



Abstract book
13th BCSWomen Lovelace Colloquium
University of Stirling, 8th April 2020

Introduction	1
Where to find things online	2
The programme	3
How the poster contests will work	4
Sponsors & Supporters	5
First year or foundation year student abstracts	6
Second year student abstracts	13
Final year student abstracts	28
MSc student abstracts	44
Thanks	54

Introduction

Welcome to the first virtual BCSWomen Lovelace Colloquium.

We decided to go online four weeks ago, when things were starting to close down because of the COVID19 pandemic, so we've pulled this together quite quickly. We hope it goes well and that you're able to watch the talks, talk to each other, and enjoy the student posters. We think it's going to be good, although we do wish we were all in sunny Stirling together.

Unsurprisingly a lot of students have found the last few weeks difficult as they've had to leave University at short notice, transition to some form of online learning, and face uncertainty and pressure on many fronts. We have had more dropouts than usual, but we've (at time of writing) over 40 posters submitted from over 100 abstracts. This book contains the abstracts for those who haven't withdrawn from the contest. We think they're fascinating to read and show the breadth of topics our undergraduate and taught masters women are studying.

Helen Miles (Chair)

Carron Shankland (Local Chair)

Hannah Dee, Amanda Clare, Alice Miller (Organisers)

Where to find things online

<https://canvas.stir.ac.uk/login/canvas> is the Canvas login page - sometimes if you're timed out you'll be redirected to a different page, but this is the one that works for external users. If you are logged in, this is the page to take you to the Colloquium:

<https://canvas.stir.ac.uk/courses/7503>

We have a short video tour of the Canvas pages

<https://stirling.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=56eb5255-229d-43fc-91a4-ab9600bcedd0>

Discord is where the discussions and posters will be. <https://discord.gg/yAU8DPt> is an invite to our Discord server. If you've never used Discord before we have

- a short video https://www.youtube.com/watch?v=ZXIUz_oM1AA&t=2s
- and a help document:
<https://docs.google.com/document/d/1HzAhHyfoHPmGfgOHTh1jfEn-g7r0GiGKMpWUq7WIm7o/edit#>

The programme

09:30	30 mins	Canvas + Discord	Time to make sure you've logged in ok to Canvas and to Discord. Video tour of Canvas . Video tour of discord .
10:00	20 mins	Canvas + Discord	Welcome & Orientation. Watch Helen Miles' introduction , and Muffy Calder's special message to us , then pop over to Discord : General Chat for any last minute updates, and to ask questions
10:20	25 mins	Canvas	Savi Maharaj : Controlling epidemic spread by social distancing: Do it well or not at all
10:45	15 mins	(offline)	exercise/comfort break
11:00	25 mins	Canvas	Lovisa Sundin : 3 concepts to make you fall in love with computer science again
11:25	25 mins	Canvas	Vicky Brock : Life and learning as a tech entrepreneur
11:50	10 mins	Discord	General announcements (discord - General Chat)
12:00	15 mins	(offline)	exercise/comfort break

12:15	120 mins	Discord	Poster contests: 12:15-13:15 foundation, first year and second year students 13:15-14:15 final year and MSc students	Lunch and chat
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14:15	20 mins	(offline)	exercise/comfort break
14:35	5 mins	Discord	Tune in to the general discord channel for announcements
14:40	25 mins	Canvas	Ros Walker : Being a learning technologist during COVID-19
15:05	25 mins	Canvas	Jess Enright : Changing Graphs to Stop Disease
15:30	25 mins	Canvas	Sharon Moore : Words of Wisdom
15:55	20 mins	(offline)	exercise/comfort break

16:15	45 mins	Discord	Panel on computing careers
17:00	30 mins	Discord	Close & prizes
17:30	-	Discord	Social - stick around on discord. Make friends, play games, hang out.

How the poster contests will work

Students in the poster contests each have two Discord channels: a text channel and a voice channel.

During their session students should “hang around” virtually near their poster; this means they’ll be in the voice channel and monitoring the text channel.

- 12:15-13:15 is the session for the First years and foundation years contest, and for the Second year contest,
- 13:15-14:15 is the session for the Final years and MSc contests

To visit a poster, click on a student’s text channel to see the actual posters (in thumbnail). This can be enlarged by clicking on the image, and if it’s still not large enough you can click “view original” underneath to see a really large image of the poster. You can ask the poster author questions using text or voice chat.

We will have judges going around and talking to the students during the sessions, and we also have a “People’s Choice” prize voted for by all attendees. To vote for the People’s Choice, give a :thumbsup: reaction to the poster.

Sponsors & Supporters



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JP Morgan - Best 2nd Year

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First year or foundation year student abstracts

Can Technology Improve Democracy? (1.01)

Abigail Banwell, *Lancaster University*

As populations get bigger and technology becomes more integrated in our lives, more and more countries are looking into electronic voting (e-voting). Allowing people to vote remotely over the internet would mean people with busy schedules would be able to easily vote without having to travel to a poll station. Installing e-voting machines at poll stations would allow people who don't know how to read to vote as well. E-voting can increase the speed of counting ballots and provide improved accessibility for disabled voters. In countries with large populations it allows election results to be processed and announced faster. The introduction of e-voting may also lead to an increased voter turnout especially among a younger population as the implementation of remote e-voting, that is voting over the internet also known as i-voting, which would lead to an arguably more democratic society. However, the introduction of e-voting leads to concerns of a rise in election fraud and attacks from third parties. Countries such as the Netherlands, Ireland, Germany and the United Kingdom have cancelled e-voting systems or decided against a full-scale rollout due to issues of unreliability in electronic voting machines. As time goes on the impact of e-voting on democratic societies will be interesting to observe and may change how elections run around the world forever. My poster will explore the impact e-voting has had on countries that have implemented it to date and discuss the benefits and disadvantages of e-voting.

How has animation changed? (1.02)

Amy Collins, *University of the West of England*

The first-ever animated motion-picture film was called *Humorous Phases of Funny Faces* (1906) by J. Stuart Blackton. Using a blackboard, this film is the earliest surviving example of a drawn animated film. Within the last 114 years, the technology used in animated movies has improved dramatically. Now the main technology used in animated films is Computer Generated Imagery (CGI). CGI has meant that it has become cheaper and quicker to make movies as computer-generated effects are much easier to create than real effects. It has meant that the animation industry can be more creative. *Spider-Man: Into the Spider-Verse* is an example of mixing techniques such as CGI and the usage of traditional hand animation. This innovative technique led to it becoming the first film in 6 years to beat Disney/Pixar in winning 'Best Animated Film' at the Oscars. However, improving animation technologies being used by major film-houses with large budgets may be putting indie films at risk. It's becoming increasingly difficult to stand out in the crowded animation market without a large budget or uniquely built animation software. Additionally AI management software, such as the one funded by Warner Bros, could further threaten the creative community.

My poster is going to explore the technology used in the animation industry, along with the pros and cons of such technologies.

What's in the data? (1.03)

Amy Topping, *University of Sunderland*

Analysing the data from your website and other online forums, such as Facebook and Twitter engagements can seem daunting. Speaking as someone with the experience others don't have, I know that someone who is not at all focussed on the world of computing, and has very little idea of how their website actually performs in helping to assist with a more varied and larger customer base, I can say from experience how much small changes can influence who interacts and calls up for work and so on.

For businesses who can not or do not provide services online, or in anyway connected to the online world, such as plasterers, builders and so on, the online world can seem daunting and in some cases pointless. I worked with my grandad over the last few years to help him see how the internet, Facebook pages, a website can change the way he does business.

People of the older generations who do not know much about computing can often be scared or just see no point to going online, building a website and engaging on Facebook through a business page with customers. I changed my grandad's mind on his website and working together, we found what people used to decide who to have working for them. I would like to share my experience.

A new chapter for humanity (1.04)

Francesca Mirandola, *University of Stirling*

Nowadays, the world is changing fast, so fast that we barely keep up with new trends while progress is constantly shaping our lives. I'm amazed by what we're capable of today: how people can easily connect around the world, how sophisticated our technologies are and what we can do with them. Life is getting easier, more efficient and AI and the IoT are coming to help us optimize our lifestyles even more: automated jobs, self-driven means of transport, more personalised healthcare systems, new ways to interact with people and what is around us and so much more. As the technology expert, speaker and author Dave Coplin said, "I would argue that AI will even change how we perceive what it means to be human" and he is totally right. However, it might be scary hearing these words: are we truly ready and willing to embrace this transformation? I don't believe we all are, but luckily, we don't have much choice: this is something we can't stop, and it will be pervasive. Therefore, it is of vital importance to know what we're facing and to learn about all these new technologies and what there's behind them. Everyone should understand better the incredible opportunities we have, actively take part in their development and use them consciously. This poster will explore some forthcoming changes in our everyday life and why it is important to welcome them. Let's stop being passive: what are you waiting for?

Signs and Wonders: Tech Solutions to Sign Language Translation (1.05)

Holly Langton, *The University of Wolverhampton*

Many people are of the belief that there is one singular sign language that is used universally, however that could not be further from the truth. In reality, there are approximately 250 different types that are used everyday across the globe. There are a multitude of smart translation tools for spoken languages, including the Waverly labs Ambassador and the commercially available Google Pixel Buds, and therefore a great deal of time and money has been invested into their development. Conversely, there are far less products/assistive technologies that are available to aid with non-verbal communications, perhaps leaving a gap in the market. AI and the Internet of Things do already provide many of the tools we need to develop solutions, so that for example, users around the world can engage in non-verbal communication via different variants of sign language (such as British Sign language (BSL) or American Sign Language (ASL)). This doesn't usually account for interaction between the alternative nonspeaking languages though. Hence, this poster will discuss potential concepts that can break the non-verbal language barriers, connect communities and enable users from all over the world to communicate with each other in the same way as verbal communicators.

AlphaFold: Neural network predictions of protein folding (1.06)

Kristina Pavlou, *University of Glasgow*

The biological mechanism by which proteins acquire their three-dimensional structure has been a source of fascinating research for centuries; how the structural composition of long chains of miniscule amino-acid molecules can control the function of a protein and dictate one's wellbeing or disease. Nevertheless, as defined by 'The Protein-Folding Problem', deciphering the countless possible bonds and interactions between amino-acids has proven to be a critical scientific challenge. Traditional, laboratory-based experimental techniques such as X-ray crystallography and cryo-electron microscopy are often coupled with high levels of uncertainty and significant financial implications. In this poster, I will be looking into the applications of artificial intelligence in biology by concentrating on DeepMind's AlphaFold deep neural network. This system has been trained by using genetic material sequence data as a source of predicting the separating distance of protein structures' amino-acid molecule pairs, as well as the angle of their formed bonds. Is this the revolutionary breakthrough craved by modern medicine, or is it too good to be true?

AD'S AND PRIVACY (1.07)

Mahitha Vukkalkar, *Middlesex university*

Nowadays with increase of new technologies and new social medias ,it comes with great advantages and greater threat to our privacy . One of the examples , is with targeted advertising that make up most of the web. Advertisements serve as a way for people selling products to connect with others who are willing to buy. But what are targeted ads? Advertisers gather data specific to you, rather than your region or neighbourhood and show you adverts based on that. So, how it's a threat to our privacy? The sellers are out there collecting and sharing information about buyers ,mainly without their awareness or consent . Companies or organization just require your name , address , geographic areas , demographic areas , and it gets passed by companies to companies and seller to seller . Advertisers can track us around the web , knowing what site we visit and what we buy. To follow us they rely on cookies , which are small files that allow a site to store a information in between visits . This is how they know that you have signed in or added items in cart or visited the product . They can gather information about us from our google account, you tube watch history , google map trips and apps installed in our phones. Ads networks work better and gather more information on mobile devices especially on android phones. Online targeted ads have become more controversial because companies can go to any further to grow their networks. These have reached social medias too. Targeted ads also have some unethical and biased ads also.

This poster will explore the ways in which advertisers track users on the web and investigate some ways to overcome this.

Help, a Robot Took my Job! (1.08)

Melanie Cope, *Manchester Metropolitan University*

Following the rapid development of artificially-intelligent (AI) technology in the last decade, AI-powered machines have been widely introduced in the manufacturing industry. By automating repetitive and laborious tasks, these machines aim to assist workers to work more efficiently, increasing their productivity. With the increasing number of jobs reported to have been replaced by machines over the last decade, convincing workers that this technology is meant to assist and increase their productivity may be a challenging task. Changes sparked by the fear of replacement have been documented in recent labour market trends; workers switching from middle-income manufacturing job roles to lower-income service-based roles to protect their source of income. Workers assume that they are less likely to be replaced by working in less-autonomous roles.

The common misconception about intelligent machines is that they are meant to replace us; making it cheaper to complete tasks previously completed by humans. However, large corporations state that the goal of this technology is to aide our quest for increased productivity. Considering this, how do we tackle the stigma surrounding this arising issue? Perhaps correcting the misconceptions at an earlier stage in workers' career development is the key to removing the stigma; if we develop syllabi at an early-education stage that

encourages automation-aligned thinking, these young learners may, in the future, create jobs in automation as opposed to jobs that could be replaced by automation. This poster will discuss potential ways to tackle the stigma in further detail.

Perils of the Deep: Crime and the Dark Web (1.09)

Mery Karunanamage, *University of Wolverhampton*

The Dark Web is a growing space online, inaccessible through an ordinary search engine. Criminal activities that were uncovered include, trade in counterfeit goods, drugs and even human trafficking. Though it is hard to quantify the amount of illegal activity, that takes place on a global law enforcement agencies are increasingly concerned about the number of crimes that may be organised in cyberspace. Many countries have specialist teams to help detect crime and find evidence using various mathematical techniques. In 2017, Europol held the first ever Cyber-Patrolling Week, where a coordinated team of 40 experts identified more than 200 active targets in areas such as forged documents, money laundering and payment card fraud. In 2019, Operation SaboTor , an international multi agency operation, targeted drug trafficking operations, which lead to high profile arrests. Despite this, the rate of illegal activities appears to be increasing and the international nature of the problem creates new challenges for law enforcement. This poster will explore the critical issues around policing the Dark Web, as well as future innovations in practice and technology that may increase the detection of serious crimes.

The Ethics and Issues of Mass Digital Censorship (1.10)

Olivia Naish, *University of Bath*

Censorship is a stigmatised word. Most people will agree that freedom of information is an essential right for any citizen and is the foundation of any free nation. However with the invention of the Internet, governments and organisations across the world are attempting to restrict access to this unfiltered mass of data. A common use of censorship in the western world is linked to the protection of children. Intrinsicly, this is not a negative position to take. However, how this is enforced is a matter of much debate.

There are two main questions that need to be answered when considering censoring adult content. The first is to decide who has the responsibility to censor the child's access to the data. People will argue between governmental enforcement of filtering of adult content and individual parental control over their child's data consumption. A prominent example of a recent implementation at a government level is the United Kingdom's Digital Economy Act 2017, which withdrew its plans to implement age verification checks in October 2019 after multiple difficulties and delays.

The second question is about how to categorise data, so that it can be filtered. Google's video sharing site, YouTube, demonstrates the effect of 'machine learning' based filtering as content creators protest against overblocking or demonetisation. Categories that can be tangentially related to adult content can also be demonetised. The LGBT+ community and sex education content creators have been particularly effected by the filtering. The poster will explore these issues surrounding censorship.

AI and education (1.11)

Paridhi Agarwal, *Durham University*

I believe your childhood is what moulds you into what you become. School is a major part of our childhood and teachers can change students lives. For me, I like math today because I was lucky to have a great math teacher in school. However, teachers can also make students fear a subject altogether. It's time for every student to get that amazing dance, science, geography teacher. With humans there's so many factors that affect a teachers mood, they tend to be partial, they get tired and sometimes they are just there for the money. I'm looking at a robot who understands the areas where the child is lagging, is always patient, explains in creative colourful ways. A robot that may learn from experience about how to make learning easier and fun. A robot with happier facial expressions than the angry, nagging ones. So many students hold themselves back and are shy to ask questions. Imagine a teacher (robot) that already knows what the student doesn't understand. This way very child gets an opportunity.

How Random is 'Random'? (1.12)

Paris Hall, *Solent University*

Random is defined by the apparent lack of pattern or predictability in events and/or where a collection of data has no determined order; once you categorise this by date, name, age it ceases to be random.

iPod shuffle was quoted "too random" because the same songs/artists were being played consecutively. Now shuffle simple reorganises your playlist into a new list, preventing the same track from appearing twice. This isn't truly random but feels more random to users.

Naïve is a type of shuffle which loops through each item in a group and swaps it with another randomly chosen item in the group; this solves the primary issue of reordering but creates a problem around over-shuffling. Since we sequentially go through and swap every single item we risk swapping the same items back into their original position. Alternatively, the Fisher Yates shuffle loops through each item and only swaps items that are still in their original position, therefore eliminating the issue of over shuffling.

Random would mean all possible sequences are equally likely i.e. each side on a dice has the same chance, 1 in 6 of being chosen, yet some are more frequent than others. Random Number Generators (RNG) are commonly seen in online gaming including loot boxes; however in some cases these numbers don't have an equal chance as certain loot prizes are rarer than others. Alternative variations of RNG generate random numbers using computer mouse movements, thus relying on human input.

So I ask, how random is random?

Brain-computer interfaces within the space industry (1.13)

Polina Mazurina, *Imperial College London*

Brain-computer interfaces (BCI) are a new word in the computing industry. They are described as a way of linking the (human) brain to a computer system. BCIs are generally divided into non-invasive (gaze-control, etc.) and invasive ones (brain-implanted electrodes transferring information directly from and into the brain). Possible applications of BCIs include a lot of areas; however, one of the least investigated (and potentially - most benefitting) is a space industry.

Space is a severe, intimidating environment, requiring reliable solutions for numerous technically challenging issues. The implementation of BCIs will enable for direct, faster communication between mission control centre and astronauts; the health stats of the latter could be also monitored more safely and easily. The time lag between the thought and control of the operating equipment will disappear. Astronauts will be able to control any moving elements outside of the cabin.

Even though neural interfaces seem to be a fascinating technology, their space implementation may carry disadvantages. In addition to currently unsolved problems of BCIs themselves (brain scarring due to implanted electrodes, and the overall underdevelopment of this industry), there are certain space-specific issues. Fatigue and mental tiredness that are common among astronauts due to demanding conditions may result in improper work of BCIs, as well as currently unexplored potential effects of space conditions on such fragile matters. Besides, engineers will face a lot of technical challenges - all details within the BCI should be light and able to withstand the harsh environment.

Artificial Intelligence in the Climate Crisis (1.14)

Sonia Parmar, *Durham University*

Two years after the Paris Climate accord, Microsoft announced the introduction of a \$50 million project to bring artificial intelligence to protect the planet. This five-year project would enable organisations worldwide to be provided with data to slow the rate of global warming. AI can be programmed to collect data worldwide and use this to help both man and machine understand our environmentally unstable planet by converting data into information to inform individuals how to manage our natural resources. For example, the data collected by the AI could be 408.05, which translates to 408.05ppm of carbon in the air on a global scale from last month. AI uses its trained skills to inform us of natural resource utilisation to abide by the Paris Climate accord.

The use of AI has already shown some results in the energy sector as companies such as Adger Energi (the third-largest renewable energy group in Norway) utilises Microsoft's cloud and AI to better capture, analyse and act on the information gathered across its electrical grid. This allows Adger Energi to predict and prepare for fluctuating energy needs in

response to changes in demand. This is because electric vehicles increasingly tax Norway's grid, therefore, AI has improved the performance of existing infrastructure and reduced the need for expensive projects such as building new power stations.

By using AI in the environmental sector, a more effective and reliable grid has been created, allowing the country to consume more renewable energy as it transitions into a greener future.

Cracking the Viginère Cipher (1.15)

Tara Harley, *University of York*

The Viginère cipher is a polyalphabetic cipher that took roughly three centuries to break. In it's simplest form, it consists of a number of Caesar cipher alphabets of differing shifts being chosen to encode the plaintext based on the letters of the key.

As the key is (generally) substantially shorter than the plaintext and thus must be repeated, there is a way to break the cipher given a long enough plaintext. If there are repeated chunks of letters in the plaintext of a multiple of the same period as the repeats of the key, it creates repeated chunks of ciphertext. This can give the decipherer an idea of the length of the key as it is a factor of the length between repeats. If you have multiple repeated chunks this can help narrow down the possible length.

Once the length of the key is known, all letters of an equal (index MOD key_length) can be placed into proper subsets. Then typical methods of deciphering Caesar ciphers can be enacted on each subset.

There are various ways people have attempted to make the Viginère cipher more secure, for example using different monoalphabetic substitutions instead of Caesar ciphers or using a "running key", which is multiple keys of differing length stacked together. Whilst both of these increase the difficulty they do not make the cipher unbreakable so long as the plaintext is of sufficient length. I will be going into further detail on these in my poster.

Second year student abstracts

Helping Ada's Headaches: How Helpful are the Apps Designed to Monitor Migraines? (2.01)

Alexandra Stanhope, *Lancaster University*

As a child, Ada Lovelace was plagued by “severe headaches that obscured her vision”, a condition also known as migraines. This is an ailment familiar to around 14.7% of the global population according to the Migraine Trust, including me. Migraines are severe headaches that can last between 4 and 72 hours, and are sometimes accompanied by sensory disturbances, such as vision obscuration, or severe sensitivity to light and sound.

Unlike Ada, I have access to migraine tracking apps that claim to let you keep track of your migraines to help identify triggers and allow you to understand your condition better. They commonly allow users to input data about their migraines such as the duration, where the pain started, and their symptoms. The apps also allow the users to track their exposure to common triggers, such as strong smells, chocolate, or red wine, then over time help the user identify them as triggers through the analysis of inputted data. The results of the analyses are collated into reports that can be used to help the user convey the impact of migraines on their daily life to their doctor. This poster explores the world of apps designed to help people with chronic illnesses improve their daily lives. We will explore the features that make these apps beneficial, and the challenges that make these apps sometimes cause more headaches than they cure.

“Big Data is Watching You”: Using AI to Detect and Track infectious disease outbreaks (2.02)

Amy Pajak, *University of Birmingham*

With the world population predicted to reach 10 billion by 2050 and travel becoming ever more accessible, a significant challenge we face today is the early and reliable detection of disease outbreaks. Coronavirus, Ebola, Swine flu... These deadly diseases mutually share the speed at which they spread due to a lack of information.

However, with the modern-day ubiquity of social networking, we now have access to a rich collection of online data that can offer insight to communities and public interactions both at massive volume and in real-time.

This poster will show how Bayesian networks can be utilised to create an intelligent system that effectively performs biosurveillance of infectious disease outbreaks. I explore a probabilistic Bayesian model of an entire population that can predict if and when an individual will become ill. The model extracts and leverages infectious outbreak insights through social media posts by training on big data. It represents spatio-temporal information using nodes in a network, such as location of outbreak, date of outbreak, and age, gender, symptoms and location of an individual.

By combining the power of machine learning with modern issues involved in safeguarding public health I will share how achieving early detection can assist medical professionals and government bodies to provide time-critical response and treatment.

Differential Privacy: Being “Wally” is now a breeze (2.03)

Apoorva Patil, *University of Birmingham*

This poster defines the concept of differential privacy, provides a literature review and positions it in the context of real-world examples. It provides a view of the benefits to individuals and shows how businesses can build trust if they adopt the right practices. Cynthia Dwork says, “Differential privacy addresses the paradox of learning nothing about an individual while learning useful information about a population”. In simple terms, consider two otherwise identical datasets - one with your information in it and one without it. Differential Privacy ensures that a statistical query on either of these datasets produces the same result with nearly the same probability. This becomes relevant from a user’s perspective when, say, a browser wants to identify high resource consumption websites based on its users’ browsing history to ensure better user experience. In this case, we want the browser to detect these domains without having to know if a given website is being visited by an individual user. Differential privacy becomes even more important when we realise that anonymisation of records is not enough to ensure privacy. Reverse engineering techniques can easily be applied to obtain personal information. In today’s world where data is increasingly being collected and used to build predictive models for enhancing user experience, differential privacy gives users the comfort of knowing that their personal information is not susceptible to any linkage attacks. The adoption of differential privacy by companies would help them gain users’ confidence amid all the uncertainty around users’ data privacy.

Will we ever find efficient algorithms for every problem? (2.04)

Awen Rhys, *University of Bath*

Some problems are relatively easy to find efficient algorithms for, such as multiplying numbers and sorting lists. However, other problems such as solving a sudoku grid don’t have efficient algorithms to solve them. However, are these problems fundamentally different to the ones we have found efficient algorithms for, or will we eventually manage to find an efficient algorithm to solve these problems? This is the core of one of the Millennium Prize Problems, the problems deemed to be the most important open questions in mathematics, of whether $P=NP$. P contains the problems solvable in polynomial time, such as sorting and multiplying. However, NP problems aren’t currently solvable in polynomial time, but an answer can be verified in polynomial time. Take solving a sudoku grid, given a solution you can easily check the solution, however finding a solution is much harder. Many of these problems can be regarded as NP -Complete, meaning if any one of these problems have a polynomial time solution, all NP problems do. This would solve a lot of important problems, such as Boolean satisfiability, the travelling salesman problem, and the vertex cover

problem. However, thousands of hours of research have been put into finding algorithms for such problems with no luck, but the existence of such an algorithm hasn't been disproven either. Is it likely that computer scientists will find either a solution or disprove its existence, will advances in AI give us the answer, or will quantum computers be able to solve these NP problems efficiently?

Computer Doctors: A look at AI in Diagnostic Medicine and Healthcare (2.05)

Camilla Jones, *Keele University*

Over the last 50 years AI has grown exponentially, becoming more efficient and wide-ranging in its applications and uses across all fields. This has been observed particularly in the field of medicine and healthcare. For example, the creation of MYCIN in 1972 and ADA (2017 UK) an app used for diagnostics which is instrumental in aiding doctors to detect patterns that are not immediately apparent whilst also covering a wider dataset. Furthermore, there has been a boom in biometric monitoring devices, virtual healthcare assistants and smart devices. which further supports the observation, tracking and recording of healthcare vitals and chronic conditions

Today we have AI in diverse areas of medicine, for instance: oncology, diagnostics and drug development with many big companies such as Google, IBM and Phillips investing billions of dollars into healthcare AI. Given a fast changing global demographic and ageing population the question of how AI is best utilised within medicine is expedient. Consequently, this poster will explore the benefits of AI within the field of medicine and healthcare looking at AI's ability to diagnose, monitor, consolidate data, improve reliability, reduce human error and medical costs.

Molly's Game?

Nah, Charlotte & Lynn's Blockchain (2.06)

Charlotte Matthews, Lynn Muswere, *Loughborough University*

Blockchain for business is cool, but it gets even cooler when used for entertainment. Using Blockchain in Casinos isn't a new idea, in fact you can read about it here; <https://hackernoon.com/what-does-gambling-in-a-house-less-blockchain-casino-look-like-o91tx385s>. But how would a game of poker work on a Blockchain network?

Picture this, you're sat in a game of poker...

Your hand: Ace/King

Flop: Ace/Ace/Queen

...you calmly but confidently say 'all in', you're matched by 1 other player. You show your cards, the other player shows theirs...

DAMN they've got Ace/Queen, you think it's all over... But then the remaining 2 cards get dealt...

River: 6... King!

Your full house beats theirs and you collect your winnings!

But just think, that £1 million you won has 10% taken by the house, that £100,000 could pay for a VERY nice holiday... so why not get rid of the house? and replace it with...

BLOCKCHAIN?

This would eliminate the corruption that often comes with high stakes games; each player would have an equal share in the network so there isn't 1 party (the house) controlling what is going on, taking cuts of the profits and fixing games.

But what would these games actually look like when you've converted your players into organisations on a network, created your 'raiseBet()' and 'foldBet()' transactions and chucked in some private data collections to keep player's secrets secret? We can show you how to do it, and we won't take 10%! So grab your seat to learn about Charlotte and Lynn's Blockchain.

Being of Sound Mind: Predicting emotional responses to noise (2.07)

Chloe Allen, *University of Wolverhampton*

Environmental noise has documented effects upon health, wellbeing, and quality of life. Whether listening to an orchestra or running from a siren, we are typically aware of how different sounds make us feel. With increasing pressure on the resources of health service providers and more patients than ever before, creating an environment conducive to good health and recovery is of utmost importance. Perceived annoyance is often measured through surveys to understand the quantity of noise effects, but a gap in knowledge remains in determining whether there are neural markers that also describe noise effects.

Experiments have shown that neural activity of listeners during noise events can be measured using an electroencephalograph (EEG). This is anticipated to correlate well with a listener's emotional response to different noise sources. This poster is based on experiments to investigate the relationship between sounds we experience and the moods we feel using both qualitative and quantitative collected data; perceived versus neural response.

Using a microphone, raspberry pi and applied mathematical techniques, we can predict a listener's likely EEG response to any sound based on the acoustic measures. This response can be plotted in terms of alpha and beta band power on an output display. With this data, planners and designers can assess or 'tune' an environment to optimise the health benefits in terms of noise. The model can answer design questions like 'what is the optimal building arrangement for a development to maximise an external, tranquil space?'

N-Visaging the Future of Nuclear Safety (2.08)

Chloe Hodgson, *University of York*

Nuclear facilities can be some of the most hazardous work environments of any industry worldwide, in some cases requiring intense safety precautions and training to traverse. The UK's 15 reactors currently generate approximately 21% of the nation's electricity [World Nuclear Organisation], but decommissioning efforts mean that half of this capacity is to be retired by 2025. Large labour forces are needed to maintain and deactivate these facilities - how can technology be used to streamline these processes and ensure workers safety?

One of the complications in nuclear safety is accurately detecting radiation and contamination. By visualising the hazards, more confident decisions can be made. N-Visage Fusion is a radiation modelling system, developed by Createc, which can be used to characterise facilities by combining multiple hazards into one model, using data from different instruments. Worker exposure can be controlled by viewing the 3D dose environments, calculating future dose rates and estimating waste volumes.

New insights into the data is revealed as models can be changed to approximate changes in dose for ALARP analysis. Once modelled, workers can navigate environments remotely in VR and rehearse operations with realisation of the hazards that they will face. Practising detailed walking patterns allows workers to minimise their received dosage per second and therefore increase time to complete assigned tasks before their daily limit is reached. Work is made more efficient, and importantly worker safety is optimised.

Lifesaving Tech at our Fingertips (2.09)

Claire Storey, *Sheffield Hallam University*

What if you were told that the key to saving lives was in your fingerprint? Well it potentially could be. Examples of fingerprints from crime scenes are already being analysed using "Matrix Assisted Laser Desorption Ionisation Mass Spectrometry Imaging (MALDI MSI)(Bradshaw, Denison, and Francese 2017). This revolutionary technique allows forensic scientists to discover any substances that the person has encountered, but also what they have taken and metabolised. The results can also be used to calculate how long ago and what doses have been taken. At present the technology is being tried and proven further in real criminal cases with great success, however I would consider the potential implications if technology could be developed to support these ground-breaking techniques on a smaller scale.

If in hospitals when a patient arrives unconscious, if this technology was readily available then their fingerprints could be used to determine what they have taken in order to save their lives. If the Mass Spectrometry equipment and software could be developed for smaller devices and faster speeds, this could be applied to cars, preventing drivers under the influence of drugs or alcohol from being able to start a car.

This is my aim – to investigate and consider the further development of this technology to save lives across the world, as well as considering the ethical, social, and security implications that such technology could present.

Works Cited

Bradshaw, R., N. Denison, and S. Francese. ""Implementation of MALDI MS Profiling and Imaging Methods for the Analysis of Real Crime Scene Fingermarks."" *The Analyst* 142.9 (2017): 1581-90. Web. Jan 31, 2020.

Our phones are getting us followed (2.10)

Deega Mohamud, *Middlesex University*

The technologies that can pinpoint locations of people and entities, track their movements and store them electronically all use location tracking. Most people use Global Positioning System (GPS) regularly if its help find the nearest train station or a local bakery. Commonly used in smartphones as they have a GPS chip incorporated in them, even though there are other ways of location tracking I we will be focusing on smartphones.

Majority of the applications downloaded on a mobile phone request to access the location data, some of these have valid use for this information such as Google Maps, Find My Friends and many more. However, there are applications that request location tracking regardless of it being necessary.

Two employees at cyber security research company named Synack presented a workshop at an event. Their workshop was about their researchers claiming to having the abilities to pinpoint locations of a large amount of people in real time. This research was focused of dating app for gay and bisexual men Grindr. They used location data and specific locations like home addresses of celebrities to give the information of the exact identify of the owner of the mobile phone. The researches at Synack are able to track using location data that is not secure effectively, then we are all vulnerable to potential attackers.

The rise of cryptocurrency (2.11)

Ikeoluwa Olagunju, *The University of Sheffield*

When words such as “cryptocurrency” or “blockchain” are mentioned, the first association people make is with bitcoin, however cryptocurrency and blockchain are more than just bitcoin. Blockchain is essential digital information stored in a public database. While cryptocurrency is a digital asset that uses cryptography to carry out financial transactions. Cryptocurrency uses blockchain technology. There are various implementations of

blockchain and many more cryptocurrencies other than bitcoin. However, there is a lot of uncertainty surrounding the use of blockchain technology. Due to the nature of blockchain, cryptocurrencies are decentralised, transparent and immutable. These features have enabled banks and financial services to utilise the technology to develop their own digital coins. We have already seen a prototype version of a digital coin in JPM Coin which runs on Quorum. Quorum is an open source blockchain platform based on Ethereum, where businesses can develop their own blockchain. Other banks are considering and developing central bank digital currencies, this will involve everybody having a digital, immutable financial record that can be used for financial transactions regardless of location. My poster will define the terms connected with digital coin and present an investigation of the different ways digital coin can be used and implemented by financial services and could benefit the general public. I explore the future possibilities surrounding the idea of a central bank digital currency, the different ways blockchain can be used to implement this and the effect of digital coin on the financial markets.

How Network Intrusion Detection Systems are Advancing for the future (2.12)

Jade McDonald, *Sheffield Hallam University*

Intrusion prevention systems (IPS) do the following: Identify suspicious activity on a network, log security events, attempts to block intrusion/limit damage and report intrusion attempts. The difference between NIDs and IPS is that IPS is a monitoring system. NIDs doesn't alter any packets going across a network, where as an IPS prevents the packet from delivery, this is based on the contents of the packet, this is like how a firewall prevents traffic by checking Internet Protocol (IP) addresses. This means rather than flagging up abnormal/malicious activity the system can stop the packets from being delivered altogether, this would prevent attacks rather than just detecting them.

Machine learning, computers can learn and improve from experience without being programmed explicitly automatically. Machine Learning uses these machine learning techniques to train themselves about a network, by doing this it will be able to detect abnormal behaviour. There are many machine learning algorithms used but the most generic ones are: Bayesian networks, Genetic algorithms, Fuzzy logic, Markov model and Neural networks.

Fog computing an alternative method of traditional cloud computing, in which various cloud services are not provided by remote data centres but the local machines themselves. This then brings network traffic into the local host rather than the cloud; this is where a NID system would fit in to protect the network. For example, the system could use a NID to protect the network nodes (A network node is an active electronic device that is attached to a network) that are connected to the system.

Big Data (2.13)

Jessica Lal, *Aston University*

Humans are the biggest data source. Myriads of data is produced from every human's day to day life. From social media preferences, to location tracking and even transaction monitoring, data can be collected from anything at anytime and at any place. This extensive collection of data sets is known as Big Data. One may ask what the purpose of collecting such a vast amount of data may be, thus this poster represents the benefits and the ethical issues involved in the gathering of such data. It explores the end user's benefits and the issues revolving around the process in which this data is collected. In addition, to how the businesses and receivers of this data are put at an advantage, varying from economical benefits to the tackling of security issues. The poster illustrates some recommendations based on how businesses could improve their methods of collection as well as the 6 Vs of Big Data. The latter allows the word 'Big Data' to be defined in terms of Volume, Value, Variability, Veracity, Variety and Velocity and so allows Big Data to maintain its integrity as data that becomes so large that it cannot be processed using conventional methods. Furthermore, the poster will present case studies which will investigate an instance in which the issues revolving around Big Data came into play along with another instance in which the benefits of Big Data can be portrayed. Overall, this poster gives an overview about Big Data and how it affects our daily life.

Will AI and Machine Learning put lawyers out of business? (2.14)

Kanika Mehta, *Durham University*

"Space, the final frontier. These are the voyages of the Starship Enterprise. Its five-year mission: to explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before." - Star Trek, T.V Series

Law from all other social sciences may come the closest to a system of formal logic. This logic-oriented methodology of legal ruling is exactly the degree to which AI and machine learning can be applied perfectly.

AI undoubtedly opens gates for lawyers to take on creative and interesting tasks all the while reducing hundreds and thousands of words into one opinion. But despite this advantage, it is sensible to say that family, clinic and private laws are preferred highly to be practiced by human lawyers who can provide the required closure and sympathy. AI clearly doesn't have the human intuition to take on new tasks. Since AI learns from human behaviourism and the knowledge that it can gain, it won't respond in the necessary manner when handed a new task or something which it's completely unfamiliar with.

When we talk about eradicating bias, we tend to construct an algorithmic decision making data base for the AI which is itself biased. It is impossible to have an unbiased decision to a court case and hence replacing the jury instead of the judge with AI sounds more appropriate and just. Safe to say that AI should never have the final say.

Could AI predict another film CATastrophe? (2.15)

Katarzyna Romaniuk, *Lancaster University*

The process of writing scripts and turning them into a film is not always effective, and can result in a considerable financial losses on cinema flops. “Cats”, based on a successful stage musical with many well-established, talented actors (and singers!) and a budget of 95m USD, would appear to be an obvious film success. However, reviews suggest that this is not the case. A recent 1Digital Journal article notes Warner Bros. have signed a contract with a startup (Cinelytic) whose AI is to predict film’s success. Could such an algorithm have come to the rescue of Cats before it entered production stage? Could AI analyse contributing factors for not hitting the projected box office numbers? Filtering the list of potential film candidates would become faster and script writing could become more automated. But would the merits outweigh possible drawbacks of using AI in film prediction and creation? There are some serious concerns for new actors stepping into the film industry as algorithms may reject them due to limited available data. Another challenge could be scripts of a particular genre becoming more and more similar to each other as AI may look for specific success patterns. This reduction in diversity and creativity could inhibit the film industry. My poster will explore these issues and examine data that could be used in a film prediction system. Based on this, I will reflect on whether AI could have saved the infamous “Cats” film.

1 Link to the article:

<http://www.digitaljournal.com/entertainment/entertainment/warner-brothers-to-use-ai-topredict-film-success/article/564902>

BCIs to Restore Language Function (2.16)

Kate Bobyn, *University of Sheffield*

Can you imagine suddenly losing the ability to communicate your thoughts? Approximately 30 million people worldwide suffer from various forms of aphasia or speech apraxia -- disorders caused by neurological damage that impact one’s ability to process, generate, and/or verbalise language. In many cases, cognitive function is otherwise intact, which makes this condition immensely frustrating for sufferers and carers alike.

With speech therapy, determination, and support, many aphasia sufferers are able to regain some language function. But could technology play a role here? I believe that the advances in brain-computer interface (BCI) research over the past decade have potential applications in helping us understand and treat various forms of aphasia. Electroencephalography (EEG) data, combined with signal processing, computational modelling, and machine learning techniques, can be used to gain insight into the nature of cognitive disruption and hopefully help some patients communicate again, whether it is by parsing signals sent to the muscles for speech generation, recreating 'imagined' speech (researchers from Carnegie Mellon refer to this as "synthetic telepathy"), or classifying patterns of event-related potentials (ERPs) associated with certain thoughts or intentions.

My poster will discuss the major developments in this area and directions for future research, as well as some of my experiments using a 14-channel Emotiv EEG device to try to replicate recent findings in computational neurolinguistics.

Knowledge Representation Issues with Humanoid Receptionist Robot (2.17)

Kiranjit Kaur Shergill, *Coventry University*

Humanoid robots acting as receptionists is now being used in firms, a Nao Robot that is now on the frontline. Despite this being an advancement in artificial intelligence and bringing positive impacts to the firm such as automated technology increasing efficiency and reducing labour costs, there are knowledge representation issues that cannot be ignored. The major knowledge representation issues that need to be considered to achieve receptionist abilities are factors such as the height of the robot, facial recognition and maintenance issues. For example JiLL, is a NAO robot who is only 57cm tall, a suitable platform would be required for the robot to communicate effectively with human client due to not being an average human size. This is a significant factor because the robot receptionist needs to be visible to the human eye when entering the office. Moreover, facial recognition may not be appropriate or favoured by humans as the choice is very limiting in terms of reply. In addition to this it could lead to the robot acting in a racist manner as it may not be able to distinguish people from different ethnic backgrounds. This has been an issue in the past with facial recognition used on smartphones. For instance, people from diverse backgrounds have not always been recognised due to software not being advanced enough to recognise distinguished features. Furthermore, if there is a fault in the robot, it could have a negative impact on the workforce if they cannot access the required information in time.

Up in the cloud (2.18)

Leah Fluegge, *Sheffield Hallam University*

Cloud computing has changed the landscape of the IT industry. It is used in people's daily lives, in the business world and at university. Especially in the business world companies make use of cloud technology as it is an efficient way of delivering enterprise applications. It allows companies to extend their infrastructure or to launch new innovations. The way the infrastructure and software model works is to enable ubiquitous access to shared pools of storage, networks, servers, and applications over the internet. This allows for data processing to be done in a privately-owned cloud or a third-party server. Additionally a company may choose from three different cloud service models such as SaaS, PaaS, IaaS all addressing different needs of a business. Maximum speed and reliability is created and the way people work together has been revolutionised. The cloud content can be accessed from anywhere at anytime, enabling extreme digital content generation and consumption as well as exponential growth in computing capabilities. IT departments are able to establish more with less hardware, and software. This allows companies to succeed in a competitive and rapidly evolving environment. Nowadays tremendous amounts of information are traveling across businesses and the cloud enables these to be stored and accessed securely, opening opportunities across the globe. The poster outlines the different cloud models, the way it revolutionises and simplifies people's lives and the areas it is used in.

Predictive modelling of cancer treatment – dealing with trends instead of points (2.19)

Marina Krivova, *University of Sheffield*

For the majority of prediction tasks, machine learning and especially neural networks models act as black boxes. And no one is usually interested in patterns and trends inside it as long as satisfactory final predictions are produced. However, the trends are themselves of great importance in natural sciences, particularly in studies of cancer drug sensitivity and predictive modelling for personalised therapies.

It is a common practice to evaluate the sensitivity of cancer cell towards applied drugs in terms of so-called dose-response curves and some summary characteristics, particularly IC₅₀ (drug concentration required to reduce cell viability to 50% of initial response), manually computed from them. Unfortunately, it was found that there is no straightforward mapping of IC₅₀ with the space of genomic data available as training data for machine learning. So it is proposed to take a step back and generate the initial drug dose-response curves, i.e. deal with the trends, instead of direct predicting of final summary characteristics. The problem here is that “the black boxes” of the best machine learning models hide ensembles of different algorithms which have no physical meaning. Therefore, a set of separate points should be predicted to generate a target drug dose-response curves for further analysis. Such an approach is naturally more time-consuming. But it can be paid off if a successful machine learning model can replace expensive and potentially dangerous pharmacological experiments with real patients.

Virtual or Reality? (2.20)

Neelum Ashiq, *UCEN Manchester*

Virtual reality is a computer-generated simulation of an atmosphere or 3-dimensional image where users can interact in a real or physical way. Since the term “Virtual Reality” (VR) was first found and used in the 1960s, VR has evolved in an increasingly similar way to the real world. There are two types of VR can be identified which are; non-immersive and immersive. The first is a computer-based environment that can simulate real-world or fictional world locations. The second leads the idea further by conveying the perception that it is physically present in the non-physical world. Non-immersive virtual reality can be based on standard computers, but Immersion virtual reality will continue to evolve as the required devices become more user-friendly and economically accessible. In the past it was very difficult to use equipment such as a helmet with glasses, but in this year and age new devices have been developed to improve the user(s) experience. Virtual reality, based on the three basic principles of user immersion, interaction, and user involvement in the environment and story, greatly increases the potential of education by increasing motivation and appeal for learning. The use of virtual reality in educational games has been limited due to the high sport devices, there are new tools like the commercial ‘Oculus Rift’ which allows access to virtual reality in several educational situations for an example; it shows that in the last 6 years how has virtual reality in general are used for training adults in situations or for university student(s).

Cybernetics Augmentations - A step closer to Transhumanism (2.21)

Nikko YiJing Pang, *Swansea University*

Transhumanism is the belief that the human race can surpass their biological limitations by means of science and technology with the goal of becoming “posthuman”. As technology continues to evolve, this concept becomes all the more plausible. Although we may not have been made aware of it, cybernetic augmentation has already been put into practice in the world around us. Examples of such includes bionics and prosthetics, brain-computer interfaces, RFID implants and nanobots injections which are being used for medical purposes.

The poster will present various techniques demonstrating how machines and the human body can co-exist and communicate with one another while observing the effects that they could have on society. Additionally, it will also address any privacy and ethical considerations as well as possible technical security and health issues as it will come into direct contact with the body. At the moment, there is a social stigma against the transhumanism movement due to the people’s fear of lack of control and uncertainty. This can be seen with our paranoia to any disruptive technology even though this can very well

be the next step to transcend mankind into a new world of possibilities that could allow us to obtain perfection in the future.

Computing the Classics: Natural Language Processing in Latin and Ancient Greek (2.22)

Olivia Swarthout, *University of Glasgow*

Although Latin and Ancient Greek are considered to be dead languages, linguists and classicists have long since explored the insights they can provide into history, culture, and modern languages. Today, the way we analyze classical texts is changing as computerized Natural Language Processing (NLP) techniques are beginning to be applied to single texts and across entire bodies of work to uncover new meanings and patterns within them. Natural Language Processing exists at the crossroads of Linguistics and Computing and is a field that serves to use programming to deepen human understanding of natural languages by analyzing grammar, meaning, and even different subtexts of words and phrases. This poster will discuss the relevancy of classical languages and our understanding of them in a modern setting. It will also seek to describe different NLP techniques and how the field has been used in the past. The main goal of the poster will be to explain what tools are being made available for NLP in a classical context and how those tools can provide new insight into texts and languages that have been the subject of analysis for centuries.

3D Printing: How Can 3D Printing Reduce Waiting Times for Lung Transplant? (2.23)

Sara Wilson, *University of Stirling*

3D printing has exploded in popularity over the last few years. Something that seemed like magic just a decade ago is now a common feature of many businesses, with some households even incorporating them for recreational use, such as in metalworking and gardening.

But one area of particular importance is the 3D printing of organs in the medical industry. It is a growing area of research and is still in its early stages, but shows a tremendous amount of promise for the future of patient waiting lists and organ donation shortages.

In the latest annual activity figures for organ donations and transplantations, published by the NHS on 8th April 2019, statistics show that of the 6077 patients on the waiting list, 338 of them were waiting on a lung transplant, and yet the number of donors that year totalled only 162; there are over twice as many on the waiting list as there are donors, a huge demand. 3D printing however, offers the opportunity to reduce the demand by artificially creating these organs for use in transplantations; currently only synthetic material can readily be used, however researchers are finding ways to create real human tissue and utilise it in this process, which is very exciting.

This poster will illustrate the various ways in which 3D printing technology can be used to construct synthetic organs, particularly lungs, and how this can massively reduce waiting list times for patients in the UK.

To infinity and robotics – robotics in space exploration (2.24) Sarah Ann Clowe, *Keele university*

50 years ago, humans first landed on the moon. However, the first robot (sputnik) in space was 12 years before that in 1957. In the past 62 years, robotics in the space industry has advanced rapidly, from rovers landing on mars to voyager exploring the outer solar system. The robotics on mars has allowed us to have planet-wide mapping, with distinct features and possible traces of life. All these robotic missions have been accomplished without the cost of human life. Currently, AI has been used to make discoveries on space exploration missions. In the future, AI-controlled robots will be like a smart assistant which will collaborate with scientists. Machine learning will help the unexpected to be noticed. In the future humanoid robotics equipped with an AI can explore space with human-like aspects, so more of space can be explored with little to no human lives lost. These robots will be able to assist in missions and go where no human can go. This poster will discuss the advantages of robotics in the space industry and discuss how robots are used currently in the space industry. Furthermore, this poster will examine the potential benefits of humanoids with machine learning and how they compare to humans.

Mainframe: reframed (2.26) Venyah Kowalik, *University of Surrey*

In the age of the rising popularity of cloud computing technology, one could think that mainframes as technology are obsolete and no longer as relevant as they were fifty years ago. As the trends shifted, so did the attitudes, especially among young developers who are more willing to educate themselves in the areas of big data and cloud technologies. If we zoom in even further to a subset of the young developers who are women, the numbers start to look really desperate. In general, as the number of female college students decreased over the span of the last 30 years (Eggers & Andy, 2008), the question arises about what can be done to promote gender equality and encourage women's interest in computer science. With the latest research on mainframe conducted by BMC Software Inc. showing that 92% of the technical executives consider mainframe a long-term option for their business and 96 of the world's top 100 banks using mainframes, it might be of interest to explore how we might inspire the next generation of women to learn more about technologies with longer history such as mainframes. In this poster, I share the analysis of the results of a survey designed to investigate women's attitudes towards the mainframe and

the cloud. I explore the obstacles that prevent women from stepping into that field and the strategies that can be adopted to encourage their interest such as providing role models, creating early research opportunities and demystifying stereotypes.

Final year student abstracts

The prototype of mobile application for customized tourism in Edinburgh (3.01)

Adrianna Kaminska, *Edinburgh Napier University*

Since the rise of smartphones and the Internet of Things, today's tourism changed a lot in comparison to previous years. Today we can talk about etourism and smart tourism, as different websites and mobile applications are targeting travellers around the world, allowing them to plan holidays online without the use of travel agency and fill them with a high amount of information about their destinations. But this also causes issues like over-load of information and overcrowding in most popular cities around the world.

The focus of this paper is on investigating of how much technology impacted tourism, what are the problems caused by this impact and on developing a prototype of mobile applications for customised tourism as an answer for those issues. The focus of the prototype is The City of Edinburgh, which thousands of tourists visit every year. Customised tourism allows to offer different travellers experience more applicable to their areas and interests and hobbies, and helps to advertise other, less known parts of the city, helping in spreading new incomers around the area, instead of focusing them in specific places, causing overcrowding.

Gathered results from testers who tried the prototype, proved that this type of mobile app can be useful and many of them would like to use it in different cities around the world.

Moreover, the feature in the form of basic achievement system where user gains achievement where visited mentioned in the app place raised lots of interests.

Anonymous in Public (3.02)

Afka Pranoto, *Middlesex University*

UK has one of the highest rates of CCTV per individual. While this has raised concerns regarding one's privacy, what people are less wary of are the many lens held in the hands of others within the area. The cameras in our phones have reached a quality comparable to dedicated cameras which, when combined with our phone's large storage capacity, allows us to take thousands of pictures and high-resolution footage hours long in length. Our ability to capture every aspect of our lives also makes it so that we are now sharing the littlest moment for everyone to see. Not everyone is as willing to share their personal lives with others, however. When thousands of people visit and take pictures of the Eiffel Tower each

day, you're bound to appear in at least one photograph from a stranger. And as the saying goes, "anything on the internet lasts forever". This poster will investigate the effects of sharing media from the perspective of a non-participant and the current laws in place. For example, while public photography is completely legal in the UK, France is more careful with the idea, stating that ""everyone has the right to respect for their private life"". It will present some approaches that can be taken to help aid in reducing the chances of sharing other peoples information, with the core case being the proposal of a software that will blur identifiable information in people and objects in the background.

Using HashLife to support the identification of emergent phenomena in a simulation of Conway's Game of Life (3.03)

Alexandra Krajewski, *Durham University*

John Conway's Game of Life is a popular and widely studied cellular automaton. Cellular automata are models that augment from generation to generation based on a set of rules. They are typically represented on a grid. What makes the Game of Life interesting is the visual patterns that form after letting the simulation run for many generations. While humans can recognise repeating patterns by watching the simulation, it is greatly unfeasible for a computer to store and recognise patterns in the same way that the human brain might. This would require not only a large amount of storage space but also a lot of computational power to ensure that the simulation doesn't take an unreasonable amount of time to compute even just one generation. Hence, a more effective way to recognise and highlight emergent phenomena in a grid implementation of the Game of Life is through the use of the HashLife algorithm which stores the grid in repeating sub-states and hashes these states for effective access and comparison. This poster follows the creation of an importable Python module that will supply the user with an interface where they can observe a simulation of the Game of Life with a strong focus on highlighting emergent phenomena.

Can machine learning techniques help buildings utilise their resources more efficiently? (3.04)

Alice Bjaaland, *University of Bath*

Universities, businesses and shared spaces usually operate on a booking system, they are not always accurate as people do not attend or occupants do not make full use of the room's resources. With ever-increasing concerns for the environment, advanced mechanisms must be considered and developed to monitor and mitigate the impact of under-utilisation in addition to smarter management of room, electricity and security.

The energy used by non-domestic buildings, including higher education buildings, accounts for approximately 18% of UK carbon emissions and continues to increase significantly.

Carbon Trust's research has revealed a significant opportunity from existing commercial measures – a 35% carbon saving is possible with a net benefit of at least £4bn by 2020. A carbon saving of 75% by 2050 is achievable at no net cost (Low Carbon Innovation Coordination Group, 2012).

Because of this, methods of estimating room occupancy have been researched to great extent over the years. Systems such as measuring room CO₂, passive infrared sensors and traditional image processing have been used to approximate the number of people within a room and control resources effectively.

Recent machine learning developments that can be applied to computer vision could potentially make human detection from video streams possible in real-time to a high degree of accuracy. This could benefit Universities, businesses and the environment by saving energy and money via turning off lighting, technology and heating when spaces are not in use, without physical inspection.

Facilitating independent living for individuals diagnosed with dementia through voice-based assistive technology (3.05)

Aliza Exelby, *University of Bath*

Dementia is defined as the degeneration of cognitive function. This affects basic skills, such as the ability to think, remember, and reason. In 2018 there were an estimated 50 million people living with dementia and, with a new case being diagnosed every 3 seconds, this figure is set to more than triple within the next thirty years. With the incidence of this disease set to rise so dramatically, it is important to research ways in which life can be made easier for those diagnosed.

Although there is currently no cure for dementia, many methods are being used to treat the symptoms and slow the cognitive decline. One of these is the use of assistive technologies, used to boost quality of life and extend independence, allowing them to stay within their community and out of residential care for as long as possible. People in the earlier stages of Dementia often have trouble with the instrumental activities of daily living, which relate to self-care within a wider environment, such as engaging with others and cooking. However, this is an area which is rarely touched with assistive technologies for Dementia. This project aims to produce an Alexa Skill which is capable of prompting someone in the early stages of Dementia through an instrumental task which they now have difficulty with. This is necessary both as a way of facilitating independence but also as a way to increase the accessibility of such technologies which, where available, are often costly and very specialised.

DIY Capture the flag (3.06)

Amy Hudspith, *Durham University*

The aim of my poster will be to explain how you could create your capture the flag event where participants work to 'hack' into a specially created system with cyber security vulnerabilities.

Capture the flag events are not only fun and safe ways to practice your hacking skills but are also a great way to get people interested in hacking. In particular I envisage the use of CTFs to get children interested in hacking by getting them to do something practical, rather than just reading or listening to theory. With such a shortage in cyber security professionals in the UK, giving as many students the opportunity to find out about and possibly develop an interest in cyber security is of great importance.

My poster would go through commonly used practices/challenges that are often set in CTF events, explaining both how to create and solve them. In particular, I will be looking at encoding, SQL injection, manipulating URLs, password guessing/hacking and steganography. For each I will explain what it is, how to create a challenge and hide a flag, and how to go about finding the flags.

I also intend to discuss how to vary the difficulty of challenges to suit beginners in high school to experienced university students, and presenting a how to guide that teachers or event organisers could use to create their own CTF.

Breaching the gap of trust between machine learning and cerebral aneurysm rupture prediction (3.07)

Anete Zepa, The University of Sheffield

As our Healthcare systems generate a significant amount of digital health data, it is a hard and pressuring job for those who must interpret this data. Typically, clinical decisions are based on clinical guidelines and experience using the data available in inpatient health records. These data sets are heterogeneous, and for any individual, they are often sparse, incomplete and inconsistent. To fill in the missing data, in silico models are constructed for a specific patient's case. These models aim to calculate the missing data. This poster focuses on the cerebral aneurysm and predicting its ruptures. A cerebral aneurysm is a condition when a bulge in a blood vessel forms, once ruptured it leaks blood inside the head. This usually leads to moderate-to-severe disability or even death. Early detection and management are crucial.

The data available from many MRI scans already have in silico descriptors of the form, size, and flow of the aneurysm. It also includes patient health record data with important markers for predicting cerebral aneurysms such as age and smoking. This data allows machine learning models to predict rupture in new cases. This poster will show my attempt to reach a high accuracy using linear regression and k-nearest neighbour classification algorithms that were widely used in previous research.

The gap is between understanding the model output percentage accuracy and the trust we can put into it, as no models are entirely accurate. To aid medical practitioners, a UI will be created, that intakes new case data and outputs the probability of future rupture and similar cases. This will allow clinicians to make better-guided decisions for risk management, combining their expertise with past case analysis that will reinforce the trustability for the machine learning prediction.

Programming the Past: Analysing Evolution in Formal Languages Using Historical English (3.08)

Annabel Bowen-Nielsen, *University of Glasgow*

Linguists state emphatically that formal languages cannot evolve and that it is solely a feature of natural languages. They have been writing about language change with this limited view for many years, and this project will utilise and reinterpret that knowledge in the context of programming languages with the new perspective which can be gained from computer scientists. Among scholars from the field of computer science, the idea of programming languages evolving is widespread and accepted. This dichotomy of views between the fields of linguistics and computer science about how language works may have some basis in a discrepancy between their definitions of the word 'evolve', and their perspectives on evolution. As such, this project will examine the issue through a new and objective lens.

This project will compare and contrast the effects of creating evolution by intelligent design with the effects of the blind watchmaker. It will compare natural languages and programming languages and, by scrutinising their processes of evolution, discover whether programming languages evolve in the same way as natural languages. The project will use some specific examples of language change which have occurred in the English language, and in programming languages, in order to better examine, exemplify, and express the processes of change in the two types of language. In looking at the results of change, the patterns of evolution are more clearly visible and can be compared and contrasted across time and language.

Using Persuasion Technology to Increase Food Bank Donations (3.09)

Annette Reid, *University of Bath*

Many people in the UK rely on food banks for healthy and nutritious food due to poverty or benefit delays. Food banks are not funded centrally through the government and rely on businesses and the general public to provide donations. Due to changes to benefits, social reforms and the cost of food the number of people reliant on food banks has increased. The quantity of donations however has not increased and so many foodbanks are struggling to provide enough food for those that require assistance.

This report aims to help food banks increase the quantity and variety of food donations through showing how to change the public's donation habits. By analysing and understanding persuasion technology this project suggests a design for a shopping list application which makes use of persuasion concepts such as gamification and social proof. This application aims to persuade users to donate more often to food bank donation points in supermarkets while shopping for their normal groceries with live suggestions provided by the local foodbank. The design has been partially implemented to gain feedback on how a fully-fledged application could be built to increase food donations.

Food banks are a vital safety net for many families and individuals. By utilising persuasion technology food banks can increase the quantity and variety of food they are provided by the general public and hence provide more nutritious food for those that rely on them.

Towards Greener AI (3.10)

Aya Hammad, *University of Stirling*

The amount of energy that is consumed through Machine learning is evolving in our everyday life. As humans we have relied so heavily on it but not many consider the impact that AI has on our planet. The amount of energy that's consumed by programs is growing in importance especially now that our planet is in dire need of saving due to climate change. When people consider climate change they immediately associate it with pollution due to physical garbage waste and the amount of harmful gases that are released into our atmosphere. It does not occur to them that the devices that they are using to spread awareness on a daily basis are also contributing to climate change through their energy usage.

So how could we continue on with our lives as normal by using our AI systems but at the same time conserve energy? In my project I will be exploring this on a small scale and see how different datasets have an impact on energy consumption and see how I could optimise their energy consumption.

With a few minor changes within programs and we can explore the possibility of faster, more efficient and error prone machines this taking us one step closer to greener AI and one step closer to a greener planet.

Next Day Delivery Healthcare (3.11)

Bridget Meade, *University of Stirling*

With an ever-growing population, the risk of illness and pre-existing health conditions increases. At present, treatment is supplied via health professionals. Due to great demand, health assessments can take up to three weeks to receive, and waiting lists are expanding. Can technology be introduced to lessen the demand? Can we have next day delivery on medication? Self-assessment is a process currently in use with individuals with pre-existing conditions. For example, those with type 1 diabetes can use a flash glucose monitoring

device that allows the wearer to monitor their glucose levels. The device has a small sensor that is inserted under the patient's skin. This sensor can then collect data through the sensor inside the body and store it on the device. Could this idea be adapted to create a diagnostic tool? The data collected from the individual could go under assessment, a treatment plan can be produced and selected and dispatched for delivery. This concept would mean there would be no need for face-to-face meetings with a health care professional, and as a result, it would be expected that the demand for appointments would decrease. Currently, we are continuously reading about the great demand on our health care system. The NHS has become overwhelmed with the number of patients it is required to see. Could technology help save our health care system?

Application for encouraging young women to pursue a future in Computing Science (3.12)

Cara Murphy, *Stirling University*

In 2016 only 16% of people studying computing science at a University level in Scotland were female. It has been proven that in business diversity equals success. Teams made up of people with different backgrounds are more strategic and forward thinking compared to groups made up of only men. So how do we encourage girls to pursue a career in computing science? Studies have shown that by high school children have begun to stereotype specific careers based on life experiences. This results in a cycle of negative behaviour towards STEM subjects because in the media they are so often defined as both male and “geeky” which are traits that are certain to put off some young women from pursuing computing further. The answer may be to teach them at a young age where they have no pre conceived ideas about the field. The problem is that there are not many resources used for teaching computing which appeal to girls. Boys are often inspired to choose computing after playing video games which is a brilliant way to introduce young children to technology. However while games may interest boys they often have the opposite effect on girls. This is because women are often negatively portrayed in video games. For this reason I aim to make an educational app about databases designed with young girls in mind. This app will focus less on playing video games and more on information gathering and querying which are skills equally relevant in computing.

What life lessons can we learn from centenarians and how can we best use digital media to share this? (3.13)

Celina McTavish , *Edinburgh Napier University*

As technology and medicine advances annually, human life expectancy ‘typically’ does as well. Those who are lucky, can live to be over 100 years old. They are known as “centenarians.” In the world today, there are five destinations where there is a high

concentration of centenarians. These five destinations are known as “The Blue Zones”. There are, however, issues that come with ageing which mainly stem from a lack of a healthy lifestyle. Disabilities and diseases are obstacles that humans have no control over. An individual has the potential to avoid these challenges later in life, if they observe and study those who live the longest. If the most recent generations, Generations Y and Z, implement life lessons from centenarians, they will have the potential to prevent irreversible health issues and live for longer. Humans cannot depend on luck alone to win at life. If they take control of their lifestyles, they can increase their overall wellbeing and live to tell the tale.

This project will identify the most crucial life lessons gained from those in the Blue Zones. These lessons will then be implemented through a process to distribute the information in the most effective way using digital media. Individuals born in Generations Y and Z will then test the digital media artefact and be interviewed to find the best solution for sharing these lessons through a Design Thinking approach.

The effects of technology on our mental health and possibly preventing it? (3.14)

Courtney Reid, *University of Stirling*

Technology is huge. Over 4.4 Billion people around the world are active internet users. Around 58% of the globe’s population, 3.7 Billion of these users are on social media. Social media is amazing right? Can use it to catch up with friends, for finding out the latest news and also can be used for you to update friends and family with tweets, a picture post on Instagram or a Facebook status. Its so simple and instant, anyone can do it. Whilst this is all amazing many are finding themselves falling into a trap. Teens on average are spending a massive 9 hours using social media per day. That is a huge amount of time to be spending staring at a phone screen. What if we had a way of controlling this and checking up on people. Mental health is becoming a big problem in today’s society and social media and technology is playing a massive role on making this worse and it is well and truly getting out of hand. My idea is to create an application to aid mental health even just that little bit of guidance could make a huge difference to someone’s life. From reminders to make your bed when you get up in the morning and to drink more water during the day, tracking your daily phone usage on social media and reminding you to take breaks and a section for stories from real people telling you about their struggles and how they coped with certain aspects of their mental health for when you really are struggling reminding you that it does get better from here. I hope to make a difference and develop an application that can be used by many.

How to inspire girls into STEM through new blended approaches (3.15)

Elena Pederiva, *Edinburgh Napier University*

There have been many studies around the STEM subjects and how girls are in evident minority in these fields. People tried to find out why and what this means to the world of science, technology, engineering and mathematics. Girls often feel left out from this world, either because of a gender gap or because of stereotype threat that weights on the decision making of the young women. Researchers tried to find solutions on this problem by informing the students about role models to follow or by organizing out-of-school programs where girls can increase engagement, interest and knowledge of STEM subjects.

What this project wants to discover is how to inspire and change girls on pursuing a STEM related career through interactivity and new blended approaches. It has been studied that using these new mixed-reality approaches in education was beneficial on the students that could engage better and boost their learning experience. Learning more about STEM would be highly beneficial for young girls and doing so through a more engaging, fun and effective way would give them the opportunity to discover something more about a subject but also something new about themselves that they didn't know yet.

Improving User Experience through Motion (3.16)

Frida Lindblad, *Edinburgh Napier University*

Motion in interfaces is today ubiquitous, helping to create better experiences for users. It is no wonder that technology companies like Apple, Google and Microsoft have specific guidelines on how to apply motion into their interfaces. Motion gives context and meaning to elements on the screen. It allows users to understand relationships, hierarchy and functions, with simple and informative movements. Something that a static interface cannot do, as sudden changes distract and confuse users, creating a less enjoyable experience.

When applying motion to a user interface, either desktop, tablet or mobile, it needs to have a purpose. There is a possibility for motion to become a hindrance when applied wrongly, distracting the user rather than being beneficial. When motion goes unnoticed, it has become a natural part of the interaction. A perfectly integrated movement that gives the user information and meaning about the interface. Motion in interfaces should not be added for the sake of it. It is vital to think about how it will enhance the usability, as well as how it will improve the experience.

Although motion is everywhere in interfaces, there are few studies and no overall formal guideline on how motion should be applied. Studies either focus on experience, type of animation or which software tool to use. The aim of this work is to further study and investigate how different guidelines can be combined to create a more comprehensive guide on how and why motion should be added to enhance usability and user experience.

Smartwatch Technology: Improve health and well-being of patients (3.17)

Hannah Dowell, *Sheffield Hallam University*

In today's rapid development of connected devices, organisations have had to constantly re-engineer their methods to keep up with the changing pace of technology. This includes organisations within the pharmaceutical industry and due to the recent evolution of wearable devices, it is a prime time for a digital progression within healthcare. Today, health related applications appear to be on the rise, as it gives people the opportunity to track general health, set goals and share results with others. This interest in digital health applications indicates that people are looking for a way to self-track their health and want to be provided with such technology to do so. Pharmaceutical industries have started to embrace the digital age that we now live in and are contributing to the journey to better health and well-being for people worldwide. The poster will present an insight into the advantages of introducing smartwatch technology to the pharmaceutical industry and what features should be heavily invested in. It will uncover the possible audience for a medical smartwatch and the effects that a smartwatch could have on long-term health conditions. However, the poster will not only focus on how a smartwatch could improve the lives of patients but also caregivers. It will display caregivers' opinions about such device being administered to patients and how they feel it will impact themselves. From the pharmaceutical standpoint, health is a main contributor to the high sale of smartwatches so adopting this type of technology could change how we see healthcare today.

LoRaWAN Location Tracking (3.18)

Isla Roberts, *University of Stirling*

Technology is used in various aspects of everyday life to make tasks and activities simpler, solve problems and provide modern solutions. Over the last decade increasing amounts of apps and devices have emerged to facilitate location tracking. Targeted at pet owners, GPS devices have been created to assist in pet safety. These devices transmit their location with the intention of helping pet owners track and retrieve lost pets. However, all current solutions available on the market use Bluetooth or cellular to send data. This project looks at the benefits and practicality of using the LoRa network instead to transmit location. LoRa is designed to be a low power, long range connection supported by the Things Network, which should allow the creation of a more efficient and low cost solution.

E-commerce innovations (3.19)

Joana Trashlieva, *Aberystwyth University*

Today e-commerce sales form 15.5% of sales worldwide. We can argue about what e-commerce is - a business and its site or activity that results in customers purchasing something online. Let's say it is the latter.

In recent years the use of artificial intelligence and augmented reality has become more common. IKEA, is allowing customers to virtually place a piece of furniture in their homes to see how it will fit. Due to the increased environmental focus, the demand for second-hand goods, or re-commerce, is growing. Companies like Facebook and eBay are very successfully adopting this.

E-commerce is not done only on website. Customers use mobile applications to browse stores and purchase goods. PWA, progressive web applications, are on the rise with great success. That ensures that the look and feel of a website is authentic as a native app.

Interestingly, e-commerce companies are now going bricks and mortar. Deriving from that, they use beacons to customise the in-store experience and match it with that of an online shop. Amazon, a company renowned for putting physical stores out of business, has now invested in one.

Another e-commerce innovation Amazon has a huge part in is drone deliveries. But only time will tell how far will this go as it's heavily subjected under privacy regulations.

All these innovations are focused on the customer. The biggest change in recent years is the move for personalisation of a website to each customer specifically.

So, what will be the next big innovation in e-commerce?

Sôn amdan, Cymru... a beth arall? What do Members of the Senedd Cymru do (3.20)

Leena Sarah Farhat, *Aberystwyth*

The Senedd Cymru is the democratically elected body that represents the interests of Wales and its people, makes laws for Wales, agrees Welsh taxes and holds the Welsh Government to account. It takes care of the peoples of Wales most important needs but in this uncertain and mistrusting era of politics, people are discouraged by elected bodies. So what do the Senedd Cymru actually talk about? What do ministers do? How do they help the people of Wales and what can be improved?

In this project I will be using Natural Language Processing to find out more about this important elected body.

Can Digital Media help tackle the Gender Imbalance in STEM subjects? (3.21)

Lucy Smith, *Edinburgh Napier University*

STEM subjects at university are mainly male dominated. The reason for a lack of female students in this sector is due to factors such as; discrimination, a lack in confidence, stereotypical beliefs and inadequate support from family and teachers (Akhtar, 2019). This imbalance of gender continues after education into the workplace as only 24% of people employed in STEM are women, this is mainly low in IT and Engineering industries. (Barcatt, 2018) This project will explore how Digital Storytelling can be used to encourage women to study or work in STEM, in particular, the Technology industry. By using an interactive animation young girls are able to learn about significant women in history such as Hedy Lamarr, Ada Lovelace and Grace Hopper who built the foundations of the technology we use today, as well as learning how they can contribute to the future of STEM and end the gender imbalance. By showing young girls what a world would be like without the technology we use every day in particular, mobile phones, computers and Wi-Fi created by these inspirational women it will demonstrate that girls belong in STEM just as much as boys.

Creating empathy through a realistic synthetic environment created in VR (3.22)

Mari-Nikol Panteva, *Edinburgh Napier University*

Trophy hunting has become the 4th most profitable global crime, causing an irreversible harm of the diversity of animal species, many of which are already endangered. In South Africa, trophy hunting is considered controlled, however, the illegal wildlife trade is not. Animal poaching has led to the death of a significant number of African elephants, more than 100 000 of which were killed over a three-year period (2014-2017) for ivory. In addition, South Africa has the largest population of rhinos in the world which leads to a high number of rhinos poaching, with more than a thousand a year being slaughtered for their horns. The VR experience will present the wildlife crisis to people in a vivid and immersive yet playful and harmless manner. The idea behind the informative VR video is to explore the power of the new technologies in raising awareness. Even though for the past few years the statistics are showing a decrease, illegal wildlife activities are still a significant issue. Nowadays, most of the rehabilitation centres are relying on social media to raise awareness and provoke people to take action. I believe that positive change can be achieved if people work together while making use of the power of the smart and rapidly evolving technologies we have access to. Therefore, I decided to bring together an area I am passionate about and the skills I have acquired in the past three years of my studies in Napier, to create an immersive product that raises awareness.

Pedestrian Visual Attention Detection by Gaze-Following and Saliency Estimation (3.23)

Millie McQuillin, *Durham University*

Human detection is one of the oldest problems in computer vision. These algorithms have now evolved for use in autonomous driving, detecting pedestrians in front or around the vehicle or on the sidewalk, with the more complex algorithms using convolutional neural networks to detect pedestrians who may be occluded by scene features or other vehicles. However it is common for pedestrians to be distracted by mobile devices, scene features, or other pedestrians, and research has shown this makes them a higher risk to autonomous vehicles. In this paper we aim to investigate the effectiveness of an algorithm which could evaluate levels of pedestrian visual attention.

In other areas of computer vision algorithms have been developed to detect human visual attention on objects or features. These can be used in human-object interaction algorithms to great effect. We propose combining these two techniques and developing an algorithm capable of estimating levels of pedestrian visual attention by combining both gaze-following and saliency research.

In this poster we will explore the initial findings of our research in this field, as well as exploring different technical approaches we could take to detect pedestrian levels of visual attention. We will present an initial model, and discuss the likely challenges we will encounter, including the need for high performance and processing speeds, and the detail needed at distance to detect pedestrian attention. Finally we will explore how research in this area could benefit and improve on current pedestrian detection techniques.

Formal Grammars in Procedural Game Generation (3.24) Rebecca McGowan, *Edinburgh Napier University*

Currently, game development isn't a very accessible field to anyone who isn't interested in programming. This means it's a difficult hobby for anyone who is more creatively inclined, short on time, or new to computing. If games could be created by simply describing the kind of game you want to see and what you would like to do in the game, making and playing your own games becomes easy and fun.

Being able to generate randomised games with certain specific elements allows people who like specific game types to keep creating new adventures to play. Being able to quickly create a game where you can pick and choose what elements or mechanics are included provides an easy way for developers to quickly prototype new ideas. Being able to create a theoretically unlimited selection of games with a limited set of common words makes game development accessible to those who otherwise find themselves faced with large and complex game engines.

My project aims to provide this functionality to users interested in creating 2D games but not in having to write hundreds of lines of code, through the use of formal grammars and the Unity3D game engine.

Analysing Twitter for trends in a movie/TV/channel repository (3.25)

Rimma Chepik, *Middlesex University*

Emotions play an important role in successful and effective human-human relationships. People have a deeply need to be heard, share ideas and experiences, which give the ability to connect with other people, use communication to share observations, ask questions, and engage with other people in meaningful dialogues.

One way to analyse social media data is to use Twitter. Twitter is a social media platform. It is a blogging service that allows people to communicate with short messages that correspond to thoughts or ideas. Twitter is a free, high-speed, global text-messaging service. Twitter is a social website that allows you to see the latest happening of any user. Twitter connects a wildly diverse array of people from all over the world. It is easily customizable and open-ended and become more popular with people and companies.

Twitter provides API which is available to registered users, and it will be used to mine data. Twitter API allows searching tweets according to various criteria, such as date, geolocation, tweet keyword, user id. Using the Twitter API, tweets that mention certain words (like film, movie, TV-show, genre) will be collected and saved.

After tweets are mined, they will need to be analysed in order to produce a movie list. The research will be done to find out more about the best practices of tweet analysis. Movies will have to be ranked. One way to do this is just to count the number of mentions, however, some tweets could be positive and some could be negative. The sentiment analysis helps to know if there has been a change in public opinion toward any aspect of the business. By reviewing customers' feedback regularly business can be more proactive regarding the changing dynamic in the market place.

What is the perceived learning benefit of photogrammetric 3D tools for studying the cerebral arterial circle? (3.27)

Ronja Struck, *University of Aberdeen*

Cadaveric specimens are the most realistic learning resource for learning anatomy. However, their availability is limited. Traditional learning resources, such as plastic models, textbooks and current 3D online atlases are widely available but idealised. Studying complex 3D spatial relationships such as the Circle of Willis is therefore challenging. To bridge the gap between idealised models and cadaveric specimens, we created a labelled video and

interactive PDF of a photo-based 3D model of the Circle of Willis and asked students to evaluate these new learning resources.

Our sample consisted of 100 undergraduate students. Each subject was given the opportunity to explore the new learning resources and then filled in a Likert scale questionnaire with questions on their usefulness, video rotation speed and text label timing. Responses showed a clear preference for our digital 3D tools over traditional learning resources. Most students agreed the digital 3D resources facilitate the identification of structures in cadaveric specimens and the creation of a mental 3D image of the anatomical structure. 90% of students agreed that they want to use photo-based 3D models for self-study. Most students were satisfied with the rotational speed and timing of text labels in the video, but there is a tendency towards slightly faster rotations and slightly longer display of text labels in the students' preferences.

Our new learning resources received very positive feedback from students, which encourages us to create more resources of this kind. As a next step, we plan to translate the student feedback into our videos.

“You look like a happy pig” – how facial recognition is used to assess the emotional state of pigs (3.28)

Venla Kamppari, *Durham University*

A facial recognition system is a technology capable of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from given image with faces within a database.

Now facial recognition technology is also used to detect different emotional states in pigs. The researchers and companies backing the technology say they can help farmers isolate disease carriers, reduce the cost of feed, increase the fertility of sows and reduce unnatural deaths. This technology is being pitched as an alternative to the tagging of pigs' ears, a practice that many farmers find cruel and that has come under increasing scrutiny as conscious meat consumption has gained popularity.

Pig facial recognition works the same way as human facial recognition does. Scanners and software take in the bristles, the snout, the eyes and ears, and these features are then mapped. Pigs are highly expressive, and research has previously shown they can signal their intentions to other pigs using different facial expressions. There is also evidence of different expressions when they are in pain or under stress. This makes it possible to map out these expressions and use them to recognise, when the animal is not feeling well. This same kind of technology can be applied in other situations as well, for example to tell, when therapy animals are feeling unsteady and thus avoid any incidents.

Eldercare Robot Demonstration on a pepper Robot (3.29)

Yifan Xu, *University of liverpool*

The world's population is aging, and, with that, new social issues arise, especially in terms of healthcare and daily activities. Robotics could be one of solution since it could provide healthcare support, assistance in an emergency, or treatment compliance. The Pepper robots developed by Softbank Robotics is one of such robot to realize this vision. This project aims to explore the probability of using the PROforma/Tallis system to control pepper robot, design an eldercare robotics demonstration and develop some use cases as a robotic healthcare assistant in a hospital environment, including offering advice to medical professionals.

PROforma and Tallis's framework implement Java, but the pepper robot program in Python. Therefore, to execute the PROforma program on pepper robots, the project will need to find PROforma / Tallis API or run a program on another machine and send a command or receive information from the Pepper by wireless networking. It will utilize a simple "pathway" in Proforma for a hospital/ medical robot task, including sending commands and received information from the pepper robot using PROforma/Tallis API. Also it will devise a set of simple demonstrations of tasks a Pepper robot can perform in a hospital environment, intended to aiding and encouraging human users through interaction with pepper robots. The demonstration will not only design to perform daily tasks and support necessary activities but also provide elderly users companionship from a psychological perspective.

What really happens when you go on the WWW? (3.30)

Zulia Shavaeva, *Durham University*

This poster aims to explore a complex but yet incredibly fascinating topic on what happens when you type something in "google.com". I will explore this from both the hardware and software side to illustrate some essential infrastructure and technologies that make up the internet.

The hardware of the internet includes everything from the cables that carry terabits of information every second, to the computer sitting in front of you along with routers, servers, satellites that carry information packages, etc.

The internet is a flexible system: it consists of both static elements that make up the backbone of the internet, to a continually changing 'connections'. These connections are performed by two types of users on the web: servers and clients who continuously exchange data via nodes. These nodes carry out the information in the form of information packages.

However, this infrastructure would be impossible without a rigid set of rules called “protocols” to control this crazy traffic.

Finally, the software behind these communications is split into two: user-side and server-side. They continuously communicate with each other via HTTP requests and the data is saved in a database where it is then retrieved on a users request.

All these components and more make up the backbone of the internet which is an essential part of our everyday lives. This poster will attempt to provide a simple, yet informative explanation of how the internet works. And, best of all, it will be interactive!

MSc student abstracts

Lifesaver or Heartbreaker? (4.01) Avanthika Vineetha Harish, *Lancaster University*

Internet of Medical Things (IoMT) is a term relating to the network of inter-connected devices in hospitals. These devices aim to improve the quality of treatment and service, from sensors attached to the patient’s bed detecting bedsores, drug infusion pumps, through to lifesaving pacemakers implanted in patients. The range of IoMT devices is vast and improves the monitoring and treatment of many health conditions for patients both in and out of hospital. But have you ever thought about the security of a device implanted or connected to your body? In 2019, the US Food and Drug administration issued warnings that medical equipment such as Implantable Cardioverter-Defibrillators (ICDs) could be hacked due to lack of encryption and authentication, alongside unpatched vulnerabilities and incorrectly configured settings on devices and connected systems. Other vulnerabilities were raised about morphine infusion and insulin pumps that could be remotely controlled to overdose and potentially kill patients. Even the medical imaging systems like CT and MRI scan machines were found accessible to the attackers, altering images and manipulating scan results. All these connected devices and unpatched legacy systems leave hospitals and patients vulnerable to cyber-attacks.

With a little technical knowledge, there is the potential for attackers to do harm. In this poster, I will explore the cyber risks associated with the implanted IoMT devices like pacemakers and drug infusion pumps and look at solutions to mitigate them from different stakeholders’ perspectives (manufacturers, hospital authorities, doctors and patients)

Intelligent Assistive Navigating Device: A relationship between the features and enhanced usability (4.02)

Bokyung Lee, *University of Glasgow*

Devices to aid people with visual impairments have been developed as part of a drive to increase the availability of assisted devices for people with disabilities. This study examines how to enhance the usability of such devices when being used for navigation. To assess the usability of these devices, three features derived through the principles of universal design: Accessibility, Depth of Information and Obstacle Detection. The evaluation showed a positive relationship between the three features and enhanced usability. In order to judge usability, the previous work at Glasgow International College involved developing the essential characteristics: the system should be able to use in both indoor and outdoor area; the system should use tactile or acoustic sense but also need an accurate supplement of the disturbing conditions; the system should alert detailed information in real-time. Therefore, the possible suggestions to improve these intelligent assistive devices will be drawn in the poster especially in terms of the software perspective. I propose the improvement of human-computer interaction (HCI) for the devices, data analysis and machine learning for detecting obstacles while yet more studies are required in this field.

Gender Bias in Recruitment: Is Artificial Intelligence the Problem or the Solution? (4.03)

Delyth James, *Aberystwyth University*

Despite a growth in awareness of gender bias, and employment legislation which seeks to protect employees from discrimination, there are still industries where women are massively underrepresented. In 2018 only 26% of professional computing occupations in the U.S. workforce were held by women. A study of women in the tech industry in the same year found that over 50% of respondents felt that there was a visible bias in hiring for tech roles, and that almost 55% believed that blind hiring would help improve technical recruitment among women. Major companies increasingly use Artificial Intelligence in their recruitment process as an efficient method for sifting through large numbers of applicants and short listing those who are likely to be a good fit for the role. This method has however frequently been criticised for amplifying bias by using training data which reflects the already skewed gender balance within certain industries. But are we too quick to dismiss machine learning as a method to remove bias from recruitment? The machine itself cannot be biased; it can only be taught to perpetuate human bias. A machine can be trained to ignore gender entirely, something which is impossible for a human who will always have some level of unconscious bias. Rather than blaming Artificial Intelligence for causing gender bias in recruitment, should we look again at how we train a data driven model in order to create a level playing field for both male and female applicants?

Auditory and Haptic Feedback in a Socially Assistive Robot Memory Game (4.04)

Emilyann Nault, *Heriot-Watt University & University of Edinburgh*

Age-related cognitive impairment is becoming a more prevalent concern as the elderly population continues to increase. Technological systems created for cognitive rehabilitation need to be motivating to combat the personal and logistic factors that make it difficult for them to remain engaged. By incorporating the motivational strengths of a socially assistive robot with the accuracy benefits of sensory feedback into a memory game, we investigated design considerations to inform the development of a system to aid individuals with age-related cognitive impairment. We present a memory game facilitated by the socially assistive robot Pepper that employs sensory feedback (audio, haptic, and both). The haptic wearable device was created from an Arduino and a vibrating motor. The system was evaluated with adults, and user's game accuracy, cognitive load (NASA TLX), and system preferences (System Usability Scale (SUS)) were assessed. The preliminary results suggest a preference for auditory feedback, and participants believed they performed best in this condition. Based on qualitative feedback, we have identified improvements that can be made to the system to enhance engagement. Future work includes implementing these improvements and testing with older adults. Additionally, we plan to test the system on both Pepper and Nao to see if there is a preference for a particular robotic platform. Through these preliminary studies, the ultimate aim is to explore design considerations of a cognitive rehabilitation system for individuals with age-related cognitive decline.

Health and safety standards in architecture projects using deep learning for image recognition (4.05)

Hanan Alkueder, *University of Stirling*

In recent year, many applications have been developed using auto-generic and deep learning technologies to provide architects and designers with the best experience in designing stunning buildings. A common misunderstanding between people that architecture only focuses on designing visual aspects of buildings. In fact, architects are expected to work with space and materials using Building code regulations to ensure efficient and flexible designs that can provide coherence, health, and safety.

The International Building Code (IBC) is a list of regulations and standards that includes safety requirements in different areas of buildings. For example, places involving hazardous materials, exiting paths in emergency situations, accessible services for people with special needs, type of materials used in building and so much more. During the design phase or planning renovation on old buildings, tracking and detecting these standards from floor plans and sketches is hard to accomplish and can easily be misused or miscalculated.

This poster aims to highlight today's technology used in architecture applications, mainly discussing and proposing possible techniques using deep learning for image recognition to detect any violations of Building code regulations in designing floor plans and suggest alternative optimal designs. This can be approached by reading images of floor plans (e.g.

Site Plans, Landscape Plans) using deep learning model that recognize the main objects of buildings and their surroundings. Then use previously learned information about Building Code regulations to confirm the efficiency of the design in terms of health and safety.

Artificial Intelligibility: An interdisciplinary approach to helping English language learners improve pronunciation (4.06)

Hannah Bouteba, *The University of Sheffield*

English has increasingly become the language of education and research, due to the internationalisation of education meaning ever more people around the world study in English. With approximately 1.5 billion people learning English globally, this trend looks set to continue.

For non-native speakers, pronunciation is often one of the biggest challenges – English has 19 vowel sounds while many other languages have 5 or fewer. From my experience working in English Language Teaching around the world, I saw how pronunciation is often neglected in the classroom in favour of grammar and vocabulary. Yet, pronunciation disproportionately affects perceived communicative competence.

Computer-Assisted Pronunciation teaching (CAPT) offers a solution. Over the last decades there has been significant research in the area and many technologies from Automatic Speech Recognition (ASR) have been employed in developing CAPT systems which can identify learner errors and offer feedback.

However, without collaboration across different fields, there has been difficulty developing effective feedback models which allow the learner to go beyond identifying segmental errors (phonemic). In order for CAPT to be more effective, pronunciation instruction should focus on both segmental and suprasegmental features (intonation, word stress), thus facilitating improvement in the two key areas of pronunciation - accuracy and intelligibility. Furthermore, by tailoring to the learner's language background specific phonemic errors can be prioritised leading to greater accuracy in the ASR system.

This poster will investigate current research in the area, examining the effect of accented speech on ASR, and propose an interdisciplinary approach, which combines computer science, linguistics and pedagogy, focusing on intelligibility, and effective forms of feedback.

AI, AIN'T I A WOMAN? (4.07)

Janet Leparateleg , *Lancaster University*

Simply put AI is intelligence demonstrated by machines, a good example being self-driving cars; this task can be accomplished by processing large amounts of data and recognizing patterns in the data and data sets, algorithms, therefore, become the classifier. Hence a need for diverse data sets. Behind every algorithm, there is always a person with a set of personal beliefs that no code can eradicate. We are always driven by stereotypes since that's how our mind works. A good example of technology that fits a stereotype is "Alexa" created as a "servant" and hence has a female voice as traditionally women were seen to be of service to others. There is a need for every coder to be self-aware of their own personal bias be it Gender, race, class etc. They need to understand that they are human and take responsibility accordingly and work towards human-centred computing. Just as we want Politicians who represent us, we also want technology to represent us, mirror who we are, share our values and preserve them.

This bias has real-life consequences and its bound to get worse if nothing is done, an example being the serious consequences in the justice system as algorithms trained on historically biased data have a significant error rate for communities of colour especially in over predicting the likelihood of a convicted criminal to re-offend. This poster will explore how addressing diversity in the workplace could help us build better AI systems.

Pixel Perfect (4.08)

Kristen Rebello, *Middlesex University, London*

Capturing attention. Exceeding expectations. Engaging crowds. Using technology? Definitely! Technology has walked a long road when it comes to development, especially in the gaming and entertainment fields.

It can be as simple as tracking a hand gesture on projecting Math sums or far more complicated like having an indoor forest with animals running around. The idea behind projections and interactivity sounds very tasteful when it comes to keeping an audience engaged during a presentation or even an advertisement.

Visualizing is a very important part of any industry, and Projection Mapping can make for a very fun and creative way to demonstrate something. An idea. A concept. What is Projection Mapping? Simply put, it is projections mapped onto a 3D or flat surface. It really is innovative and captivating to see what a camera and a projector can do.

But what exactly does this mean? How far have we come in implementing it? Presentations, CVs, maybe even, movie or story experiences. This poster is going to look at Projection Mapping in not only an entertainment setting, but any common and informative use, and any potential dangers or limitations.

Digital nomads and taxes - A framework for monitoring and analyzing remote work for tax purposes (4.09)

Maria Radu, *Bath University*

Remote and flexible working are becoming more common as technology advances and enables the workforce to perform as well in the office as out of the office. With the Global Talent Trends 2019 report from LinkedIn (2019) stating that they have analysed data from their platform to gain insight into flexibility at work and discovering that job posts that mention work flexibility have increased by 78% since 2016. Moreover, it is no surprise that tech is the leading industry in this new type of working, with 72% of companies allowing remote work, at least for some of the time (LinkedIn GTT 2019 report) and others choosing to be freelance digital nomads.

The present poster's research topic and the software proposed use data monitoring and visualisation to understand what implications it might have in terms of risk, HR, compliance, legal and financial aspects. The scope of the research will look only at the tax risks and implications that remote working from countries other than the one workers are resident in have, and designing a framework and system of monitoring the time they spend working in those locations. Following that, a set of suggestions, alerts and actions would be suggested to the mitigate any of those risks and avoid tax evasion.

References:

LinkedIn, 2019. Global Talent Trends Report. [pdf] Available at: <https://business.linkedin.com/content/dam/me/business/en-us/talent-solutions/research/pdfs/global_talent_trends_2019_emea.pdf> [Accessed 1 November 2019].

CYBER-SECURITY AWARENESS: APPLICATION DEPLOYMENT VS CYBER-EDUCATION (4.10)

Mary Michael, *University of Glasgow*

Trends in technology indicate that there is no haven from cybercrimes, cyberthreats, and cyberattacks; thus, the responsibility to be cyber safe is a global concern. The developed countries trade with companies and governments in developing or underdeveloped nations without ensuring that these countries are at par with regards to cybersecurity protection standards.

Even with sectors like the banking and IT industries making recent considerable investments in the implementation of expensive cybersecurity solutions to improve their protection against cyberattacks, there is no complimenting effort to create the human capacity that will manage the security applications. Efforts in improving the awareness of the users impacted by these attacks are minimal.

The biggest threat to the success of cybersecurity attacks is the personnel, hence the need to educate the staff is as essential as investing in the technology. Companies sometimes imagine they are beyond the targets of hackers, but as the developed countries get stronger

in protecting their cyberspace, the attention and focus will shift to the more vulnerable nations.

Recent efforts indicate that governments provide sponsorships to study these new cyber prevention skills to transfer this knowledge to other personnel. With increased education of Cybersecurity in areas like cyber forensics, an employee can identify, combat and prevent incidents such as cyber financial crimes.

In order to bridge the awareness gap of personnel, the aim is to encourage the implementation of Continuing Professional Development (CPD) tools for cybersecurity education and to re-evaluate the tools to determine their effectiveness where these tools currently exist.

Security design patterns for Internet of Things (IoT) based systems (4.11)

Nurulnadiyah Dzainuddin (Nadia), *University of Brighton*

IoT is a buzzing word with only three letters in or else known as Internet of Things. IoT was first phrased over two decades ago and its growth unstoppable since then. It's exists in every corner of our life from home, hospital, transportation and even cities. IoT technology develops rapidly for the past years but with insufficient security and privacy consideration. This research explores existing security design patterns for IoT system. The findings show that there are limited designs currently exist and immensely specific to industries. The identified design patterns are concentrate in software system or the authentication segment of IoT system, and it's across industries, from cloud based eco system to smart water management system. It is also distinguish that there are no standardize of the security design patterns specifically for IoT system. This research found that there is an opportunity to have a generic security design pattern for IoT system as research community has established IoT system generally will base on basic architecture layers. The most common and widely use IoT architecture layers are three or five layers architecture models. These includes Application Layer, Network/Middleware/Transport Layer, and Perception Layer for basic three layers architecture models. Additional layers for five layers architecture models includes Business Layer and Processing Layer. To have standardize application for security design patterns to each architecture layers is a feasible proposition. Standardize security design patterns could be the prime countermeasure for IoT system security challenges and perhaps to could be the key research in the IoT system security field.

Monitoring climate refugees from Fiji Islands using Data-enabled design visualising behavioural patterns using interactive storytelling (4.12)

Rachele Cavina, *The University of Edinburgh*

Climate Change has a major impact on small islands such as Fiji, where the consequences for the local economy and living conditions are at high risk. Fiji residents are fleeing their homes and relocating long-term but this is their last chance for survival which is “financially, psychologically, and socially” costly. It is imperative to recognise behavioural early warnings to build systems that incorporate social emergency response measures to provide aid before and after climate disasters.

Big data is a key source for the analysis of human behaviour and user-centred design: the new generation of products and services produces data introducing the realm of Big Data to design which provides insightful information on how people interact and behave in the environment. Data Analytics is the best way to examine behaviours in situations where primary research is difficult to do and data-enabled design targets behavioural change by remotely monitoring people to tackle global societal issues based on four steps: envisioning, designing interventions, acquiring data, analysing and validating data; and machine learning plays a key role in accurately recognising patterns and deviant behaviours to predict future behavioural transformation from a user-centred perspective.

Data needs to be demonstrated and understood by multiple background users becoming accessible and interactive, in this aspect “gamification” becomes an opportunity to bring data into the visual and virtual world. Storytelling becomes a tool to communicate data through experiential activities that aim at changing the audience’s behaviour towards climate change and its impact on high risk groups of people.

Developing an application for exploring the Mandelbrot set in C# (4.13)

Sara Khoder, *University of Greenwich*

There has been an increase in the usage of digital art and mathematical art, and therefore, there is a need for a constant evolution in this field to keep up with the user’s requirements and needs. The idea of chaos theory and fractals theory has been around for a while; however, the idea of implementing it to be able to create art is either very basic or non-existent. There are several softwares available that support the usage of fractal art and colour filters that allow the user to generate random palette for fractal images. It is also possible to buy or download fractal art through the web. This project would be beneficial for people as it allows the user to use advanced methods in creating art without the need for programming knowledge. This project would also be beneficial as it would enable the user to create new patterns and fractal art design that has not existed before.

Fractals are rough geometric shapes that have the ability to diverge into self-similar smaller copies of the original fractal. There are a number of unique features that fractals obtain. This includes having smooth structure at inconsistent smaller scale as well as being self-similar. The Mandelbrot set and the Julia set are generated using the same iterative process but with different initial conditions. There is only one Mandelbrot Set and infinitely many Julia

Sets - each point on the complex plane acting as a parameter to the Julia Set. There are two important theorems that describe the relations between the Mandelbrot and the Julia set.

Oh no! I think I have been Hacked: Privacy and Security Concerns of Cyberspace (4.14) Unwana Umoren, *University of Bath*

The advent of the internet has no doubt revolutionized our society making information sharing, resource gathering and other networking activities readily accessible. Although the internet has greatly contributed to technological advancements, issues of privacy and security remain unsolved. With the increased number of devices and users on cyberspace, the vulnerability to cyber-attacks remains on the rise as most users of the internet have little or no technical knowledge of the internet's back end, thus engaging in activities that expose them to attacks from cyber-criminals who have enriched technical knowledge of the internet. Some forms of cyber attacks include DDoS (Distributed Denial of Service attack), SYN floods, ransomware, social engineering, and many others. The most used is social engineering which involves the attacker manipulating the emotions of the target to obtain confidential information such as; credit card details, passwords and other information not meant for third parties. Most information has been compromised using these deceptive methods leading to great losses by both companies and individuals. The question could be: "There are thousands of users out there, how can the hacker find me? Yes, there are millions of users out there but as simple as clicking on a malicious link or even connecting to a public network could increase the risk of being attacked. The scariest part is that hackers are not the only threats, but some reputable companies sell user data to third parties. Cyberspace may be resourceful but is not yet a haven, thus users need to be cautious.

ReBo: The possibilities of emotional AI chatbot (4.15) Yuqian Sun, Goldsmiths, *University of London*

Considering the challenges of natural language processing and the current AI technology, AI agents like Alexa and Siri are hard to give emotional responses to users. We have a long way to go to get to the cyber life that is often portrayed in movies since empathy is hard to reach during affective computing. This poster presents a psychology and design-based approach to create the AI chatbot, ReBo, that is more human-like.

ReBo is an emotional AI chatbot inspired by the famous ancient Chinese poet, Li Bai. He can chat and exhibit happiness or sorrow that is triggered by memories, or even go offline when he gets drunk. He tells his story through everyday conversations, and if you share your life and story with him, he may even become inspired enough to write poems again.

The main mechanics behind it is the emotional state machine. We set markers in the corpus that connect to ReBo's emotional state, so the score of positive emotion of the chatbot is influenced by real-time communication with users. Chatbot's behavior and attitude, like typing time, frequency of talk and conversation topic will change through the conversations.

The poster explores the future possibilities of digital intimacy and finds a possible perspective where humans and robots could build an empathetic relationship.

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