Bank University*

This paper outlines an attendance registration system using face recognition to register students automatically whilst in a large lecture theatre. When using traditional methods such as calling out roll calls or taking a student's signature, managing attendance can be a time-consuming task and error prone. Face recognition-based attendance systems are a solution to the problem of recognising faces for the purpose of collecting attendance by utilising face recognition technology based on high-definition monitor video and other information technology. After the recognition is complete, the attendance will be immediately updated in a database with the relevant information. This paper reviews related works in the fields of attendance management and face recognition. The aim is to build a prototype face recognition and identification system to record student attendance using image capture of the audience in a lecture theatre or other teaching room. The basic functionality will require a database to be designed that combines images of students (or required facial recognition measurements derived from images) together with their student ID, a second database that contains timetabled events identified by room and time and to which student attendance can be added. In its initial format the system can be built using static image analysis on a PC (i.e. with saved photographs of an audience) and local databases. For a practical implementation it could be installed onto a Raspberry PI equipped with a camera and connect to the required databases over the network. The system will face many challenges such as obscured faces, and also raises privacy issues and these problems might need solutions designed. Finally, experiments will be implemented to provide evidence to support this project. Ethical considerations will be discussed.

Design and Deployment of Swarm Dispersion Strategies for Indoor Robotic Applications (3.69)

Omnia Habiba *London South Bank University*

Swarm robotics is a system that can be created and deployed using a large number of robots that communicate with one another and work together to complete a task. Swarm robotics has drawn inspiration from naturally occurring self-organizing systems such as social insects, flocks of birds, and schools of fish. Researchers have advanced the understanding of how complex behaviours emerge in nature and provided proofs-of-concept that highlighted the capabilities of robot swarms over the past two decades. However, more research is needed to acquire the abilities and knowledge required to get robot swarms out of the lab and into the real world. Robotic swarm dispersion appears to be beneficial for situations like post-hurricane urban surveillance and data collection after a nuclear event. The objective of this research is to design and develop a novel swarm dispersion algorithm that efficiently deploys robots to cover the most distance within the area to be explored in the shortest amount of time. The study employs Kilobot swarm robots in indoor environments to simulate and experimentally compare the performance of the proposed robotic dispersion method with that of existing solutions. This project is intended to conduct an interior experiment using kilobots. Using a sampling approach, the signal intensities are realistically represented while taking into consideration the relative orientations and distances of the wireless sensors. The new dispersion algorithm is designed to increase sensor coverage and decrease the time of dispersion. Using a design of experiments with different operational conditions, we found that the proposed algorithm significantly outperformed state-of-the-art dispersion techniques in terms of both coverage area and dispersion time.

Mastermind: How well can an RL agent play and win the game? (3.70)

Pooja Leelodharry *University of Bath*

Mastermind is a popular 2-player board game which originates from the paper game Bulls and Cows, dating back over a century. Traditionally, the code-maker creates a secret code of length 4 choosing from 6 colours, which the codebreaker aims to determine. After each turn, the guess is scored, allowing the codebreaker to use this feedback for the next move. The game terminates either when the codebreaker has run out of guesses, or the secret code has been found. Mastermind has been solved algorithmically using various methods: Exhaustive Search, Evolutionary, Information Theory and Reinforcement Learning (RL). The first technique created a benchmark by proving that algorithms should be able to solve the game within 5 guesses. While extensive research was carried out in the first 3 methods, RL techniques for this game are yet to be explored in depth. RL is a branch of Machine Learning stemming from animal behaviour where knowledge from previous experiences influences the decision-making process. Following this concept, an RL agent explores the environment and consequently learns the optimal policy. Monte-Carlo, Deep Q-Learning (DQN) and its variations such as Actor-Critic and PPO are some algorithms appropriate for Mastermind. Given the impressive performance of RL algorithms implemented on the domain of Atari 2600 games, it is believed that an RL agent should be able to learn about Mastermind's environment and return the most optimal move, winning the game within a minimum number of turns.

Personal Memory Game (3.71)

Reem Khider *Canterbury Christ Church University*

The term “dementia” refers to a syndrome caused by cognitive impairment in the brain that impacts the patient’s ability of thinking, behavior, and memory. Many researchers have confirmed that the most promising strategy to reduce the risk of developing dementia is to practice cognitive activities. The main objective of my project is to build a personal memory game that prompts the users to upload several photos to be used in the game, and then try to match them and find their pairs. This cognitive activity would help stimulate the users' long-term memory and maintain their cognitive function. In addition, it helps them keep remembering family members and special venues in their lives as they play. The following phases would be performed during this project. Requirements: Investigate topics related to the development of the game and dementia to capture and classify the requirements, then verify and validate them. Design: Hence the game would be used by older adults, some accessibility and usability criteria were considered such as ease of learning, efficiency, and visualisation. Implementation: The game was developed by initialising a database using MySQL, and building the game using PHP, JavaScript, and CSS to add functionality, features, and style. Testing: This phase would be carried out in two steps: 1- Validating and verifying the game, hence unexpected errors may be detected. 2-Testing the application with the end user.

How inclusive are Recommender Systems? (3.72)

Roshni Vachhani *Durham University*

Recommender Systems (RS) are becoming more and more common in our everyday lives, spanning across various industries like entertainment and food. Their purpose is to help customers navigate the overwhelming amount of options available online by providing personalized recommendations for items they are likely to enjoy. While there are already some movie recommendation systems in use, such as Netflix and Hulu, this project specifically aims to examine how well these systems accommodate the needs of the disabled community. Unfortunately, the disabled community is often overlooked in the design and algorithm decisions in the development of these tools, and this lack of consideration can greatly impact their ability to effectively use these systems. This poster will present the various RS within the movie domain, examine the algorithms used to recommend and suggest items, and analyse how closely the needs of those with disabilities are considered. By developing a disability-aware RS, the systems will be compared to identify the need for this type of system, and to gain an understanding of how inclusive these RSs currently are, and how they could be improved to better serve a wider group of people.

Low Earth Orbit satellite tracking robot (3.73)

Sheung Hei Camilla Tseh *The University of Liverpool*

Some experiments or observations conducted on Low Earth Orbit (LEO) satellites provide essential materials for study in many areas, including environmental, biological and material science. Unlike the LEO satellites for communication and Global Positioning System (GPS) system, where one or more satellites from the same network are always connected to the transceivers, LEO satellites, such as the International Space Station (ISS) will only be in range for a short period at a particular location. Therefore, for the ground station to receive data from or send a signal to the satellite, it is important to identify its real-time position, hence, enabling the antenna to point towards it. The three main methods to locate an LEO satellite are using radar, radio, and optical, which require a continuous internet connection or additional equipment. By using simplified perturbation models and the latest data of the two-line element (TLE) set, the position of the satellite can be accurately discovered. To point an antenna towards the satellite, the angle of azimuth and elevation will also need to be determined using the calculated longitude and latitude from the simplified perturbation models. This project aims to build a robot that an antenna can be mounted onto and pointed towards a target LEO satellite. Simplified perturbation models and calculations of elevation and azimuth angle will be performed using an Arduino board. Two stepper motors are for the rotation according to the elevation and azimuth angle. The poster will cover necessary background information/theory and key findings from the project.

Quantitative Approaches and Constraint Satisfaction of Gene Regulatory Networks (3.74)

Simran Aggarwal *University of Warwick*

Computational biology is a rapidly growing area in which biological systems are being represented using software as opposed to making physical systems. Computational modelling has removed the need to use real cells in the pursuit of research thereby increasing efficiency of creating new biological systems. However, there are many applications of computational biology that have not been explored as thoroughly as they could be. The study of synthetic biology has become increasingly important in the medical field. Gene regulatory networks are a part of this field, and there is a growing interest in how gene expression can be manipulated to infer specific properties. Researchers may find useful a tool that can tell them what strength promoter to use based on what properties they want the final GRN to yield. Instead of modelling an existing network, we can use these models to create a new network. This project aims to produce a computational tool for researchers within this area, allowing models of real biological systems to be produced. It will make use of the current modelling and simulation techniques to determine how synthetic gene regulatory networks can be made. The software aims to find a gene regulatory network that satisfies constraints given by the user, as long as one exists. In a GRN, these specific constraints can be satisfied by changing the strength of the promoters that activate and inhibit the synthesis of proteins.

Can Antidepressant Side Effects Be Predicted Using Modern Technology? (3.75)

Sophie Dillon *The University of Sheffield*

On an average day in the UK, up to 11% of people take an antidepressant. Specifically, the most commonly prescribed antidepressants (ADs) by GPs are Selective Serotonin Reuptake Inhibitors (SSRIs) with Sertraline (a type of SSRI) totalling up to 631,539,864 defined daily doses of Sertraline being given out. With SSRIs, examples of side effects include feeling/being sick; loss of appetite; loss of libido; headaches; and feeling agitated, shaky or nervous. Before someone switches SSRI dosage or starts a new course of SSRIs, it can be difficult to predict what side effects there will be. There are different possibilities that ways that predicting SSRI side effects can be simulated. For instance, one route could be developing a digital twin based on previously input data over a variety of months. Another route could be using predictive neural networks based on wellbeing data that an individual may have recorded. Or is this even possible at all with modern day technology? Does predicting side effects go well beyond the scope of what can be predicted? This poster will elaborate on day-to-day difficulties individuals can face with antidepressants and explain the potential solutions that modern day technology has to offer, such as predicting a person's future mood/wellbeing. This can help to pave the way for future individuals who may be struggling with low mood and provide a good indicator of if proceeding with an SSRI dosage could be the right choice for the individual or not.

Impact of User Experience Website Design Principles (3.76)

Stephanie Gelder *University of Stirling*

The recent preference for online shopping and travel booking in comparison to conventional high street shopping and travel agents, has highlighted a need for increased understanding of user experience (UX) principles in relation to website design. The trend towards online has been evident for several years, however it has seen a forced acceleration in recent years in light of the Covid-19 pandemic. Given the above, this poster focuses on UX website design principles in relation to the highly saturated and competitive travel industry. It also discusses how imperative it is for travel firms to not only invest in UX research in relation to their own customers, but also to reflect on the results of their research and implement changes to their websites if necessary. Knowing that design choices can alter the experience had by users, and how to optimally implement these to maximise the positive experience had by users, can enable companies to improve the usability of their websites for their users. Achieving this when operating in a highly competitive and saturated market would be the difference between influencing a potential customer to book their holiday through your site, and them choosing to book elsewhere. Thus, this poster looks specifically at one feature present in all travel booking websites to investigate which gives the best overall user experience; the results of which could theoretically be implemented by new travel companies to allow them to be more competitive.

Modelling and Solving Real-World Problems using Temporal Graphs (3.77)

Tala Eagling-Vose *Durham University*

Graph theory, first originating from Euler's 1736 paper on the Seven Bridges of Königsberg, is a crucial area of study in computer science. The ability of graph theory to model various real world problems such as transportation, wireless and social networks, and even evolution, has made it a widely influential field. However, a common characteristic of these systems are their highly dynamic nature, for example within public transport networks each bus has a specific time, meaning they require a less simplified model than traditional graph theory allows. This has resulted in the development of temporal graphs that incorporate the changes over time into the algorithms themselves. This allows more comprehensive solutions to problems like pathfinding that consider arrival time, time spent at each vertex, the robustness of such paths, amongst others. More recently, temporal graphs have also been considered in relation to modelling the spread of disease, as they offer a theoretical framework for the sequential nature of contacts as well as the time sensitivity of infectiousness. While the potential of temporal graphs in solving real-world problems is clear, the computational complexity of finding such solutions remains a significant challenge. Some problems such as shortest path finding are still solvable in polynomial time on temporal graphs, but others like strongly connected components become NP-complete. The combination of both significant real world benefits alongside often surprising complexity make it interesting both theoretically as well in application.

A secure system architecture for learning technology that supports the right to object to data collection in schools (3.78)

Taurinta Nazarova *The University of Winchester*

The use of technology in schools is increasing rapidly with the need for more effective and efficient learning methods. A particular system that was created to help students learn more effectively is personalised learning. This method consists in creating a learning profile of the student based on their needs and their learning style, to do so it acquires data over a prolonged amount of time, the more the data the more accurate and personalised the methodology is. To make personalised learning accessible to all students a lot of resources would need to be invested in its creation, many policies and issues would emerge that will change the scholarly system almost completely: the staff would have to adapt to the system and be more specialised while the students would need to change their learning methods entirely. At first, it would create suspicion and doubts which could lead to its failure entirely. Nonetheless, it would be ideal to enhance each's student potential, it could reduce dropouts and it could make the school a more interactive place. In the case of this system or a similar one being implemented in schools, the hope is to make education more engaging to the students and increase the number of brains in our country in several faculties as well as offer more possibilities to the underrepresented in society. Surely, before its integration into school, its interface, availability and data collection should be analysed to make sure it complies with the GDPR, especially with minors involved.

How emerging technology is improving inclusivity in the makeup industry (3.79)

Tomilola Adedewe *Manchester Metropolitan University*

Today, the makeup industry has started to capitalise on Artificial Intelligence (AI) and Augmented Reality (AR). In the past, makeup brands have relied on trial-and-error method to find the best fit skin tone products (i.e., foundation and concealer) for their customers. This has led to poor customer satisfaction due to unsuitable colour matching, resulting in high returns and loss of customers. As research shows how a key factor that influences a consumer to buy foundation, is it being the right shade at 20%. These challenges have grown to show the lack of inclusiveness of brands, as women of darker skin tones not only have a higher chance of colour mismatching, but also revealed the lack of selection that brands offered them. AI and AR have offered a viable solution to the market by enabling customers of all skin tones to use technology to find the most suitable foundation colour. AR scans an individual's face and feeds the face data into AI algorithms to search across all the possible skin tones to discover the best match from the products offered by the brand. This technology no longer restricts customers to high street stores, as customers can now buy foundation online without worrying about whether it is the right fit for them. Additionally, AR and AI have shed light on how diverse the consumers are within the makeup industry, as the data generated from this technology enables brands to create skin tone-based products that are reflections of all their customers.

AI idols and virtual influencers' effect on the music and entertainment industry (3.80)

Wing Yung Miyuki Fung *Lancaster University*

Thanks to the rapid advancement of Artificial Intelligence (AI) technology, there is an increasing trend of virtual idols debuting in countries such as South Korea and Japan. There are different types of virtual idols: anime-styled virtual idols like Hatsune Miku, virtual idol groups inside video games, virtual idols that were created based on real idols, and AI idols that were made to impersonate real humans. There is no doubt that virtual idols prove that there is unlimited potential for technology to be explored in different fields and that music can transcend reality. From the view of entertainment companies, AI virtual idols have many advantages. For example, they do not have real feelings or personal lives, so their health will not be affected by their busy schedules. Besides, they can “travel” to different countries without going on a plane and can be used to prove the level of technology skills the companies have. Yet can AI idols replace human idols who exist and have emotions? The increasing popularity of virtual human-like idols leads us to think about the future of the music and entertainment industry, and most importantly the alarming ethical issues brought up by this topic. One of the main controversies is that some AI idols gained more attention than trainees who spent years of their life training and working hard to become an idol. This poster will introduce the underlying technologies of AI idols and influencers, and the potential threats and changes virtual influencers and AI idols would bring to the current entertainment industry.

Temporal Event Data Analysis and Visualisation for Supply Chain Processes (3.81)

Xuan Ni Leong *The University of Sheffield*

The automotive industry is highly dependent on the supply chain to ensure timely production. However, the highly interconnected relationship between the Original Equipment Manufacturers (OEMs) and their individual tier suppliers pose special challenges to smooth process operation. The horizontal integration of different tier suppliers and their own suppliers demand for the modules, components and individual parts to be supplied on time and at the right quantity for production as this is critical for the success of their just-in-time and just-in-sequence production methodology. Hence, this project aims to optimize the flow of the supply chain processes in the automotive industry through tracking the visibility and control over their Tier N suppliers. This will involve applying discrete event simulation (DES) to build and model the automotive supply chain datasets. Sequen-C, a visual analytic system that adopts temporal event visualization technique will be used to perform in-depth analysis of the datasets. This system allows for multi-level and detail-on-demand exploration of datasets, uncovering the most common and deviating sequence of processes in the data according to clustering summary. It also enables the analysis to focus on a selected set of records by zooming in on a specific sequence of processes, viewing and comparing data attributes associated with it at both the sequence-level and event-level. The outcome of this project will be a proof-of-concept demonstrating how full-tier visibility in the automotive supply chain helps organizations identify and eliminate vulnerabilities, leading to optimized and resilient supply chains.

Indoor Localisation and Asset Tracking Using 5G Networks (3.82)

Zoe Sweetman London South Bank University

The proposed project aims to apply a deep learning architecture model to locate and track indoor assets moving outside of a specific area. The demo product uses scene analysis to determine whether the asset is within the designated safe area, or not. If the asset is deemed to be outside the safe area, an alert is generated for the user within the app. The main aspects of the demo model involves data collection; data presentation; an implementation plan; and a web app to be developed in Python. At present, the process of localisation on an asset in an indoor setting is very reliant on the triangulation of signals from the asset to the access points around the building. This solution would utilise RSSI signals stored in a table and be able to pinpoint and track the asset as it moves around indoors. This information would be relayed on a map displayed on the app. One use case is at the hospital as this technology would allow nurses to locate patients in a more efficient way. This is because the app features a map that visually displays the assets location making tracking them down a much easier task.

Smart Hydroponics – a data visualisation case study (3.83)

Cynthia Ikerionwu *London South Bank University*

Smart Hydroponics – a data visualisation case study Farming is an occupation that plays the ultimate role in helping this world survive. It meets the greatest number of human needs in this world. With the invention of the Internet of Things (IoT), there is also an improvement in the field of farming with the implementation of automation. This paper outlines the use of IoT and data visualisation used in hydroponics to capture environmental characteristics such as temperature and relative humidity. A front-end visualisation website will collect environmental factors in a real-time graph. These values, which include temperature and relative humidity, can then be captured and used for smart farming analysis. The project requires the collection of data on the environment through the use of a Raspberry Pi that was fitted with various sensors in order to monitor the growth of the crop that was being grown in the hydroponic farming experiment at LSBU. The experiment has been setup in a controlled enclosed environment to ensure external factors do not interfere with the hydroponics environment. My project work involve collecting data, analysing that data, and visualising the data. The project's ultimate goal is to offer users a real-time, graphed representation of the temperature and humidity levels in their smart farms. The challenges encountered will be shared and recommendations offered.

MSc (or final year for integrated masters courses)

An investigation into the use of universal authentication methods and whether they are benefiting or restricting the vulnerable community.

(4.84)

Aimee Robinson *The University of Winchester*

With the use of online accounts growing at an exponential rate, there is an ongoing need for users to protect their personal accounts. Authentication methods consist of something that is known, owned or biometrics. They have been used since the earliest days of computing, mainly through the use of passwords. Although authentication has been predominantly effective, it is not accessible to all people. Authentication methods are so widely used that they have grown to be the norm and are accepted with a lack of further investigation. This means that to adequately provide crucial cybersecurity protection for all people, there needs to be a discussion on the accessibility of different authentication methods. This will determine whether vulnerable people have been excluded through unintentionally discriminatory authentication methods. It is important to assess all types of authentication to see whether there is a more effective method that could be implemented. This authentication would have to be a financially justifiable method for businesses to apply while also being accessible to users. This poster and related discussion will analyse the current methods of authentication and how accessible they are. There will be subdiscussions surrounding multi-factor authentication, biometrics and whether it is the responsibility of the user or business to improve issues with authentication. Authentication methods consist of something that is known, owned or biometrics but are mostly seen through the use of passwords (something that is known). Authentication methods are so widely used that they have grown to be the norm and are accepted with a lack of further investigation. Although this method has been effective, there is a needed discussion of how accessible authentication, specifically the use of mainstream authentication, is. There is a general expectation on those who are vulnerable to “keep up” with others technologically to access the new plethora of online content. This expectation and lack of investigation can prohibit vulnerable users from adequate login information, lower security and lack of access to financial, health-based and social communication sites. The use of this poster and related discussion is to analyse the current methods of authentication methods and who it is and isn't benefiting. This will help to see areas of improvement and research whether this could directly benefit vulnerable people through unintentionally discriminatory authentication methods.

Riding the Rails of Fairness: The Tramway Transformation with Intelligent Fair Evasion Detection and Reporting in the UK. (4.85)

Anthonette Adanyin *University of Wolverhampton*

Despite being a significant contributor to any country's economy, the transportation sector is severely harmed by fare evaders. The UK's taxpayers are thought to lose out on roughly £240 million a year due to fare evasion, according to the Guardian. Additionally, fare evasion reportedly costs Transport for London (TFL) £100 million annually, according to the BBC. This misconduct occurs when a user accesses the system in inconsistent ways to evade the fare payment. Numerous studies have been conducted utilizing machine learning to prevent fare evasion in the bus and train transportation systems in the UK and other nations (Claiborne & Gupta, 2018; Burgos-Prada et al., 2021; Nicodeme, 2022). Thus, with the emergence of intelligent technologies, fare evasion in both (Bus and train) has drastically reduced and might be a bit difficult for a passenger to evade fare. However, there are dearth in researches using intelligent systems to monitor transport fare evasion especially in tram network. Also, payments, ticketing and ticket monitoring in trams are done manually leading to high evasion of fare, hence loss of revenue to the ministry of transport. There is therefore a need to develop intelligent systems that can detect, monitor and report fare evasion practices in trams which will be addressed in this paper.

Residue identity prediction from an amino acid residue's atomic-environment with equivariant graph machine learning (4.86)

Antonia Boca University of Cambridge

Understanding the structural role of individual amino acids in the context of atomic environments is important for protein engineering. We can understand this role by predicting the most promising amino-acid given the surrounding structural environment. State-of-the-art methods use 3D Convolutional Neural Networks to predict this amino acid residue identity, and this approach has recently had success in engineering more thermally stable plastic degrading enzymes. However, when using such architectures, the structure of the protein must be discretised onto cubic grids. There have been recent advances in the development of equivariant graph neural networks, a type of neural network that has the potential of overcoming the discretisation introduced by using 3D-CNNs. This work investigates whether equivariant graph neural networks can outperform the current state-of-the-art 3D-CNNs on the task of residue identity prediction and improve protein engineering in practice.

Mobile Messaging Phishing (4.87)

Aqsa Sarwar University of Strathclyde, Glasgow

Phishing is a common security attack that aims to trick users in revealing personal information. Traditionally, email was the main means through which phishing attacks were executed. However, in recent years attention has shifted towards mobile messaging platforms like whatsapp. As more and more people are using mobile devices for communication and accessing sensitive information, phishing attacks have shifted towards mobile messaging platforms like WhatsApp. These platforms provide a new avenue for attackers to reach a large number of potential victims and carry out their phishing schemes. It's important for users to be aware of the dangers of mobile messaging phishing and take necessary steps to protect themselves. To avoid falling victim to mobile messaging phishing, it is important to be cautious when receiving unsolicited messages, to never reveal personal information in response to an unsolicited request, and to verify the identity of the sender before responding. Additionally, it's important to keep software and mobile operating systems updated, use a reputable security solution, and educate yourself on the latest phishing techniques and how to identify and avoid them. By being vigilant and taking these preventative measures, users can reduce their risk of falling victim to mobile messaging phishing attacks. Mobile messaging phishing is a growing threat, and it's essential for users to stay informed and take proactive steps to protect themselves. By following the recommended preventative measures, users can reduce their risk of falling victim to these types of attacks and protect their personal information from being compromised.

Mind Games: Cognitive Bias in Cybersecurity Expert's Decision making (4.88)

Arohi Naik *Lancaster University*

Organizational cyber security is a complex combination of systems, processes and human behavior. In this context, a prime responsibility of security analysts is to make decisions to be able to detect and defend their organization from cyber threats and attacks. Good decision-making is therefore core to good cyber security practices. However, people tend to take mental shortcuts when analyzing complex information, referred to as cognitive biases; these are defined as systematic patterns of deviation from the rational judgment. The implicit nature of cognitive biases could cause security analysts to make misinformed decisions while interpreting security data. This may cause them to draw inaccurate conclusions about security threats and leave their organizations vulnerable to attacks, making it difficult to respond. It is critical to understand cognitive biases in security analysts' behavior when designing and developing defense strategies for organizations. For instance, if there is news of a new ransomware attack, organizations might concentrate on safeguarding their network while ignoring other crucial problems that could do even more damage. We thus need to understand, raise awareness and find mechanisms and processes to overcome these biases. The poster specifically identifies and discusses how certain types of bias can affect security decisions and proposes how we could seek to recognize and avoid these biases in practice. Further, it emphasizes the impact of cognitive biases on incident response, such as how they can affect the prioritization of threats and the selection of countermeasures.

“SMART DETECTION, SMARTER PREVENTION: The Power of AI in Credit Card Security Online” (4.89)

Augusta Obidinnu *University of Wolverhampton*

E-commerce and online shopping remain a worthwhile innovation whose usefulness has transcended post-covid. The convenience of this shopping method has invariably led to a sporadic upsurge in fraudulent activities aimed at unsuspecting consumers who use their credit/debit cards online. Juniper Research (2022) estimated that \$21 billion was lost to online fraud in 2015 and projected a \$30 billion loss by 2021. This grave situation has led to numerous research (Jiang et al, 2018; Priya and Saradha, 2021; Rodriguez et al, 2022) in a bid to detect and prevent online fraud. Most of these studies relied on patterns in customer online activity, shopping history, behaviour, location etc, and used these to identify fraudulent activities. The drawback of this method is that most detections occur post-transaction, which has already caused damage. Abdallah et al (2016) deemed it pertinent to focus on constructing and implementing fail-safe identification techniques on individual shopping sites and payment gateways, as well as employing multi-factor authentication including customers' financial institutions to checkmate credit card fraud. This proposed method will aggregate facial recognition, pattern recognition and optimisation methods which are highly dependent on the collaboration of businesses (retailers), fintech companies and financial institutions.

1, 2, 3 ... Can you detect my breathing? Use of Machine Learning to classify respiratory breathing types. (4.90)

Elizabeth Aladejare *Brunel University*

With the increasingly ageing world population, there is a rising shortage of hospital staff such as: nurses as mentioned by Health and Social Care Committee (2022), Bourgault (2022) and Maresova, et al., (2020); Physicians as highlighted by Whitcomb (2006) and Healthcare assistants detailed by The Health Foundation (2022). This is causing hospital beds to be occupied for longer, patients not being timely discharged to complete their last 10% of recovery at home and leading to extended waiting times to be seen by a medical professional. (British Geriatrics Society, 2022) 8 million people in the UK have Asthma per exploration by British Lung Foundation (nd); with 36,000 people annually affected by dirty air which affects their breathing and ultimately leading to premature death (Asthma and Lung, 2022). Breathing problems are a common issue and early detection can greatly improve patient outcomes. The aim of this research is to explore a machine learning algorithm that can accurately diagnose breathing issues, monitor and give personalized treatment recommendations for a patient virtually at home; thereby relieving hospital strain on healthcare professionals. This research would support current and future healthcare goals in line with the United Nations (UN) goal no.3 for healthy lives and wellbeing for everyone by 2030. (United Nations, 2022). The results of this study will inform future research in this critical field and contribute to the development of more advanced Internet of Things (IoT) technologies for remote breathing assessment. References: 1. Asthma and Lung (2022) Asthma statistics. Available at: <https://www.asthmaandlung.org.uk/new-air-pollution-laws-will-leave-children-breathing-dirty-air-for-another-two-decades-charity-warns/> (Accessed: 19 December 2022). 2. Bourgault, A. M. (2022) The Nursing Shortage and Work Expectations Are in Critical Condition: Is Anyone Listening?. *Critical Care Nurse*. 42 (2): p.8–11. <https://doi.org/10.4037/ccn2022909> (Accessed 10 December 2022). 3. British Geriatrics Society (2022) Addressing the shortage of care workers: What next? Available at: <https://www.bgs.org.uk/blog/addressing-the-shortage-of-care-workers-what-next> (Accessed: 2 February 2023). 4. British Lung Foundation (nd) Asthma statistics. Available at: <https://statistics.blf.org.uk/asthma> (Accessed: 13 December 2022). 5. Health and Social Care Committee (2022) Workforce: recruitment, training and retention in health and social care: <https://publications.parliament.uk/pa/cm5803/cmselect/cmhealth/115/report.html> (Accessed: 19 January 2023). 6. Maresova, P.; Prochazka, M.; Barakovic, S.; Baraković, H. J. and Kuca, K. (2020) A Shortage in the Number of Nurses—A Case Study from a Selected Region in the Czech Republic and International Context. *Healthcare* 2020, 8, p.152. <https://doi.org/10.3390/healthcare8020152> (Accessed 1 February 2023). 7. The Health Foundation (2022) Skills for Care report shows sector is ‘on its knees’. Available at: <https://www.health.org.uk/news-and-comment/news/skills-for-care-report-shows-sector-is-on-its-knees> (Accessed: 22 January 2023). 8. United Nations (2022) Goals: 3 Ensure healthy lives and promote well-being for all at all ages. Available at: <https://sdgs.un.org/goals/goal3> (Accessed: 2 February 2023). 9. Whitcomb, M. (2006) The Shortage of Physicians and the Future Role of Nurses. *Academic Medicine* 81(9):p 779-780 https://journals.lww.com/academicmedicine/fulltext/2006/09000/the_shortage_of_physicians_and_the_future_role_of.1.aspx (Accessed 18 January 2022).

Cloud-Based Water Quality Monitoring System for Marine Hatchery Using IoT (4.91)

Eva Chowdhury *Middlesex University*

For marine hatcheries, water quality is essential, so that marine creatures grow in a suitable environment. The toxic substances get dissolved in the water, which degrades the water quality and harms humans, the environment, and aquatic ecosystems. This paper presents a real-time water quality monitoring system to help marine creatures survive in a good environment. The method for this project is by using Rapid Application Development. The main hardware is temperature, pH, turbidity sensors, and a microcontroller Arduino Wemos D1 mini. The data is retrieved by real-time monitoring and stored in Firebase Real-time database and ThingSpeak. In this paper, a comparison between Firebase and ThingSpeak has been made. The Arduino system is the central part of this system. Three sensors, temperature, pH, and turbidity, are connected to the Arduino WEMOS D1 Mini with few resistors and capacitors. All the data from the sensors are sent to the Firebase and ThingSpeak for storage. The second part is the comparison between Firebase and ThingSpeak. After the experiment, the results based on latency Firebase are faster, and that based on functionality, ThingSpeak is better. A mobile application is also developed to make it easier for users to check the water quality from remote places. The developed prototype stores the information in Firebase and ThingSpeak through a mobile application developed to serve end-users. The experimental results prove that the system has a great prospect and can be practically used for water quality monitoring in marine hatcheries.

Visualizing personal finance management UX for users with ADHD (4.92)

Farah Dianputri *City, University of London*

Managing personal finances can be challenging for people living with ADHD, and it can cost them an extra £1,600 per year due to missed payments and impulse spending (Monzo and You Gov, 2022). As a result, they are more likely to face a debt spiral and anxiety over their finances than those without ADHD. However, banking applications now offer greater transparency and automation through notifications, visual spending breakdowns, and direct debt, which has allowed users with ADHD to gain more control over their finances. The objective of this study is to explore possibilities for a novel personal finance management app designed specifically for people with ADHD. Through user research interviews and usability testing, a prototype was iteratively designed based on user feedback to continually improve the user experience. The poster showcases key design decisions that were influenced by research and feedback from users with ADHD. These features include a savings challenge, visual debt repayment plans, safeguards against online spending, and data visualization for savings goals.

Machines Can Only Be Fair When Humanity is Finally Equal: How Explainable Artificial Intelligence is Exposing Bias Within Artificial Intelligence Models. (4.93)

Petra (Georgina) Lundy *University of Strathclyde*

Humans are inherently flawed - not flawed by naturally wanting to share and absorb information, instead by the way we are unable to guarantee communication of information without the addition of conscious or unconscious bias. Complex, curious, our lives are spent learning and teaching. We are beginning to develop this by programming machines to assimilate for themselves. It could be thought that designing a machine which does not think based on emotion or opinion, but instead on knowledge alone, would be the best way to ensure human health, safety, and happiness. However, when developing artificial intelligence (AI) models to make decisions, it is trained using datasets that have been created by humans. As we compile data and train the model, it leaves an opportunity for bias to seep into the algorithm, influencing the decisions made. As AI is rapidly developing and becoming a staple in professional and personal settings, we inventors are obligated to ensure that our models are equal and fair. The 'black box' that encases many models which make it impossible to explain how a decision has been made is not acceptable to be implemented in fields which have direct impact on human rights, and lives. One of the major aims of Explainable Artificial Intelligence (XAI), is to expose data and societal bias which may be implemented into a model with or without the knowledge of the creator or end user, in order to reduce possible prejudice and discrimination.

FamtamAI: a Fusion of AI-MoCap Technology in Augmenting the Human Motions (4.94)

Gowthami Rasanayagam *King's College London*

The sentient AGIs we fear are not just already transforming multiple industries declaring “code red” for human jobs but also augmenting human capabilities in many unseen ways. AI’s are seamlessly integrated into our day-to-day life and play simple roles like revamping our languages to assisting us in moon shot missions making intelligent calculated moves. At the same time, traditional Motion Capture (MoCap) technologies have moved out from silver screens and started appearing in our routine life with affordable wearable and vision based Motion capture technologies. Here we will touch on FamtamAI: fusion of AI and MoCap technology in Health, Sports and Ergonomic performance augmentation. AI assisted strategies and game theories for team sports like football fed with MoCap data of players has pushed the limits to dominate the games and opens a new horizon of injury prevention while promoting healthy and efficient human motion. Detecting bad posture in real time alleviates musculoskeletal conditions which are leading contributors for disability worldwide and support in assessing the ergonomic conditions in many different environmental settings. Personal motion inferences using FamtamAI enable us to track our nutrients and hydration levels and lead to healthy practices. Prosthetics powered by AI trained on personal motion data seeds a new generation of enhanced and powerful bionic human beings like impersonating natural gait patterns for amputees. FamtamAI’s competence in uniquely identifying individuals based on their movement fingerprints opens up a wide range of applications in surveillance and security. Thus, it enhances and augments quotidian activities and seamlessly integrates into our life.

Predictive analysis of covid-19 pneumonia using deep learning and CT scans (4.95)

Habibat Giwa *Sheffield Hallam university*

COVID-19, caused by the virus SARS-CoV-2, was declared a global pandemic by the WHO in 2019. It spread quickly across the globe and has affected millions of people, making it a major global health concern. COVID-19 pneumonia is an infection detected in some patients following their infection with COVID-19. As COVID-19 pneumonia can range in severity from mild to life-threatening, it is important that it is identified at an early stage so that appropriate healthcare is provided to assist recovery. This research, aims to detect COVID-19 pneumonia using deep learning methods on CT scans. Four different deep learning models were investigated: CNN, Inception Resnet 50, MobileNet, and VGG19. The results showed that the CNN model had an accuracy rate of 95%, while the Inception Resnet 50, MobileNet, and VGG19 models had accuracy rates of 92%, 74%, and 92%, respectively. The open-source dataset used, consists of 19,685 CT scans, including 5,705 images of healthy scans, 4,001 images of confirmed COVID-19 pneumonia, and 9,979 images of COVID-19. In conclusion, our study demonstrates that deep learning methods can assist the detection of COVID-19 pneumonia on CT scans. The implementation of this promising technique, will help reduce the time required to examine patients' scans, as a preliminary classification/indication will be provided during the scan. This will also facilitate the assignment of additional tests to identify potential cases, in case the preliminary assessment is unclear, leading to reduction of waiting time in healthcare.

Speaking in Tongues : Achieving Multilingual Multi-intent Detection for Dialogue Systems (4.96)

Hrichika Nag *The University of Edinburgh*

Task oriented dialogue systems are increasing in popularity and are becoming more widely adopted across various industries. Such dialogue systems are designed to help their users achieve certain objectives, and intent detection is a critical component of these systems. Traditional intent detection models are usually domain specific and map input sentences to a single event. Such models are not able to perform well when the user's goals become more complex. For example, "I would like to cancel my reservation to London and instead need the best flight deals to Madrid" contains three intents: "cancel_reservation", "search_flight" and "find_best_flight". In single intent detection systems, this would be mapped to only "cancel_reservation". Furthermore, the success of task oriented dialogue systems is tested on a handful of languages, such as English. This means that speakers of other languages are left behind and without access to such developments in technology. We will explore how we can build a multi-intent detection system that extends to not only English, but also to other languages, in a multilingual setting. In our case, we will conduct experiments on Spanish (high-resource), Marathi (medium-resource), Turkish(low-resource) and Amharic (low-resource). To achieve a multilingual multi-intent detection system, we will investigate the effects of intermediate fine-tuning on large pre-trained sentence encoders such as SentenceBERT. We expect that this will allow such models to learn sentence representations that are more domain and task specific for better intent detection.

"This Body May Not Be Mine". Can Digitisation help prevent Stereotype induced dysphoria in kids? (4.97)

Jane Ezumezu *Sheffield Hallam University*

Gender dysphoria is a term that describes a sense of unease that a person may have because of a mismatch between their biological sex and their gender identity. This sense of unease may be so strong that it can cause anxiety as well as negatively affect daily living. It could take place at a young age or much later. Children may express interest in items or clothing that society believes relate to a different gender. They may be unhappy with their physical characteristics. However, this type of behaviour is reasonably common in childhood and is part of growing up. Not all kids who act in this way have gender dysphoria. The cause of gender dysphoria is unclear as gender development is quite complicated. However, child labelling or stereotyping can have an effect. There are stereotypes everywhere, at home, at school, and in the media. The number of gender identity cases are rising and it's important that this is addressed using effective methods. This poster aims at showing how Digitisation can help in boosting self-esteem in kids and creating self-assurance in cases where self-doubt and gender dysphoria might have arisen as a result of other people's views and expectations. This is not a replacement of the GP or specialist for diagnosed cases. This is a proposed approach that should provide support to kids with low self-esteem, as a result of doubts created by their environment or adults around them.

Automating Task Reports (4.98)

Jasleen Kaur *University of Stirling*

Every project needs proper planning to achieve the target. Technology is used to make the journey smooth and we can replace manual labour with just a click. People work on different projects, with different people, and at different locations, so it could be a difficult task to gather all the information, feed the data from all sites, and then present it to higher management or use it to forecast the demand. So building an app can be a helping hand for the organization. It is not location specific, instead enter the data in the prefilled form e.g. Name of Employee, Location, Tasks (with a drop-down to select), amount of work done, contractors, and date. This information can be added to the database by just clicking on the submit button. This can then be extracted from the app by entering the date and project name. This CSV file can be fed on visualization tools like Tableau or Power BI. Import the file and then dashboards can be built to help the higher management clearly understand the progress. It is checked with the planned work, the bottlenecks, and how the future targets can be set. It takes a lot of time to feed the data, also the employees involved on sites have an extra task to update regularly, so this can hinder the performance of already running tasks. Thus this can be of aid to parallelly run both the tasks and is of help for the company.

Barriers to a Career in Technology (4.99)

Kiranjit Kaur *Shergill University of Warwick*

Despite living in a world where technology surrounds us and has become a major plus significant part of our daily lives, there is still a number of barriers to be able to confidently enter this field. The barriers begin from a very young age, as IT and Computer Science are not taught well if taught at all in schools. Therefore, children lack basic knowledge on how to effectively adopt technology and fail to understand the potential career paths it can provide. Moreover, the younger generation are not confident to apply their digital literacy skills to a tech career. In addition to this, tech culture tends to connote gender bias especially due to the industry predominantly being male dominant. Unfortunately, there is a lack of diversity too which has been recognised when attracting a diverse workforce in this type of profession. Furthermore, the tech culture has also been promoted to result in unhealthy work life balance due to the nature of the work as it is constantly changing consequently leading to the challenging hours. To overcome these barriers to be able to have a successful and fulfilling career in technology, it is important to focus on providing a good foundation to children at their younger years of education and emphasise and highlight the benefits of pursuing a career in technology. Additionally, a company's corporate social responsibility should also aim on shifting culture patterns along with eliminating negative connotations. They should be the forefront of setting a positive example to lead by.

Economic Freedom through the lenses of the Gender Wage Gap (4.100)

Luisa Fernanda Estrada Plata *University of Warwick*

Countries often use multiple indicators to analyse their progress and develop effective policies and regulations. A standard indicator is the Fraser Institute's yearly Economic Freedom index, which reflects how easy it is for people to access a free market (Gwartney et al., 2021). Nonetheless, some countries impose barriers based on gender, making men and women experience their Economic Freedom differently. In particular, we find alarming results when analysing gender-specific data, such as how women are simultaneously underrepresented in higher-paying jobs and overrepresented in low-paying ones (Ortiz-Ospina & M. Roser, 2018). Even so, studies that compare how men and women perceive the world are scarce. Thus, we contributed to the discussion about women's financial inequality by proposing a new gender disparity index to adjust the Economic Freedom area of 'Sound Money'. To do so, we use the gender wage gap together with the male and female workforce proportions at the top and bottom wage quantiles to simulate how the wage distribution shifts once seen from a woman's standpoint. Still, our results made us wonder about the impact of gender inequality on the remaining areas used to build the global Economic Freedom index and question how to include other explicit and implicit cultural biases towards women and other marginalised communities.

Implementing Blockchain to Optimize Waste Management Cost (4.101)

Megang Nkamga Junile Staures *University of Stirling*

The current practice of garbage collection in most cities in the world requires the municipality to hire truck drivers (TD) with a fixed salary to ease the collection of garbage through all the streets where bins are located every week regardless of the garbage bins being full or empty. To handle this challenge, we can develop a mobile application system for TD to be used by citizens to notify their location when their garbage bin is full and pay a certain amount of money via the system so that TD can come and pick up the garbage. Blockchain is connected to the project to simplify the supply chain and create a more efficient, transparent mobile application system that will help track garbage collection and financial transactions. By using blockchain technology, we can ensure that all data related to this project is stored securely and transparently. In addition, blockchain can also help streamline financial transactions related to this project, making it more efficient and cost-effective.

TALKING TECH! BLANK CANVA (4.102)

OLUWAFUNMIKE AFOLASHADE SHITTU *SWANSEA UNIVERSITY*

There is so much to explore in technology knowing how vast technology has become, every manufacturer uses different terminology which can be very confusing especially if you do not know where to start from. There are various approach available when it comes to developing an application. Technology developer are tremendous using an approach they can best relate with. When space technology began, there are number of steps to explore starting with application of certain principles in engineering, to designing the structures, then developing and manufacturing of the product and operating the devices and systems for space travel and exploration ensuring a desired outcome which the world celebrates today. Channelling our attention toward the inexhaustible evolution evolving in technology, alongside innumerable list of unveiled ideas in technology. Understanding the fact that technology is becoming a mystery everyone with keen interest are exploring. Thankfully technology has evolve to a level where everyone has access to basic knowledge of its existence by using smart phone in our daily activities to structure our sphere. Driving home my point Technology has come to stay and will keep evolving, I believe if the tech world of innovation can positively channel basic orientations to make individual see all that are explore-able in tech. 1. By creating awareness and pointing out the advantages. 2. Helping people build interest in wanting to know more 3. Making the learning steps easier We can surely build the world together and explore more of technology blank canva

Reducing Mental Health Inequalities among the BAME Residents of Herefordshire & Worcestershire Communities (4.103)

Oluwatimilehin Olabamiyo *University of Wolverhampton*

The current economic crisis, post-covid impact, and various challenges facing the National Health Service (NHS) might negatively influence the mental well-being of the United Kingdom residents. These effects might be worse felt by residents of rural communities or people identifying with some protected characteristics due to inadequate amenities or social isolation. Some parts of Herefordshire and Worcestershire communities are rural, and it is important to investigate the impact of the current challenges on the BAME residents as they might even be more affected just like it was seen generally in the UK during the covid-19 crisis or mortality. Data for this study will be extracted from the Primary Care Network (PCN) and Herefordshire & Worcestershire NHS Trust database between January 2018 and December 2022 to investigate the mental health inequalities among the BAME residents of these communities and develop strategies that could be introduced to enhance the mental health equalities in these communities. The awareness level of common mental health issues, experiences, and outcomes when residents visited mental health services will also be examined with the usage of validated questionnaires such as RCADs. Data analysis will be carried out with the usage of Python and Power BI while data will be stored in the Microsoft SQL Server database. This study will support the Herefordshire and Worcestershire NHS Trust plan for reducing inequalities and provide information at the population level for these communities.

DISCRIMINATORY ROBOTS (4.104)

Opemipo Mariam Otaiku *Brunel University*

AI chatbots have been around for some time; from Eliza, which was developed by MIT professor in the 1960s to OpenAI's ChatGPT, the chatbot on everyone's mind. An AI chatbot is a software program that understands queries in the form of spoken or written human language based on Natural Language Processing. The user can type freely and the bot understands the intention behind the query and will respond. Bots are trained using Machine Learning with data collected over time from the internet including data inputted into the chatbot. There are ongoing conversations on the ethical implications of deploying AI chatbots, especially on the issue of the bots displaying discriminatory language. Microsoft disabled their chatbot "Tay" due to the offensive responses it generated; it was emulating the language of those who were using it. It is now common practice for software developers to table out ethical considerations before launching a chatbot - but how effective is it? Taking ChatGPT as an example, whilst the owners confirm that the bot is trained not to respond to queries that will cause it to generate offensive content, it appears users are able to bypass this. Do we simply accept that offensive robots are here to stay because not all instances of subtle discrimination can be predicted? Users of ChatGPT have criticised the bot on the basis that the issue of bias still persists and as long as that is the case, owners of chatbots, including ChatGPT need to deploy better models before widespread release.

Tracking and Early Diagnostics of Endometriosis | Empower HER (4.105)

Radina Kraeva *University of Strathclyde*

We [the global citizens of the world] are constantly reminded about the ever-evolving nature of medical and healthcare innovation and advancements and the growing positive impacts they create for us. Even so, the gender pain gap is still prominent. A recent survey conducted by Nurofen suggests that 1 in 6 women who participated experiences severe pain every day, yet due to engrained gender biases, their pain is consistently overlooked in healthcare, underrepresented in research, and overall dismissed [1]. This poster aims to investigate how endometriosis, one representative of the gender pain gap, can be addressed through technology and innovation. Although technology cannot entirely solve the issue, it can positively impact it. Endometriosis is a disease where tissue similar to the lining of the uterus grows outside the uterus, causing pain and/or infertility [2]. Research shows endometriosis affects roughly 10% (190 million) of reproductive-age women and girls globally [3]. There is currently no recognised methodology to prevent endometriosis. Although there is presently no cure, increased awareness, followed by early detection and treatment, may slow or stop the disease's natural development and lessen the long-term burden of its symptoms. This project aims to carry out a User Experience (UX) research study for the creation of a digital-forward solution focusing on tracking and early diagnostics of endometriosis. Furthermore, the project will investigate how Machine Learning can be used to create a diagnostic tool for endometriosis. References 1. Gender Pain Gap Index Report (2022). [online] Available at: https://www.nurofen.co.uk/static/nurofen_gpg_report_nov-2022-54693dac1565d22a8bbd0b209b60c488.pdf 2. World Health Organization (WHO). International Classification of Diseases, 11th Revision (ICD-11) Geneva: WHO 2018. 3. Zondervan KT, Becker CM, Missmer SA. Endometriosis. *N Engl J Med* 2020; 382:1244-56.

The New age of child's play. (4.106)

Sarah Clowe *Keele University*

Children's toys and games have developed exponentially over the past 50 years; toys are now not just for fun but also for education. With the introduction of robotic Lego (Lego EV3 Mindstorm, Lego Inventor Mindstorm) and Minecraft coding, children can learn new skills whilst playing. Schools are now implementing these Lego robots into their curriculums, as it teaches creativity, imagination, and fine motor skills on top of coding, maths and English. Minecraft have brought out several different versions of the game, from Java to Bedrock and now they have Minecraft Education edition, which has a coding platform called the code builder. This code builder allows players to make mods in scratch, Python and JavaScript. Already there are after school clubs encouraging Minecraft as its fun and educational. Minecraft education also has a chemistry option to allow players to experiment with the elements in the periodic table and create new things for their games. Another advantage which has come out of both Minecraft and Lego Mindstorms in education means those with disabilities have a more engaging, visual, and kinaesthetic learning experience. This allows for a deeper understanding in subjects like Maths, English, and Science. These toys and games are revolutionising education and child development, this poster will explore the Lego Mindstorm and Minecraft education and sum up how these educational tools are improving the education of today's children especially those with SEN, in and out of school. Therefore, these educational tools will help SEN children in the classroom with learning.

Artificial Swarm Intelligence in space debris clearance (4.107)

Srimoyee Ghosh *University of Bath*

As space tourism moves from the realm of fiction into reality, the risk of a “space collision” - getting hit by a defunct satellite or debris in space - is increasingly becoming real. Data from the European Space Agency (ESA) show that 15,090 satellites have been launched into orbit since the start of space age in 1957. 7,200 of these are functioning and 5,290 have been destroyed, but the remaining 2,600 are derelict but still in various orbits around Earth. Additionally, 65 years of launches have produced huge amounts of other junk – from payload fragmentation objects to rocket upper-body parts. Some of these are as large as buses, moving faster than a speeding bullet, tumbling uncontrollably, and pose a catastrophic threat to any other objects they hit. While many experiments are underway at ESA and NASA to solve this, our proposal is to use Artificial Swarm Intelligence to clean up the debris field. We will launch into orbit a swarm of AI-enabled miniature CubeSats which will be decentralized, networked and self-organized. They will be powered by computer vision and have independent path planning, decision making and manoeuvring capabilities. Once in orbit, they will identify target debris in their neighbourhood; autonomously select and navigate to the nearest one; and form a constellation to capture and de-orbit them into the atmosphere. This way we could clean up space in a relatively low cost and scalable way, prevent the danger of “Kessler syndrome” and safeguard the future of space travel.

Impact of Artificial Intelligence on Legal Systems (4.108)

Sweta Patra *The University of Sheffield*

AI applications, will presumably have a larger influence on human affairs which were earlier categorized as chaotic. In civil dispute cases, the judge is required to make a distinct analysis of the definite issues. Although this is usually effortless for experienced judges. But in scenarios where there is inexperience, it could lead to dilemma. This may not be fair for the defendant. Now if we add the parameter of inadequate time to inexperience, it ascends to furthermore issues in decision making. These kind of low key cases could be assisted with AI pattern recognition, identifying patterns in cases that lead to certain outcomes. It could also be used for highlighting which cases are most likely to be violations of already existing legal conventions. Usage of speech recognition in capture and generation of case transcripts. We do have certain challenges like the role of academic freedom, the existence of a wide diversity of legal and ethical norms applicable to or endorsed by the global NLP scholarly community and Ethical Limits of Natural Language Processing on Legal Text threat of moralism in legal NLP research. AI like any other software is prone to errors both logical and factual and might even be biased depending on the user inputs. Thus it is essential to ascertain that the person in charge of providing inputs to AI algorithm, has the utmost clarity on legal scenarios and no bias. Despite the above issues, AI is already enriching the practice of law and amending the judging process.

The Role of Artificial Intelligence in Enhancing Student Learning Experience in Higher Education Institutions. (4.109)

Titilope Adewuyi *University of Dundee*

Artificial Intelligence will continue to play an important role in the student learning experience both now and in the future. Unlike how some perceive it, Artificial Intelligence poses no threat to teachers, and cannot replace them but it is there to deliver better education to students. With AI in place, teachers are able to easily and critically understand the strengths and weaknesses of the students. Some AI-driven platforms like Coursera, Edx, LinkedIn Learning, and Udemy promote more differentiated and individualized learning experiences. To some extent, AI helps us to rethink our whole education system. It easily helps to assess how education is delivered and its impact on the student learning experience. Several authors have analyzed and discussed the unending benefits of integrating AI into the educational system. However, there is a dearth of literature on the impact of adopting AI in higher education learning. Furthermore, the commonly adopted AI methodologies and how they truly impact student learning experience remain unclear. We aim to provide a more explicit literature review of the important role AI plays in enhancing student learning experience as AI algorithms are integrated into the educational and learning theories and to analyze the various AI algorithms used in previous empirical research studies, their implications, and to conduct more empirical study which will examine the actual impact of AI application on students learning experience in higher education. Lastly, we aim to recommend the most impactful AI algorithm that will optimally enhance student classroom engagement, performance, and overall learning experience.

Explainable AI for Cyber Security Applications (4.110)

Ukamaka Nkechi Oragwu *Brunel University*

The goal of Explainable AI (XAI), a branch of Artificial Intelligence, is to make AI systems more transparent and interpretable. AI models are made to perform human tasks with very high computational speed and accuracy. Over the years, the quest to improve the accuracy of these models increased the complexity of the system and created “black boxes”. The “black box” model (inability to explain the working of the model) raised concerns about the system regarding accountability, trust, transparency, and fairness. Regulatory bodies are now attempting to address these concerns by implementing laws guiding the use of these “black box” models. The European Union, General Data Protection Regulation (GDPR) has included that all AI models must be interpretable to be used in decision-making, the European Commission and United states are also working on legislation to address these issues and regulate the use of the “black box” models in industries. This research will solve the problem of the "black box" in AI by developing an Explainable AI model for cybersecurity applications. This will improve trust in AI models while meeting regulatory requirements. AI is frequently used in cybersecurity to assist corporations in safeguarding their systems and data. The methodology of this research will utilize a chosen public dataset from one of these applications to build and demonstrate our explainable model. Two datasets being considered are the CIRA-CIC-DoHBrw-2020 dataset and the CIC IoT Dataset 2022, both from the Canadian Institute for Cybersecurity.

Modeling Air Pollution and Source Inference (4.111)

Zinia Tasnim *The University of Sheffield*

The global ecosystem is largely linked to air quality. If the source of these air quality problems can be identified, effective strategies can then be adapted to reduce air pollution. Air pollution modeling provides an estimate of the relationship between air pollution sources and their effects on ambient air quality and its impact on the earth's climate. Using the Advection-Diffusion model, the distribution of air pollutants can be understood. A novel and powerful approach for performing source inference of air pollution[1], has been developed by the University's research group. This provides an effective approach for modeling the source as having a Gaussian process prior and assuming a linear PDE (or ODE) to describe the advection and diffusion of air pollution. This model can be used to represent and detect pollution sources for inferences such as forest fire, using the location of substantial fire data, collected through a remote sensing satellite. More examples include city or countrywide monitoring of PM2.5, and global radioisotope dispersion: if after a containment failure at nuclear storage and reprocessing facilities, monitoring stations across the world can detect the radio-isotopes released, using this transport model the source might be reconstructed or in the future a country's CO2 fossil-fuel emissions could be estimated using this model combined with measuring carbon isotope ratios in the atmosphere. The goal of this work is to utilize mentioned system's output intel to devise the most efficient approach to reducing air pollution, contributing to lowering the chances of climate endangerment and human diseases. [1] Gahungu, Paterne, et al. "Adjoint-aided inference of Gaussian process driven differential equations." arXiv preprint arXiv:2202.04589 (2022).

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