Introduction to IT - COSC2196
7.0.0 Assessment Task 2: Team Project (GROUP)

VibeCheck

Click here to go to our team webpage.

VibeCheck - Personal Information

Ella Watts https://ellawatts-rmit.github.io/

I'm Ella (s3851446), and I've lived in Brisbane, Queensland for most of my life. One of my hobbies is learning languages - I have reached an intermediate level in French, and I am looking at learning Dutch next.

I am interested in IT because I enjoy problem solving and using logic-based thinking skills, but I am also attracted to the creativity that is required in some IT roles. However, I have very little IT experience outside of this course - I have only done some basic HTML, CSS and javascript with Codecademy, as well as an introductory R course during a previous degree.

Myers-Briggs: **INFP** - A Mediator (INFP) is someone who possesses the Introverted, Intuitive, Feeling, and Prospecting personality traits. Making up only 4% of the population, these rare personality types tend to be quiet, open-minded, imaginative, and apply a caring and creative approach to everything they do.

EducationPlanner.org: **Tactile learner**

Political Compass: **Left / libertarian**

Stephen McCluskey https://stephen-mccluskey.github.io/Profile/

I'm Stephen (s3855458) and I've lived in Australia since 2008 when I moved here with my family from South Africa. My main hobbies are in gaming and fitness as it's fun and distracting/involving.

I'm interested in IT as I wish to understand how the game developers use coding to produce the final outcome of a game, as one day I'd like to be able to produce my own games and programs capable of completing tasks.

However currently I don't really have that much experience in coding besides python, visual basics and a little bit of Javascript. But intend to further my knowledge over the length of this and other courses.

Myers-Briggs: **INFP** - A Mediator (INFP) is someone who possesses the Introverted, Intuitive, Feeling, and Prospecting personality traits. Making up only 4% of the population, these rare personality types tend to be quiet, open-minded, imaginative, and apply a caring and creative approach to everything they do.

EducationPlanner.org: **Visual learner**

Psychometrics test: **Suitability 6-7/10**

William Scott https://winikari.github.io/Assignment-1/

I'm William (s3851536) and I have always been interested in IT from a young age and due to the fact that I grew up in a generation that is was surrounded by modern consumer electronics the modern internet and modern social media and the cultural shift that came about with all of these things hitting the mainstream, it was about 5 or 6 when I started building PC's mainly just so I could play video games but as I grew up the power of I.T really started to awe and terrify me, tales like a deep learning A.I that can tell what products you want before you want or single man-made program that after being fed the right data and variables was able to perfectly predict the winners on the track at the Hong Kong horse racers.

When it comes to experiences well I've never had the opportunity to become formally trained until now therefore I am completely self-taught.

Myers-Briggs: **INTP** - INTPs are philosophical innovators, fascinated by logical analysis, systems, and design. They are preoccupied with theory, and search for the universal law behind everything they see. They want to understand the unifying themes of life, in all their complexity.

EducationPlanner.org: **Visual learner**

OCEAN: **Openness 77%, Conscientiousness 48%, Extroversion 75% Agreeableness 65%, Neuroticism 94%.**

Daniel Zaknic https://dzak77.github.io/Assignment1-DZ/

I am Daniel (s3858822) and I live in Adelaide, South Australia. I lived in the UK for 3 years, spending 6 months on the Isle of Wight and the rest of the time in Liverpool. I love football (soccer) and I am lost without it at the moment.

I am interested in the visual arts, pop culture, games, history and economics. Sometimes I think I am interested in too many things. I have a professional background in Printing and Graphic Arts and have seen the web take over the industry.

I have needed to start to understand IT and start to code HTML, CSS, Google Ads and Flash, this has been highly enjoyable for me. So I chose this as the direction I want to go next professionally.

Myers-Briggs: **INTP** - INTPs are philosophical innovators, fascinated by logical analysis, systems, and design. They are preoccupied with theory, and search for the universal law behind everything they see. They want to understand the unifying themes of life, in all their complexity.

EducationPlanner.org: **Auditory/Visual Learner**

Logical Mechanic, Analytical Thinker, Practical Caretaker, Empathic Idealist.

Personality Profiles Analysis

Myers-Briggs Test indicated that William is INTP, and Stephen, Ella and Daniel are INFP.

For the Learning Styles test, William, Stephen and Daniel are visual learners, while Ella is more tactile.

Our individually chosen tests give interesting results, William scored predominantly extroverted, open and neurotic on the 5 personalities test. Stephen scored 6-7/10 on a psychometrics test. Ella scored left-leaning libertarian on the political compass test. Daniel is logical and analytical whilst being practical and an empathic idealist.

In terms of our Myers-Briggs personality types, we all have very similar personalities (either INTP or INFP). This should work well for group cohesion as we all have fairly mild personality types. The only issue this may pose is that there could be strengths that we are lacking as a group. Majority of our group members (Stephen, William and Daniel) are visual learners, which is a great advantage when it comes to working online. Having a tactile learning style (Ella) will come at a disadvantage as there is less opportunity to interact with things when writing reports, however this disadvantage should be mitigated by the group.

In terms of our third online test, William's personality test again outlines strengths that will be useful for group work (openness and extrovertedness). Stephen's 6-7/10 for the psychometrics test suggests quite a good aptitude for group work. Daniel's results as logical and practical should help with meeting task requirements, and his empathetic result means he is likely to be a cooperative group member. Ella's political compass quiz is less illustrative for group work, as political / idealistic leaning should not really be considered when writing a report, however it would be ideal if the group could manage political views to work cohesively.

Ideal Jobs

Ella Watts - Web Developer
Stephen McCluskey - Software Developer
William Scott - Data Scientist
Daniel Zaknic - Web Developer

Ideal job compare and contrast

When it comes to the ideal jobs of each person there are very few commonalities and the ones that there are not very interesting - mainly that we all focus on a form of development, whether it be for end-user experience, company security or scientific application. The interesting part - the difference, as hinted at in that sentence - is the different orientations we wish to work for and who we wish our products to be for; from consumer oriented to academically oriented, case in point.

Ella and Daniel are very interested in the development and maintenance of end user design and interface managing code that runs the user-facing side of the sites and show desire to work in a more client and customer dictated role.

William wishes to work in a more academic role far away from the demands and requests of clients and end users wishing to focus on creative invention.

Stephen sits in the middle of the paradigm with the wish to work with clients with the relative freedom and direction in how the solution is created to avoid tiresome or monotonous work.

Tools

Our groups website here.

The repository for this website is here.

For working on this assignment, our group used two main collaboration tools. For writing the report, we used Google Docs, where we could all contribute to the report content. We found this to be a good solution for making a shared document. For discussion and team meetings, we used Discord. Discord allows us to chat and message, so we could have group discussions while also filling out our document at the same time.

The shared GitHub repository is useful however our changes only reflect how we migrated individual contributions to the profile section. Ella was responsible for more of the html as that was one of her strengths, however the rest of the group contributed more to other sections of the report - essentially, we allocated tasks and roles based on individual strengths, rather than trying to have each member do a little bit of every single section. This means that our commit repository's activity log, while still somewhat representative, does not form an entirely comprehensive picture of our group contributions.

IT Report

Industry Data

What are the Job Titles for your group's ideal jobs? How do each of these rank in terms of demand from employers?

Stephens ideal job Software Development was the highest in rank among the group members sitting at 20th out of 201 in the data set provided with 337 job posting within the year that's an avg of 0.93 a day.
The runner up was Ella and Daniel's with Senior Front-end developer ranking 23rd out of 201 and the number of job postings reflect this being a 303 within a year average making in only a 0.1 difference at 0.83 jobs posted per day.

Last was William's with his ideal job in Data Science which did not appear on this data set the nearest equivalent being Data Engineer which was 39th out of 201 with only 182 job postings within the year that is an abysmally average of 0.49 job postings per day.

From your group's ideal jobs, you can identify a set of skills required for these jobs?

Software development

General Skills
Interpersonal communication Skills
Written Communication
Problem-solving
The ability to work independently

IT Skills
Using java to make REST calls
Writing java calls to PostGreSQL
Basic SQL
Data ingestion patterns and optimisation techniques
GIT
JUnit
Understanding of Cloud Platforms such as AWS or azure
Self-development skills
Programming languages such as HTML5, JavaScript and PHP

Senior Front-end developer

General Skills
Interpersonal communication Skills
Written Communication
Problem-solving

IT Skills
Understanding of Cloud Platforms such as AWS or azure
Understanding of programming language like JavaScript and jQuery
Understanding of HTML5
Understanding of web performance and optimization
Understanding of UX/UI Design
Understanding of Drupal theme development
Understanding of GIT

Data Science

General Skills
Interpersonal communication Skills
Written Communication
Problem-solving

IT Skills
Understanding of Cloud Platforms such as AWS or azure
Understanding Statistical science
Understanding of machine learning
Understanding of Calculus and Linear Algebra

How do the IT-specific skills in your required skill set rank in terms of demand from employers?

Basic SQL is one of the most demand IT specific skills making up almost 10% of the whole IT skills demand.
The next runner up is javascript and java which just like basic sql takes up a massive near 15% of IT skills with SQL making up one 4th of all demand.
The next is Git which makes up roughly 2.7% of the whole skill demand.

How do the general skills in your required skill set rank in terms of demand from employers?

When it comes to general skills the highest is communication skills by far due the fact that is the most general and versatile skill in the modern workplace and is usable in every occupation causing communication skills too far out pace any skill in the data set.
The runner up with under half the demand of the previous skill is problem solving skills again a very general and versatile skill in the modern workplace and is usable in every occupation.
After that writing skills are the fourth highest general skill.

What are the three highest ranked IT-specific skills which are not in your required skill set?

The three highest demand IT skills not needed are Microsoft Windows Project management and S.A.P i believe the reason we do not need these skills despite their high demand is because this software is mostly used for careers in IT focusing on business and financial management.

What are the three highest ranked general skills which are not in your required skill set?

The highest demand is teamwork at 5th
Troubleshooting at 6th
Planning at 7th

Having looked at the Burning Glass data, has your opinion of your ideal job changed? Why or why not?

William:
I believe that my opinions on my ideal jobs have changed due to the fact that i mainly chose my ideal jobs with a focus of ideal workplace environment and the type of work i want to achieve and not based on workplace security and workforce statistics.

Stephen:
While the skills required to seem extensive, and may require a lot of training and courses to perfect and grasp, especially in terms of the technical soft dev specific skills. It doesn't really change my mind on programming as

IT Report cont.

the option for me, due to the fact that although it is intensive and demanding, it'll keep me occupied and busy, all the while providing me an in depth knowledge as to how IT systems work, and will evolve in future.

Daniel:
I see Web and Front end development as a natural progression of my current skill set, so this is why I chose this in the first place. I am surprised by its ranking as low as it did. I believe I had a good understanding of the skill requirements before choosing this career path. I also think that depending on which organisation the job is being offered in the choice can vary greatly in what is being asked of the position. In my ongoing study of the IT profession I am recognising that the huge variety of options available and am open to following new paths and there are a lot of interesting areas and exciting future careers available.

Ella:
These skills and rankings actually confirm my desire to become a web developer. I enjoy web development because I love how the creativity of designing the user interface and experience combines with the logic and technicality of programming, however I have been unsure of it as a career choice due to the increasing availability of platforms such as Wordpress, Wix, and other similar website-building platforms. These allow people to build dynamic websites with little-to-no programming ability, so I fear that being a web developer will become a far less in-demand.

IT Work

Our group interviewed Malcolm Watts, who currently works in ICT and as an implementation partner.

What kind of work is done by the IT professional?

For most of his clients, Malcolm serves as their IT department, helping with any day-to-day troubleshooting, as well as setting up computers, systems and networks. He considers himself a 'jack-of-all-trades' when it comes to his work - doing anything from replacing IT equipment to implementing clients' software systems. He does a lot of work setting up machines (hardware management) - this involves both the physical set up, and researching the systems and technology for his clients. He also does network maintenance - especially in the current situation with Covid-19, he is having to ensure that all his clients have remote access to files, servers and programs to be able to work from home. This involves setting up VPNs (Virtual Private Networks) and managing credentials for individual access to these networks. Malcolm says that personally, he finds himself doing very little scripting in his current position, however he is looking at automating some of the work he is doing currently for clients.

A lesser aspect of his work is also working on some projects, including a timesheet management program that his company developed. This project involves a lot of design work - system architecture and user-experience design. Running the program also involves designing databases and data structures.

What kinds of people does the IT professional interact with?
Are they other IT professionals? Clients? Investors? The general public?

Malcolm has a small company, so aside from the few IT professionals within his company, he interacts mostly with clients. These are generally professional services providers - for example, he has done work for several environmental management companies. Since he works mostly with clients, he doesn't have any significant degree of interaction with the general public.

Previously, when the company's biggest project - the timesheet program - was in early development, he also worked with a company who was sponsoring the program, however he doesn't work much with investors at the moment.

Where does the IT professional spend most of their time?

Malcolm spends his time split between the shared office space and clients' offices. He also will often have to do work at home, which is possible both because he runs a small company and much of the work he does is very feasible to do remotely. Some days, Malcolm will go to the office, and then continue work at home. Generally, his days with clients are set each week, however he may have to go to their offices at other times if there is an urgent issue or a large change. One example for this is that he flew to a client's office in Sydney recently because they were undergoing major changes to their system which he had to oversee.

What aspect of their position is most challenging?

The aspect of his position which he finds the most challenging is administration tasks such as invoicing, timesheets and accounting. Another thing that he finds difficult is sales and marketing - he learned that as a small IT company, you need more than just IT professionals; you need someone who will help attract clients and customers.

Malcolm also says that he finds that, when working with non-IT professionals, you need to maintain good interpersonal skills, as people can become very stressed or upset when their systems aren't working properly and they can't complete their own work. He finds that he has had to develop the ability to stay very calm and level-headed when his clients are potentially very angry or upset.

IT Work cont.

An example of the work the IT professional does that best captures the essence of the IT industry?

Malcolm says that for him, this would have to be implementing a hybrid environment for a company that uses large data sets, and has distributed users (i.e. spread across multiple offices, cities or countries). He says the steps to this are:

- Defining the issue that needs a solution.
- Choosing or researching potential solutions which will fulfill the requirements of the company.
- Understanding the complexities of each of the potential solutions, such as set-up costs, maintenance requirements and the limitations of the business resources such as their budget.
- Creating a proposal for the company based on your recommendations as the IT professional, outlining the strengths and weaknesses of the various approaches.
- There is the potential for a trail phase - if possible, you may have access to trial software systems or hardware.
- Once approved, moving to an implementation phase, which firstly involves designing a set up approach.
- Then, acquiring resources, which could be cloud services or physical equipment.
- Building and running a pilot program, which typically involves a small number of people to iron out any bugs - a small test-run within the business. Then fixing any issues that may be found.
- Change management - making sure that the company's employees know what's happening and what adjustments they will need to make to be able to use the new systems (including training employees in the new system).
- Implementing the system across the whole company - depending on the size of the company, this might happen in one go, it might be staged, or it might be on an as-needed basis.
- From there on, there will also be system maintenance.

Malcolm says that the people who may be involved with a job like this are a project manager, user liaison, the client themselves, technical staff (ICT professionals, network professionals, database experts), and help-desk staff, among others.

He also made note that since the IT industry is quite broad, he feels that many IT professionals would have different perspectives for this question, as there are many aspects to the IT industry.

Machine Learning

What does it Do?

In terms of accepted definitions, Machine Learning is defined as the ability for machines to automatically improve through the experience of the task it was designed for, ultimately it is a form of artificial intelligence. Machine learning isn't a new term within the IT industry, it has been worked on and referenced since the early 1950's when inventors attempted to produce machines such as the Perceptron (which is one of the first machines capable of learning), a machine designed to model how the human brain processes visual data, and was capable of identifying objects. And while machine learning has come a long way since it's initial implementation through ANN's (Artificial Neural Networks), there hasn't been many advancements to it since the 2010's introduced a more wider use of deep learning. Due to the fact that IT professionals discovered a way to more easily train those Deep Neural Networks which relied on the deep learning algorithm. However, in recent years an application of machine learning has been expanded, with GAN (Generative Adversarial Networks) tech being updated and modernised to a point in which the neural networks can be fed a larger sample size of data and information compared to its predecessors, this is also known ironically as BigGAN. Currently, Machine Learning is used in a vast majority of the professional fields around the world, ranging from medical all the way to advertisement and media, with its current objective to inter/extrapolate information about consumers or events (basically predicting) pertaining to the data it is fed depending on the information provided. For example, ANN's within banks can allow bankers to monitor and assist in providing a more tailored assistance to loans and savings options, or in terms of media, a more direct and personalised advertorial within an online shopping environment, meaning that users would see the items they might be more interested in... again providing a more tailored and custom experience. But that isn't all machine learning can do, and those examples provided above only detail a small section of its involvement within businesses today, and an even smaller aspect of its roles within societies in future. Besides the obvious improvements to performance and outputs by the ANN due to an increase in computer specs and the amount of input data accumulated/ received over the years of it running. One of its potential roles within the not so distant future includes the automation of certain aspect of our lives and careers, with ANN's possibly becoming more useful in things like automated item ordering for stores based on weekly sales (Coles currently uses a version of this which is being taught how to order certain item for areas such as the Deli). Or even in the far future, RPA (Robotic Process Automation) using machine learning, which is the automation of basic jobs like librarians and clerks using artificial intelligence trained on the inputs of human behaviour during certain instances (e.g. scanning items, packaging items, putting the correct series of button inputs based on a specific task, etc). The automation of tasks described earlier could be possible within the next few years due to the fast expansion and growth of automated machine learning, which means that the input data doesn't have to be added through human intervention, and outputs/ solutions don't have to be drawn through human intervention, but can be concluded by the ANN itself. Allowing human resources to be focused on more important areas. Even now the A. ANN is and can be used to some degree as technology currently exists, such as:

Cloud AutoML - A set of cloud based machine learning products which allows the independent training of ANNs to happen, even if the user doesn't have all that much experience.
ATM (Auto Tune Models) - Multi-data system for automated machine learning.

What is the likely Impact?

As I briefly touched upon with the 'What does it Do?' section of this technology, i stated that in future these automated machine learning ANN's would be able to take over certain industrial jobs though RPA (Robotic Process Automation). Which to summarise is the process of an ANN completing predictions and using/ obtaining/interpreting inputs without the need for human input (but the machine MUST be somewhat configured prior with test data). Eventually when a system such as this finally becomes more proficient and powerful (processing power wise), some jobs that require human resources can be taken over/ automated.

IT Technologies - Machine Learning

Some jobs like this includes but are not limited to Cashiers, Librarians, Warehouse and Manufacturing jobs, etc. This automation, although a great step toward the future can create a lot of social complications as humans become redundant in certain aspects of jobs meaning that unemployment would become a big problem within future years as there would be a smaller job pool in which people could apply and work.

How will this affect you?

If automated machine learning were to become the norm, and take over some commercial work effective immediately, it would render my job as a Coles employee useless and I'd receive no compensation as I'm a casual. However besides me, my immediate family would only be affected by the loss of a discount, and all of society would have to become accustomed to the new ways in which they may have to purchase their goods. However since that WON'T happen for at least another 5 - 10 years realistically, it provides employees specially the opportunity to find work, or adapt their position within the business allowing them to remain employed even when automation seizes their position. This time frame also allows the consumers, shareholders/ investors, and most importantly the company itself the necessary time to allow the automation to become fully incorporated seamlessly (the business), and for consumers the ability to adapt to the new way in which they may need to become accustomed to when purchasing dometic goods.

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Cyber Security

What does it Do?

Cyber Security is often described or referred to as [1] the body of technologies, processes, and practices designed to protect networks, devices, programs, and data from attack, damage, or unauthorized access. Cyber security (CS) has always been a major aspect of IT innovation, however its relevance within society nowadays has grown exponentially, as more and more people have moved to the web with their personal information at a risk to intrusion and corruption by those with malicious intent. While this area of information technology is fast developing, the transformation of ideas on how to best protect personal and private info has changed significantly. With the state of the art tech from 2018 being heavily influenced by ideas such as a better [2] 'End to End Encryption' of personal info when exchanging info, in which both users rely on primary keys (password for password locked information) to access the encrypted information. Or something such as [2] 'Single Use Softwares', which is used in-order to protect purchasable, intellectual property that in the past would be pirated. Which to briefly sum up involves the use of quantum computers to build single use software tools from light particles, in the attempt to prevent intellectual property such as code from being pirated, or a malicious attack. Whilst in modern times, the latest and greatest within tech development involves the use of AI and the automation of data collection. This new era of automation, especially within the realm of CS could potentially redesign the way info is stored, shared and protected, as processes won't be controlled with the potential of human error. Rather controlled with precision based on the events the AI is taught to protect against. Some fantastic examples of this include the [3] use of AI's in the defence and attacking of threats against companies' internet processes. These AI can be taught to defend the information and user from things such as [4] phishing links, eavesdropping malware, harmful downloads with SQL injections, etc, protecting the user and their processes online by almost instantaneously protecting the companies/individuals systems once irregular action is taken. Another example involves the use of ANN and ML to not only complete certain tasks such as data collection faster, but free up the companies employees, reducing workload on maintenance (still required but less involved as the ANN can be taught to suspend data collection when malicious malware is detected). In future, these automated processes can be refined to not only act based upon the tests data and actions it is coded to protect against, but possibly be developed in such a way that it can adapt and learn in real time to produce a greater protection of the companies/ organisations/ users sensitive information (so basically proper artificial intelligence which can learn new ways of data protection based on the experience it has during its professional use).

What is the likely Impact?

If AI and ML becomes the forefront of CS within an online system, it WILL redefine the standards for which IT professionals and companies need to meet inorder to be considered secure. As while AI and ML can be used to streamline processes for data collection and become able to shut down the potential for malicious intrusion by hackers, this access to a smarter, more capable AI system will lead to hackers producing AI and ANN's of their own in pursuit of data stealing and hacking. HOWEVER, this is currently only a presumption, as tech like this will need time for development to become even remotely capable of completing the tasks it's needed for. But, if we pretend that tech like this were to be implemented right now, tech like this would affect almost all large corporations and businesses, as the demand for Cs technicians capable of maintaining the AI, but also finding new work for the employees tasked with the jobs that were monitored by the employees. This automation (if introduced right now or even implemented in future) could cause the possibility of mass job loss, as employers will only need specialist roles such as technicians to maintain the AI and ANN used to process and secure the workplaces info, but this can also be portrayed as businesses and corporation may call for the need of individuals in the marketing, once again creating new jobs. This kind of automation wouldn't be a cause for concern in terms of job and skill redundancy, rather a little push as to promote more creative skills (marketing) and technical skills when pursuing work within an IT profession (less people in certain aspects of a job) or any profession at that.

IT Technologies - Cyber Security

How will this affect you?

Innovation such as the one mentioned above (automation of CS) while ground breaking in terms of its potential implications, won't really affect anyone including my team and I who currently work within hospitality and customer service based occupations. However, in future its members such as Ella, Daniel and Stephen may need to develop technician based skills to assist IT companies in the protection and servicing of the AI, and or be able to interpret the raw data accumulated from the ML algorithms in the collection of user, client, etc data. As human resources within the areas of data protection and collection will no longer be considered paramount in the survival of data attacks/theft, rather the servicing and protection of those AI will be considered the pinnacle of CS.

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Autonomous Vehicles

What does it Do?

Autonomous Vehicles (AV) are an evolving description of what is sometimes referred to as Self Driving Cars. This later description is limiting because the projected application of a combination of technologies is something that can be applied to all forms of transport and is likely to transform the world as we know it.

To automate a vehicle five core technologies are utilised in unison to see, to recognise, to learn, to locate and to protect the vehicle.

Cameras are positioned around the vehicle to see the environment it is travelling in. They are used to identify lane markers, painted lines, street signs and traffic lights. This only represents a 2D image and whilst we would look at the collection of pixels and the signals and dangers present the vehicle and its CPU can not rely on this alone.

Lidars often the most noticeable thing about an autonomous vehicle. It is the spinning thing usually on top of the vehicle above the widescreen. It is really an exciting technology. It consists of millions of pulsing lasers rotating around that bounce off the environment and back to its sensor to create a 3D picture of the area around the vehicle. The 3D image is combined with the 2D camera image and radar to complete the understanding of its immediate surroundings. Lidar is the most important technology and the basis for which the other technologies compliment. So it is therefore the one that is being developed most aggressively for the future success and implementation of AV technology. Being the most expensive and easily damaged part of the AV technologies it is also the one that is slowing the progress of the wider adoption as well.

Machine Learning is the next vital part of the future of AVs. Taking onboard the information from the sensors around the vehicle as well as those collected by other vehicles through the development and ongoing application. It must be able to recognise and understand the hazards and environment around a vehicle. This is something that can not be simply written in code. Collecting, analysing, understanding data to just like the experience a L and P plater goes through to see problems and recognise them before they occur. This includes adjusting to weather conditions, understanding the shape and movement of other vehicles, pedestrians, animals and other obstacles in an accumulating process. This has already begun as different companies, universities and military organisations have been testing for millions of kilometres. But you would hope and recognise that just like with humans this process needs to be ongoing and hence is built into the vehicles software development.

Mapping is something that we would probably believe that is already complete. We have for many years been using Google Maps, Apple Maps or GPS of various kinds. AV mapping requires a more road environment centric mapping. So the mapping of the planet has begun again or more accurately has been updated to include the AV technologies in order to give a fuller picture of the world as AV needs to view it. Things like the road surface and its angle and incline, distances and widths of intersections and road infrastructure are vital to the ability for the AV to navigate. This is referenced and combined with the live data being collected by the vehicles on board technologies as it is moving through the environment to create a fully picture for its decision making.

Radar is the more traditional and well known technology for this set. We have all seen war movies and understand how they work. A radio signal is sent out and bounced back to the sensor to locate objects. The important thing is that it is only able to locate metal objects. So you can see how important it is in the AVs suite of technologies. Because the metal objects are the ones that will do the most harm to the vehicle and its passengers.

IT Technologies - Autonomous Vehicles

A fully autonomous vehicle is able to combine all these elements and with a set destination, embark, navigate, follow road rules, avoid hazards, arrive at the destination and park without assistance from the human occupant. This is a truly remarkable thing and fascinating use and application of IT technologies.

Yet as we are progressing towards this full autonomy a scale has been created to define the five stages of vehicular autonomy;

Level 0:   **No Automation**
                  This represents vehicles as we know them today, 100% controlled by the human occupant
Level 1:   **Driver Assistance**
                  This is assistance with steering or braking e.g ACC Adaptive cruise control
Level 2:   **Partial Automation**
                  This is assistance with steering and braking, whilst still requiring human input.
                  General Motors and Tesla are already selling this level of automation.
Level 3:   **Conditional Automation**
                  This is the current barrier within car automation. It requires the driver to still be available but not actively following the cars driving. Whilst maintaining the ability to take over driving at some point.
Level 4:   **High Automation**
                  Is a fully automated vehicle but one that is limited to certain situations or conditions.
                  No human control is needed.
Level 5:   **Full Automation**
                  This is the goal, the car drives you and you are free to spend the time as you wish.
                  These vehicles may be built with or begin to have no availability for human drive at all.

What is the likely Impact?

The possible impact of this technology stands to change the world in as many ways as any technology before it. Possibly since the invention of the car itself. When you consider the application of these technologies to being all forms of transport it is easy to recognise this represents a fundamental change in society, urban environments, ownership, government and industry. Yet it is something that will not happen all at once because of it being many different technologies being developed and combined in a variety of ways.

Its adoption and implementation into the wider world is going to happen at different rates. A good example being that new cars on sale today have AV technologies of differing kinds and levels right now. A new Tesla comes pre-installed with AV hardware and is activated via a software update. Many vehicles already have self parking and lane sensors. You could even say cruise control and the later version adaptive cruise control are elements of AV technologies in practice.

Firstly it is unlikely that these technologies could be safely and effectively retrofitted to current vehicles. So this would mean an eventual replacing of the entire vehicle inventory of the planet.
This in modern times has to be viewed through the environmental impact of such actions.
Road environment marking and signage will change and with a possibility of them disappearing and becoming entirely virtual as a human no longer needs to visibly recognise them. Vehicles themselves are environments that humans will still occupy so the interior design of the vehicle will become less focused on the position of the driver as active pilot of the vehicle therefore freeing them to do other things. Vehicles are set to become a moving living room.

The ethical implications and by extension legal liability and insurance are in this moment being grappled with. Say a vehicle is in a situation of possibly running over a pedestrian. How does the AI decide the choice if one is possible between hitting a person versus a dog. A child versus an older person. Of course the idea is not at all

but these are the moral issues being evaluated in AV development. Next if the vehicle is automated and it has an accident is the driver at fault? The more automated it is the less you can argue that they are, yet that leaves the question who is? In a perfect world or possibility, the real one as more and more automation is on our roads, less accidents should happen. Computers don't drink too much, don't get distracted by their phones etc so less accidents and hopefully deaths occur.

So what happens to car insurance? Do we still need it? I believe the answer to both is maybe with something that has already taken place with servicing. For new cars servicing is becoming less frequent and being added as product and service when you buy the car. So the same could go for insurance, it being an infrequent and low cost as being a part of the purchase price. Also that covers some of the liability being with the manufacturer. But the flow on effect for the insurance industry will not be insignificant.

In effect of the global economy is set to change with the adoption of AV's. Employment within factories and other workplaces has already been altered by automation. Yet the transport industries change with AV's will be the single biggest change in employment in human history. This was the topic of concern of a United States Democratic Candidate during the nomination process of 2019-2020. Andrew Yang was leading his platform for election openly discussing the effects on employment by automation and using AV's as his leading example of the changes to come.

How will this affect you?

This almost leads to me asking who won't be affected. Although this change will be progressive we can see that technology changes things more rapidly the rest of society. We can imagine a not too distant future with no taxi drivers, no Uber drivers, no delivery drivers, no bus drivers, no train drivers, no truckies, no chauffeurs, no couriers. Whilst in some cases these jobs may evolve and still require a human to accompany the vehicle the nature of these professionals do stand to change if not disappear. Some may see this as a good thing as these jobs may not be fulfilling and endanger peoples health and wellbeing long term. Retraining and finding other employment for them is no easy task and would require training and forward thinking.

The design and development of these technologies have and will generate jobs of their own. Highly skilled and indeed at this early stage very specialised jobs yet they are not in the same volume that are employed by the transport industry so a future of the world employment is not something to be underestimated in this discussion.

I believe the effect on my life will only come as the cost of the technology comes down with mass production and the wider adoption of this technology. Slowly the reduced cost of transport with electrification and automation should bring the cost down of many products and services. Although the effect of unemployment discussed above with effect the whole economy.

In the long term the physical environment will change as roads change with the vehicles being more controlled and requiring different things to those needed by humans. I believe signage and traffic lights, guard rails, all sorts of these things could disappear and only be virtual.

I really like the futurism of electric and autonomous vehicles and look forward to owning one. I live in a small city and don't commute very far with time in my vehicle not as much of an issue as others. I suppose that relationship could change with this development. I could move to the outer suburbs with an AV allowing me to study, read, watch videos whilst in the car instead of driving, this intern making my overall expenses cheaper because I live further out of the city. Paying less for insurance would help me financially. I already share a car with my partner but maybe this would become more viable for more people, clearing the roads of traffic. Road safety is an issue, I have been in many accidents in my life and thankfully coming out unhurt. Safer roads overall is undoubtedly something society as a whole would see as a good thing.

IT Technologies - Autonomous Vehicles

Something that is often sold as a plus for AV's is the transport of children and the elderly or disabled. Having a degree of independence through automated vehicles, giving them the ability to move around without assistance does have its positives. I believe that the unrecognised cost would be to create further social distancing. The car time can be an important time to be together and discuss things. A journey together too and from school for a parent, or accompanying the elderly to appointments can be valuable time that is not shared in an AV world. If people are removed from this circumstance by automation it could be another piece of technology distancing us all.

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Blockchain and Cryptocurrencies

What does it Do?

Blockchain is a record keeping technology that utilises a distributed, decentralised public ledger. Cryptocurrencies emerged from the invention of Blockchain technology because it enables the transfer of funds in an honest and consistent fashion.

Blockchain is a name that derives from a description of combining the digital information, the block and the public database which is the chain.

The Blocks consist of three elements; The information storage of date, time and in the case of Cryptocurrencies the amount being exchanged. Then who is participating in the transaction via their digital signatures. Finally a unique code is created called a hash, this is added to the chain to verify the transaction. The block stores the new data adding it the ledger forming the chain.

Once those three elements are in place four qualifiers have to be met for it to be added to the chain. These are;
• A transaction must occur
• The transaction is verified (this is the network recognising that the information is correct and uniform)
• The transaction becomes stored within the block
• The block is given the hash or unique code identifier.
This is then added to the chain and finally made public.

Bitcoin is a Cryptocurrency that was the first to use the Blockchain as the basis for its operation. It is by far not the only Cryptocurrency in the world but it is the most successful and has become the brand name Cryptocurrency. Its transaction data is accessible to everybody providing information like time and date, where and by whom the blockchain was updated.

The security of Blockchain is based on the use of its network. Having millions of computers networked with the ledger requiring all to be identical makes it extremely difficult to manipulate or alter. There is no single record of any transaction.

The network itself consists of computers which are described as Nodes or Master Nodes. The nodes assume the responsibility of fully validating and confirming all transactions. Nodes are incentivised for performing this role by a process called Mining.

Miners act as auditors of the network, verifying 1 MB (megabyte) of the transaction block and then performing a math calculation in competition with each other for a reward and in doing so completing the transaction. Interestingly this only takes place once every 10 minutes and the tokens are awarded to the first Miner to arrive at the correct answer which is the hash code.

This system was created by the inventor of Bitcoin Satoshi Nakamoto. The growth of Bitcoin has created a situation where the 1 MB limit has caused problems. When a surge of activity in Bitcoin transactions takes place the system struggles to keep up, leading to delays in the procession of transactions and removing one of the benefits of this system. This has led to pressure on Bitcoin's founder to up the 1 MB limit which has so far been resisted. Further as the network is growing, it is facing more and more difficulties. The algorithms (calculations that create the hash) need more and more power to solve. So, the complexity of the task is a sensitive issue.

The maths equation element of the process is known as 'proof of work'. This method was devised to maintain the decentralised nature of the system and prevent it from being dominated and relying on computing power alone. Other Cryptocurrencies such as Litecoin use a similar system.

IT Technologies - Blockchain and Cryptocurrencies

It certainly is interesting that the elements of this system that make it work are the ones that will lead to future problems. The need for a huge network of computers and people actively processing the information in order for it to work seem so limiting to what also seems a technology with limitless potential. Whilst its core elements are set up and functioning you can see how it needs to evolve to meet these flaws or it will be superseded by other cryptocurrencies.

What is the likely impact?

Blockchain is a technology which so far has been implemented as a replacement for the established banking industry. Removing them as intermediaries and avoiding oversight and by extension their fees from financial transactions. If this technology was to fully replace banks then the world as we know it would be fundamentally changed. Although you would think that banks would still act as leaders and will likely absorb Bitcoin and its methodology as well as still having other areas in which they operate like lending.

With the use of Blockchain being more widely understood through the success of Bitcoin it is now being recognised as having wider potential for its ability to allow secure verifiable transfers of information. Potential areas of use are Supply chains, Reward and Loyalty cards, Data sharing, Data backup, Copyright and Royalty protection, Voting, Real Estate, Land and Title transfers, Taxation, Medical record keeping, Wills or inheritance, Equity trading and I believe the most interesting usage would be Digital signatures. Wouldn't we all love the end of logins and passwords?

The likely changes to the established methods of business and society as a whole can not be underestimated. The broad list of applications shows a future with the automated and secure exchange of information being the norm across many areas. As I have also mentioned above the current Bitcoin system has its limitations in the required limit of 1MB as a unit of transfer and the number of computers to provide the supporting network. So this would undoubtedly need to expand because the data within a block containing for example Medical record is far larger and more detailed than a simple transaction.

Cryptocurrencies are international currencies so their value is universal. Exchange rates are a method of control of international trade determined by supply and demand. Yet every piece of trade is done in the US dollar no matter which two countries and exchanging goods or services. So this is a threat to that undoubtedly. The fact that my Bitcoin in Australia is equal to a Bitcoin in Japan alters the global buying power for everyone. As long as the price when spending that Bitcoin is equivalent.

Purchasing goods and services is core to the way we live and a change as fundamental as this is likely to affect everyone. I can see that and it has already taken place that established institutions have a vested interest in holding back the expansion of cryptocurrencies. This is something that will play out over the coming years yet I believe that with the positives of this system that a wider uptake is inevitable.

With the expansion of Blockchain technologies into more areas people can feel a degree of assurance that their information is secure. I do not believe that it is a bad thing. Bitcoin has the reputation of being used by people wanting their transactions to be secret and therefore outside the law. Whilst it represents the opportunity for a future of the secure transfer of information free from theft or fraud.

How will this affect you?

The effect on people's jobs is less clear in my opinion, the banking industry is the one to be affected by this first yet they already have a lot of their transaction system automated. Into other industries it is also hard to say because those applications are still in development or hypothesis.

The current system of data mining and the nodes of the network is almost designed to prevent people being able to turn it into a business and do it on a large scale for profit. This is in my opinion something that makes

a lot of sense and democratises this invention. It is this that is now the very thing to hold it back. Should it be overcome you would imagine that a role out of a huge amount of infrastructure in hardware akin to cloud storage facilities and associated employment in the set up, maintenance and ongoing activity of this sort of enterprise would be on a scale like California's Tech boom or Shenzhen tech-city in China. The draw would be obvious as it would be the modern equivalent to printing money.

How I will be affected by these technologies is a bit like buying a safe. I can place valuable things in the safe and it only will do its job should someone come and try and take them. Or to say it another way, these technologies stand to be important but largely invisible within our daily lives. Maybe because of the competition of cryptocurrencies, banks have changed their delaying of certain types of money transfers so this has affected me but is canceled out by that change.

If the changes brought by cryptocurrency has an effect on purchasing, effects cost and the expense of transaction fees then I stand to benefit financially. But the way economics works it will just make other things more expensive anyway.

I am excited by the prospect of Blockchain being used in online identity. I recognise security is important whilst also being continually annoyed by everyone wanting a username and password for everything. So if Blockchain can solve this issue I would be extremely happy with that. I also recognise that a consistent Internet ID system will also have a huge effect on privacy. So I am really not sure that is a good thing.

I believe that this would affect my family and friends similarly. Blockchain is a technology that will affect us all but not in direct ways and only in certain aspects of our lives. Cryptocurrencies do just represent another form of something we already have and whether we are spending $1 or 1 Bitcoin is not really important. Yet I feel this underestimates and also contradicts what I have written about this topic. I suppose with any new technology or at least one that is not new but is at the moment a specialised field it is both easy to recognise its potential and not truly understand its effects.

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Project Idea

Project Ideas from Assignment 1

Ella - Automated pest-deterrent system
Stephen - Performance Tracking Glasses
William - Self-learning AI for 1993 video game DOOM
Daniel - Magazine style website CMS

Group Project Idea

When our group decided to suggest creating a project which incorporates different aspects of ALL our individuals ideas in assignment 1, we spent a significant portion of a group meeting attempting to all agree on the outcome, with individuals disagreeing on the expectation or overarching involvement and dependency of coding, or for example the simplicity of the suggested project prompt. These disagreements and deliberations eventually led to the group selecting Stephen's 'Performance Tracking Glasses', as it had met the most or at least one of the group requirements for each individual within the group.

These specifications ranged from the involvement of coding using things such as javascript and IOS/Android app launchers/development tools to produce the apps, as specified by both Stephen and Daniel. To things such as the creation/ design of UI, and the necessity of data stores and collection, as brought up by Ella and William respectively. These Performance Tracking Glasses (PTG) refers to the creation of a both a physical and software product, by which individuals will have the ability to track and monitor their performance based on preexisting software tools such as google maps.

Specifications and details of the Service (Old specifications with minimal elaboration):
This project requires the creation of glasses with UI compatible lenses (which exist), which will allow the user to select what will be displayed on each frame (separate, independent lenses) based on their needs. These glasses will be based around Bluetooth connectivity, by which as the user completes tasks it will transmit the data(performance) to the app on the users phone or smart watch(co-dependent), to provide direct and real time feedback based on a query of results preset by the system (base data that the user enters and the expectations they want to meet when creating a profile for the app).

 However, while a service such as this would be amazing, there are a variety of limitations to such a project, that will require an extensive amount of time or a substitution/ change to the original view. For example, how will the device be charged if the design calls for the use of Bluetooth connectivity, if a battery is used how will that affect the final design or will the application be entirely online, preventing the use the product (or some features) as the data stores requires access by the user to complete comparisons of the user data and accumulated users data. These are just some up a few of the ideas and questions our team brought up and discussed, providing the new outline for the PTG.
It will include: (group deliberation and points)
- Bluetooth connectivity to the application on the smart device, as it will be the easiest way to allow the device to connect, without forcing the user to rely on a cabled connection, which would not only minimise the devices that could be connected to the phone and or smart watch (it also doesn't look good having a cable wrapping up from your pocket or hand to the glasses frame).
- Due to the fact that this device was created to be a bluetooth dependent device, the glasses frame would need to be modified in such a way as to allow for battery space, allowing for the device to stay active for at least 2 hours minimum before recharge.
- A UI intensity adjustment wheel which can be found on the glasses frame, meaning that the user can change the brightness of the display on the fly.
- ALL display options (display choices for the UI) will need to be selected and set from an interface tab/ screen in the application.
- The application will require the user to have a WIFI/4G connection to access the features of the app, as the data and info will be stored on the companies servers (possibly a cloud service or a server side data store).

Project Idea

- The glasses frame (the hook that goes around the ears) will contain wireless earphone tech that will allow the user to not only access the application and track performance, but also allow the user to select and listen to music.

Reflection

Ella:
I feel that we have all contributed equally to the project (with the exception of Robin Lee, who was a member of our group on Canvas but was not an active member); as discussed when we mentioned our tools, we allocated roles based on skills and found that worked well for us. I was honestly surprised that our group came together well, as we all randomly joined this group without discussion, yet we managed to form a good team. I think we've all learned that above everything, it takes a lot of communication and discussion to work as a team. Sure, we're all capable of working on our own, but without our discussions we would get nowhere. I think we'll take this skill forward and use it to our advantage in the next assignment.

Stephen:
While it did take the group a little bit of time to come together and start working on the project, I do believe that this team (once working) does a fantastic job in playing to the strengths of each individual within the group. Also, once we started getting into it, I saw that all team members were very active, and committed a lot of time into not only informing the other team members about what aspects of the projects they were working on but attended the video chats and discussions frequently (which also lasted for around an hour +).

William:
I believe that all team members pulled their weight equally and we formed a good team where we all played to each other's strengths and made up for each other's weaknesses.

Daniel:
I enjoyed reading up about the research topics and the interview questions. Looking further into possible career paths. This assignment had a lot for us to draw upon, which is great for us going forward.

The group was slow to come together. Something I am guilty of, missing an early conversation that set things out. Although I felt that conversation happened without too much will to make sure all members where present, an hours notice. I felt the group emphasized getting the job done over embracing the nature of the exercise. I blame the circumstance and environment of online study for this rather than any group member.

We used the tools well, I thought Google docs and Discord were good choices for contributing and communication. Communication was not consistent for all group members, again something to be expected in this process but a point of frustration nonetheless.

The nature of group assignments lead to inconsistencies that are not like the workplace. Although I am largely happy with our outcomes I feel we could have got more out of the process if we engaged earlier.