

Assignment 2

STREATCoffee

Thomas Crysell

Demi Smith-Stevens

Quinn Westlake

Sidney Tayao

Alastair Jordan

Alexander LoMoro

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Personal information

Sidney Karlton B. Tayao (s3796481) is a student at RMIT University. He is Filipino, born in Manila Philippines and speaks English/ Tagalog at home. He graduated out of Mount Ridley College P-12 back in 2017. Recently graduated out of Victorian University, studying Diploma of Teaching, Educational Studies.

Alastair (s3430661) is a Bachelor of Information Technology student at RMIT. He completed year 12 in 2012. He has spent most of the last 5 years as a Transport and Logistics Assistant and an abseiling instructor for the Australian Army Cadets. He is a motorcycle enthusiast and is currently saving up to convert a CBR600RR into a track bike.

Alexander LoMoro (s3781797) was born and raised in Melbourne. He attended Penleigh Essendon Grammar School for his entire schooling (k-12) and graduated in 2018 and is now currently studying a Bachelor of Technology at RMIT. Learning to code during school was where his passion for IT really ignited where he created a device that allowed him to explore his interest in cybersecurity and landed him a Mayoral Award in March 2019. With a broad range of IT skills that have been mostly self-taught with whatever he can get his hands on. Besides a love of technology, he has a strong passion for cars and often cannot stop talking about them.

Tom (s3789482) is a first year student at RMIT. He is studying a Bachelor of Technology. Tom left school during year 11 to pursue a career in hospitality. He has gone on to work in B2B Sales for a Malaysian oil manufacturer. In his spare time he likes to learn about emerging technologies and how these concepts will change the way we live. During his apprenticeship, Tom has completed a Diploma of IT and is now committed to pursuing a career in IT.

Quinn (s3787842) is a Bachelor of Information Technology student currently studying at RMIT. Completed schooling in 2017 and started a Bachelor of Engineering in 2018 but dropped early. Now pursuing IT as there is much more of an interest there for him. Has previously worked as an electrician's apprentice but believes that University can offer more in the long run. Moved to Victoria recently in order to study at RMIT as previously lived in Queensland.

Demi Smith-Stevens (s3797309) is currently completing a Bachelor of Information Technology at RMIT. Having completed a double degree in Fine Arts/Arts (philosophy) in 2016 and graduating with class one honours in 2017, she moved from Sydney to pursue more postgraduate study in Melbourne. Ensur a subsequent existential crisis and she diverted routes to IT, whereby she feels she can implement a more pragmatic approach to design and theorizing. Her IT experience is limited, but her interests within the field are aimed towards that of design and UX/UI.

Team Profile

Alastair - s3430661

Big Five Personality Test:

- Openness = 79%,
- Conscientiousness = 58%
- Extroversion = 40%
- Agreeableness = 52%
- Neuroticism = 58%

Myer-Briggs Result - ENFJ-A / ENFJ-T
Learning Style - Visual

Tom - s3789482

Big Five Personality Test:

- Openness to experience = 49%
- Conscientiousness = 72%
- Extraversion = 47%
- Agreeableness = 36%
- Natural reactions = 28%

Myer-Briggs Result – ESTJ
Learning Style - Visual

Sidney – s3796481

Big Five Personality Test:

- Openness = 75%
- Conscientious = 60%
- Extroversion = 69%
- Agreeableness = 73%
- Neuroticism = 27%

Myer-Briggs Result - ENFJ-A / ENFJ-T
Learning Style - Visual

Alexander - s3781797

Big Five Personality Test:

- Extroversion = 67%
- Emotional Stability = 57%
- Agreeableness = 62%
- Conscientiousness = 57%
- Intellect/Imagination = 59%

Myer-Briggs Result – ENFJ-A / ENFJ-T
Learning Style - Tactile

Demi - s3797309

Big Five Personality Test:

- Extroversion = 41%
- Emotional stability = 39%
- Agreeableness = 89%
- Conscientiousness = 9%
- Intellect/Imagination = 84%

Myer-Briggs Result – INFP -A/-T
Learning Style - Visual

Quinn - s3787842

Big Five Personality Test:

- Openness = 71%
- Conscientiousness = 51%
- Extroversion = 41%
- Agreeableness = 67%
- Neuroticism = 83%

Myer-Briggs Result – INFP-T
Learning Style - Auditory

Ideal Jobs

Sidney Tayao	Architect
Alastair Jordan	Lecturer
Tom Crysell	Business Analyst
Alexander LoMoro	Penetration Tester / ethical hacker
Demi Smith-Stevens	UX Designer
Quinn Westlake	Cloud Security Analyst

With everyone's ideal employment, it's seen that all individuals have a different ideal position. Fundamentally, there are very little similarities between everyone's ideal jobs with the greatest association being between penetration testing and cloud security. The way these jobs are similar is unique as they essentially work against each other, with one designing and improving security while the other attempts to dismantle and breach through that security. There are overarching themes however, with Demi and Sidney opting for jobs that require creative skill sets, and Tom and Alastair needing not only strong communication skills but also creativity and problem solving skills.

Apart from this, each position is unique and very different from each other. Interestingly, our career paths, regardless of our current degree, are not all within a traditional 'tech' realm. Rather, each individual seems to be using tech as a way to further their career within an already predetermined route which is respective of their passion.

IT Technologies

Cyber Security

What does it do?

Cybersecurity is a rapidly changing environment with new cyber-threats and cyber-attacks occurring daily. Cyber security aims to protect users from a range of attacks such as viruses, password attacks, spyware, adware, trojans, ransomware and so much more. Whilst most attacks are designed to be harmful a new job title is emerging, a penetration tester / ethical hacker, that seeks to emulate cyberattacks to prevent the real ones from occurring. They seek to find the floors in the software and provide a more secure way to protect it in order to minimize the threat of an attack.

What is making the cyber security industry boom so rapidly is the influx of connected devices into our daily lives that contain personal data and store sensitive information that can be stolen for a number of purposes. For example, in Australia all the medical records of patients are being uploaded to a database instead of being stored on file locally. This then makes a great target for hackers to steal a large number of files with sensitive information on individuals.

Currently the most common way of preventing a virus on your personal computer is the use of security software. Whilst this software may be good at preventing attacks it is still not perfect as it can only protect against what is an already know attack and often misses new types of attacks due to it not recognizing it as something that is dangerous yet. Combine this with the rapid development of technology and the ability to create new forms of attacks in a short amount of time and we see security software just unable to keep up leaving some users vulnerable.

Despite this, cyber-attacks can be physical too. For instance, if you were to place a key stroke logger between a keyboard and the PC, this piece of hardware would be storing everything that is typed into the computer. Whilst this sounds like a simple attack, it can get access to passwords that may unlock important websites such as banking, emails & other accounts.

Hence, cybersecurity is such a wide field of ever evolving attacks and threats onto individual users. Preventing these attacks completely is impossible but reducing them is the best we can do.

What is the likely impact?

As the number of devices and users continues to grow in the world, there will always be an ever-growing need for cybersecurity. Like many other fields of IT, it is unlikely to become redundant in the near future as a this rapid rate in device evolution and the more technology becomes a part of our lives, the need for IT specialists in every field including cybersecurity will continue to grow and meet the needs of the IT landscapes.

In a 2018 publication, Microsoft stated that costs associated with cybersecurity incidents costs Australian businesses \$29 billion per annum.

How will this affect you?

As I become more aware of the security risks involved in the cyberspace, I continue to strengthen my defense against potential attacks by improving the password strength and what kind of information I store and where it is stored along with many other prevention methods. Further advising others around me to help protect them from being a potential target in an attack. The most important thing that is being stored digitally is photos. Often people to take the effort to create a backup of these photos in the even the originals get damaged, stolen or even locked in a ransomware attack.

A negative to this grow in cyber-attacks it that it is driving new or inexperienced users away from using new technology as they fear that they might be the next one to get attacked and the only way they feel like they can prevent such an attack it to play innocence and avoid contact with the internet and stay off the grid. However, this creates a negative impact on the IT industry as fewer people wish to adopt new technology in fear it might expose themselves.

Clouds, Services, Servers

What does it do?

The term 'cloud' is often used to refer to a collection of servers that are connected to the internet. Each of the servers in these collections are called 'cloud servers' and function in a similar way to traditional servers with some differences. Usages of clouds often come in the form of users leasing these servers for various uses. There are 4 major types of cloud computing: Infrastructure, Platform, Software and Recovery. Infrastructure is a cloud service in which the cloud will come with pre-installed and configured hardware that the user can then use as a service to meet their purposes. Platform is like infrastructure but is a more advanced version. The users are provided with an infrastructure but it also contains things such as a graphic user interface, different programming languages or even its own operating system. Software services are when the user is provided with a functional web-based application that can be changed and formed based on the customers demand. The final type, recovery, provides the user with a backup service that allows for anything stored into it to be recovered if the necessity arises such as a disaster that destroys much of a company's own data. These 4 uses make up the main uses for cloud technology currently with many preferring to use it due to its ability to deliver just about any service without the need for the computer hardware to be physically nearby. With the advancements in technology rapidly increasing, the cloud can also be expected to rapidly develop and change drastically in the coming years. It is expected that the cloud will become cheaper to use as it will continue to shift more away from physical technologies and existing largely via the internet. An increase in the security of the cloud can be expected with the growth of devices known as cloud security tools which can be used to identify users of unauthorised data, malware and anything else that may potentially be harmful to the security of the cloud. The services that will be offered via the cloud is also expected to expand, with much more specialised clouds expected to emerge in the future that can offer specific solutions depending on what the user requests. With the increase in services provided, an improvement in the individual applications is expected to increase and larger, more complex software can be expected in cloud. This may even come in forms like that of current social media, creating something similar to Facebook where the programs in the cloud would communicate with the hardware and software in order to output a similar purpose to that of social media applications. Developments like these would only be possible if advancements in other technologies are made. More powerful processor developments are critical in allowing the cloud to create more advanced services such as the example above of social media implemented into a cloud system. With advancements in processing power, the capabilities of the cloud will also increase in the form of much more efficient speeds. It has been predicted that in 2020, communications between the data centre and the cloud can be expected to reach speeds of hundreds of gigabits per second. As the size and popularity of clouds continues to grow, strides in cloud security tools will also be a necessity as without them, many companies would be sceptical in storing important data or relying on the cloud with anything of critical value when a compromise in the system could easily cause a disaster.

What is the likely impact?

With the massive advancements that cloud technology is expected to make, it's a given that they will impact it in several ways. With the increase in different cloud services, the number of companies utilising these services will increase with them now being able to fulfil more specific requirements for whatever they require. With the possibility of systems like social media, it can also be expected that cloud services may move from mainly being used by companies to potentially smaller businesses. This would also be made possible due to the expected decrease in price to use cloud systems. If these developments continue to improve, the popularity of the cloud can be expected to steadily increase and more companies will incorporate its uses over traditional servers. Due to the nature of cloud technology, it can be expected that change in focus towards the security of the cloud will happen. As stated previously, many companies will rely on cloud servers to house critical and classified information that could be disastrous if leaked. With the current reliance on cloud security tools which are frequently third party, it may be critical that changes be made to the way the cloud functions to increase security to keep companies invested and so they don't revert to traditional methods. The people that will be largely affected by these developments are mainly companies and people who work with alternate technology like dedicated servers. Companies will most likely begin switching to cloud if it begins to outweigh the benefits, which will in turn affect those with jobs working with other types of servers as they may slowly become more redundant. Many jobs working with cloud technology, whether it be in cybersecurity or programming orientated will be create but a decrease in jobs with traditional servers will see a decrease and if cloud gets popular enough, may disappear entirely in the future. This will also mean that old hardware dedicate to creating servers will become redundant which could also affect the manufacturers and force them to change into a cloud related manufacturer or a different technology entirely.

How will this affect you?

Advancements in cloud technology does impact daily life quite drastically but much is unnoticed as the user only sees the interface and not the efforts behind providing it. The most noticeable difference will most likely be faster loading times as the processing speeds between the cloud and the internet will be increased as processors continue to advance and improve. Different forms of social media may also begin appearing that are created in a different manner due to them being hosted through cloud services. As a student, it may also be implemented into education systems and allow for quality of life changes for students with the possibility of them accessing the data they require at anytime, anywhere through the uses of cloud. The cloud also plays a part in our lives that we don't really notice but are very helpful. An example is of iPhones, as if something important such as a photo is accidentally deleted, it has already been uploaded to the cloud and can be accessed. Many other everyday applications that we use, particularly social media also utilise this function and often when a picture is deleted off the platform, it is still saved within cloud storage. Due to the nature of cloud technology, it is obvious that it has a huge impact on the way our lives function in this era, but users are only able to interact with a very minor portion of its capabilities and uses, meaning it often gets taken for granted. Most of the changes we can observe are often small and labelled something that just comes with the

application or websites we use, meaning that majority of people may not be severely impacted by the large advancements relating to the cloud.

Machine Learning

What does it do?

Machine learning is seeing increasing use across almost all areas of technology. From financial analysis and fraud detection, to advertising.

Banks and financial institutions are starting to use machine learning to move away from relying solely on traditional credit scores to determine a person's ability to pay back loans and the institution's inherent risk.

Analytics producing through machine learning can help to detect fraudulent activity on a customer's credit card or to flag potential criminal activity like money laundering or funding of terrorism.

These technologies are also being used by Governments to improve multiple aspects of their operation. Machine learning is being used analyse social media and other outlets to determine public sentiment to supplement traditional polling. It is being used to address public safety in certain communities by analysing crime rates. It can be used to more efficiently address public service problems like roads and utilities by using sensor input such as traffic cameras or flow sensors and finding patterns or trends which can be proactively acted upon before any major inconvenience to the public.

Airlines and travel companies use machine learning driven data analysis to determine demand and allocate their resources where they are most needed or where they can help to generate the most profit for the company.

Machine learning is used in environmental and sustainability applications to predict the effects of global warming, deforestation and mining. Giving organisations and governments greater insight into the future and possible actions to be taken to slow down or reverse environmental and ecological damage. Even if most seem to ignore these insights.

A common use for machine learning techniques is data mining.

Machine learning and data mining is currently being used to analyze data on users activities, movements and searches to suggest targeted products and services to those users by companies like google, amazon and facebook. These companies have access to some of the largest data sets in the world and makes billions of dollars off using their machine learning technologies to determine as much about their users and what they are likely to click on and purchase as possible.

Machine learning and data mining also have more small scale applications like for a business analysing their employees' productivity and the effects on their operations. Machine learning could for example applied to metrics gathered inside a retail store to determine the effects of changes to layout, staffing, merchandising, music, lighting and any other data available.

Casinos use these technologies to track their patrons to flag cheating or unwanted behaviour such as card counting or in more extreme cases even attempts at theft. They also track spending and profits and find ways to increase patrons' overall willingness to spend.

Machine learning techniques are applied in big data environments implementing technologies like Hadoop, and many others to allow the processing of massive amounts of data. Without these additional technologies for processing large databases machine learning in many applications would not be nearly as effective or widely adopted.

The future of machine learning is extremely promising. With specialised hardware become more available and efficient and machine learning as a service beginning to emerge, more and more it will become almost a necessity to integrate machine learning into technology products.

Algorithms will be constantly retraining and improving. Users' experiences will be increasingly affected by machine learning. Whether it be natural language processing in services like google assistant, siri, alexa or watson or in smart home features like nest or ring. Machine learning will be an expected and accepted norm in people's everyday lives even more so than now, whether or not all applications are welcome.

What is the likely impact?

The potential impact of Machine Learning is enormous. With technology moving towards services and integration and machine learning being at the future core of both of these there will be virtually no new technologies developed in the not too distant future which do not in some way involve a machine learning component. Legacy systems will no doubt continue to operate for some time but the nature of service based technologies will allow organisations to abandon old systems without the traditional upfront costs associated with large infrastructure changes.

These technologies will affect everyone in the developed world and still to a large degree the developing world. For example financial implementation may result in someone with a bad credit score but spending and repayment practices which are trending in a positive direction to more quickly and easily than if a machine learning model were not applied to their application. This also provides better insight to banks as to their safety in allowing more people to borrow, increasing their potential profits.

These technologies have the potential to create many skilled jobs in industry as these machine learning algorithms, as advanced as they are becoming, still require knowledgeable oversight and development. There is also a risk of some jobs such as the service industry to be gutted and replaced with more profitable and efficient artificial replacements. However as machine learning as a service becomes more available in conjunction with cloud services in general there is an opportunity for those losing potential jobs to pursue more entrepreneurial careers using these tools.

Traditional data analysis positions will likely cease to exist entirely as their inferiority to machine learning and its effectiveness on large data sets becomes evident. These analysts will probably undergo retraining to work with the new technologies rather than be made obsolete entirely however.

How will this affect you?

I, along with my family and friends will likely enjoy greater convenience in my day to day life as more of my devices and services are integrated and improved via machine learning. City infrastructure such as public transport, roads and paths will likely improve. With any luck the grave predictions made of our planet's future livability by machine learning will encourage improvements to global emissions, with these improvements likely also being implemented as a result of machine learning.

As per the example above machine learning implementation at banks could result in me, a friend or family member being successful on a loan application or getting a better rate on that loan. Implementation by government could result in my neighbourhood having a reduced crime rate, fewer traffic accidents, or fewer power outages.

Machine learning could allow retailers to stock more effectively based on data about an area, resulting in products not going out of stock or more appropriate items being stocked.

It could mean not being late for work because my device knew I needed to wake up even though I forgot to set an alarm. It could mean not having a show or movie spoiled for me because my device knows I haven't seen it yet and automatically blocks spoilers.

It could mean early evacuation in preparation for natural disasters like floods or bushfires because machine learning predicted them from environmental data.

For myself this offers up the opportunity to use these technologies myself or to pursue a career implementing machine learning for others. As machine learning becomes available as a service this opens up opportunities for individuals to build customised services to other companies or organisations without the need for large hardware and licencing costs.

Autonomous Vehicles

What does it do?

Autonomous Vehicles have advanced greatly in the last few years. Tesla has implemented the autopilot feature to allow Tesla vehicles to self drive for long stretches with a driver still in the driver's seat. Waymo has started operating a fully driverless taxi service. While companies like Ford, Nissan, Mercedes-Benz and BMW have implemented more limited self-driving capabilities like adaptive cruise control, lane keep assist and parking assistance. In China 14-seat driverless minibuses are in operation on closed roads.

In the near future we are likely to see even more investment in autonomous driving by manufacturers and for the current technologies to trickle down to cheaper models. As basic self-driving technology becomes more common we are likely to see an increase in communication between automated systems, between vehicles and with integrated infrastructure.

An obstacle in deploying autonomous vehicles on a large scale is integration with human drivers and predicting and avoiding accidents caused by human error. Stanford University is currently doing research to increase the understanding of how humans react on the road and how that risk can be mitigated. They are also doing similar research into how professional drivers interact with a vehicle and what is going into their decision-making process. This is being done to hopefully gain an insight into how driverless cars can drive as well if not better than the best human drivers in all conditions.

Some in the industry see the opportunity to more quickly and safely advance to fully automated driving vehicles in a more closed-off and controlled environment, rather than making the transition through level 2 and level 3 automation on our current roadways. This would allow for advances in the technology to be made in this controlled environment which may then be taken to other environments when they are more mature.

Autonomous vehicles rely heavily on many other technologies to be effective and to improve. AI and machine learning are a key tool for manufacturers to allow the analysis of the large streams of data being gathered in real time by modern self-driving cars and predict what actions may be needed in any given situation. Machine learning also allows for lab analysis of data collected on journeys to determine patterns or anomalies that were observed so they can be addressed in a controlled environment before the vehicle is put back on to public roads.

Advancements in sensor technology are integral to autonomous vehicles. Currently the increasing availability of solid-state LIDAR is a much cheaper option for manufacturers to get accurate and detailed pictures of what the environment looks like. If self-driving cars are to be introduced to public roads at every level of autonomy it becomes increasingly important for the vehicle to identify vulnerable road users and pedestrians. This is still something that many autonomous vehicle systems struggle with, especially in regards to cyclists and motorcyclists. LIDAR provides a better solution than RADAR or traditional cameras for capturing detail in the environment sufficiently clearly to identify hazards smaller than a car.

Advancements in CPU and GPU manufacturing are allowing for cheaper, more powerful and more efficient processing options for integration into self-driving vehicles, allowing for more sensor input to be processed and for the vehicle to react faster to any hazards. As foundries move to smaller and more efficient processes for producing CPU and GPU packages it will allow for self-driving technology to be advanced and be implemented into less expensive vehicles.

What is the likely impact?

The impact of the growing number of autonomous vehicles on our roads is foremost that it increases convenience for those able to currently afford them. The ability for a vehicle to take over the more mundane parts of a commute or a road trip allows for the “driver” to remain more relaxed and focused on other things which may be of more value. For example, a commuter may be able to finish a presentation on the way in to work rather than wasting that time simply controlling their vehicle for an hour in slow traffic.

For now the most affected by these developments are the upper class who can afford expensive luxury vehicles like Tesla’s model S and model X, but as these technologies are integrated into cheaper vehicles the effects will be carried to the general public.

Governments and city planners will have to take autonomous vehicles into account when designing roadways and public spaces. Especially in these early stages there will many considerations to be made for each area or city as to how they are going to integrate driverless vehicles in to their transport systems. Some areas such as California have embraced testing of autonomous vehicles on public roads. While in places like China they are implementing a more controlled trial of fully autonomous vehicles on more closed roads.

This trend towards automation could lead to the destruction of jobs in the transport industry. Positions like taxis are already being taken over in some places and if Tesla and other companies are successful in bringing these systems to large commercial vehicles almost the entire trucking industry could eventually be replaced. These large scale changes are unlikely to happen in the next few years though, as the technology is really still in its infancy.

How will this affect you?

Autonomous vehicle technology has already been integrated into many common vehicles, if only to level 1. I have had personal experience of an AEB (autonomous emergency braking) system helping to avoid myself being involved in an accident. I know that schools are starting to consider these features when deciding on vehicles which will be transporting students, which gives my relatives with school aged children peace of mind. All new cars purchased in my family in the last 5 years have some form of level 1 autonomous driving technology included in them. Even going as far back as 2012 one of my friends had a car with parking assistance.

These technologies are already integrated into the lives of most people I know. As more advanced offerings are made widely available I’m sure those will be adopted as well.

When I go to purchase a new vehicle I will definitely be looking at which autonomous technologies are available and my purchase will likely be highly influenced by those options. I and several of my friends have had poor experiences with taxis and ride share services but would be much more willing to hail a ride from a driverless taxi instead. The same could be said for public buses, I would personally be more trusting in an automated system to keep a schedule and keep me safe as a passenger. Also, as these systems become ubiquitous and connected the overall road safety will increase. Which even if I am still driving a traditional car will reduce my risk of harm as a result of other drivers.

I also hope that as my parents and other older relative age they may be able to maintain their independence whilst not causing undue risk others using the roads.

IT Work Interview

Interviewee: Daryl Croke

What kind of work is done by the IT professional?

Daryl Croke is a High school teacher at mount Ridley College P-12. Currently teaching Design and Technology (robotics), Computing in year 10, VCE Computing in year 11 and 12. Teaching Python, Lego Mindstorms and IT projects that students are interested in.

Teaching students to examine the attributes of each component of an information system including people, processes, data and digital systems (hardware, software, networks), and how their interrelationships affect the types and quality of digital solutions.

What kinds of people does the IT professional interact with?

Are the other IT professionals? Clients? Investors? The general public?

VCE Students
Competition organisations
IT staff maintenance

Where does the IT professional spend most of their time?

School Lab
Electronics department

What aspect of their position is most challenging?

A difficult aspect of my position is the limited resources provided by the Arduino Starter Kit. Although it provides the very basics of what a beginner needs, I as a teacher need a larger amount of excess components due to equipment being either stolen or wasted by the students.

Why Arduino?

It was introduced to me by a previous student looking to use and build a LED display that tells the time, day or night and alarm. He used it as one of his two folio projects for ICT. I found it interesting how cheap the parts where to order online and how good the quality of the parts turned out to be.

Why do you teach Arduino in school?

Students if they choose to work with Arduino, they are able to learn the basics very quickly and can be self-guided with specific projects they like to choose from. Personally, I enjoy teaching it, because students can creatively express their ideas on paper to something physical. Like in the last 3 years of me teaching at this school, students have created custom LED signs, thermometer, RC robots, RC for normal house appliances and homemade drones and battle bots. I teach it because my students find ways to make their lives easier or other people lives easier, common problems that they face in life find and build quality of life fixes.

What are somethings you don't like about Arduino?

Somethings that I find difficult to work with Arduino are power limitations, equipment provided and its storage library. Unless can find a stronger resistor for power components, most of the time students lack power to run stronger projects. Such as robots that have multiple lines of code to achieve an objective. Equipment provided by the starter kit is plentiful for my student when they first get around it, but I found out through other people we can by bulk parts on third party companies that make the same part in bulk bundles. Storage is difficult to work with because Arduino storage library is a mess overall.

Industry data

What are the job titles for your groups ideal jobs? How do each of these rank in terms of demand from employers?

Architect – Architecture had a strong growth over the past 5 years and anticipates a moderate growth of roughly 9,000 nationally by 2023^[1].

Business analyst– With an accumulative total of 12, 600 jobs on both ‘Seek^[2]’ and ‘Indeed^[3]’ within the last 30 days business analysts are high in demand. Notably, Business Analysts are named as one of the top 4 skilled hotspots within IT^[4].

Lecturer –University Lecturers are in high demand, with an expected growth over the next 5 years of 34,000 jobs nationwide. That’s a respective increase of 6,800 job openings per annum^[5].

Cyber Security Consultant – According to both the Burning Glass data and additional sources, market demand for cybersecurity has doubled within the last year^[6]. Turning from 22 jobs per million, to 50 per million listing. Moreover, Australia is currently only supplying 7% of the cyber security expertise that is needed to be adequately protected digitally and it is increasing rapidly, with the listings within the last year increasing by 173%^[7].

UX/UI Designer – Design positions increased from 2,394 in 2017 to 2,848 in 2018. Ranked as the 21st IT Job title in 2018 by Burning Glass and identified in *Hays*^[8] as a demand hotspot, UX/UI designers are rapidly becoming in high demand due to the need for greater user experience.

Systems/Cloud Analyst - *Hays*^[9] identified Systems analysts as being one of the most highly demanded position currently. This is reinforced by the Burning Glass data, whereby this position was ranked within the top 3 occupations of 2018. There is an estimated 12, 000 job openings within the next 5 years with the majority of those being a result of turnover due to generational gaps^[10].

Groups required skill set

General skills (communication, problem solving, writing etc)

General skills

- 1) Communication and personal/customer service- this includes understanding the customer’s needs, measuring and mitigating customer satisfaction and providing good quality service.*
- 2)English Proficiency – this not only includes the ability to engage in English fluently, but also the spelling of words, composition and grammar.*

- 3) *Problem solving –inclusive of both technological and collective work environments.*
- 4) *Teamwork and collaboration.*
- 5) *Time and deadline management.*
- 6) *Administration and Management – both the planning and coordination of people and resources*
- 7) *Writing.*

IT specific skills

- 1) *Design– This is inclusive of tools, techniques, and principles used to make wireframes, blueprints and models.*
- 2) *JavaScript/JAVA*
- 3) *SQL / Python*
- 4) *Technological industry knowledge*
- 5) *Business Management*
- 6) *HTML/CSS*
- 7) *Business Management*
- 8) *SAP*
- 9) *Node.js/Angular.js/React.js*
- 10) *Docker/Ansible/Elasticsearch*
- 11) *Microsoft Office*

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

The top ranked It - specific skills by employers were SQL subsequently followed by JavaScript. Although Design is ranked as first for our group due to a collective of creative endeavors, our skill set overall is highly demanded by employers. Within the top 25 identified industry specific skills, we acquire 8 with two of those being within the top 5. Overall, our skills are moderately matched, the latter part of our identified skill set is industry specific to our ideal jobs, and although they're ranked at the lower end of the scale within the Burning Glass data, as seen in the comparison between the 2016-2018 versions, this data is rapidly growing and expanding. Yet, is it notable that the consistent elements of the data take up the majority of our top 6.

b. How do the general skills rank in terms of demand from employers?

Our generic skills are highly compatible with what is being requested by employers. We identified communication skills as our highest required skill as it is imperative across all of our ideal jobs. Similarly, within the top 10 ranked generic skill sets we aligned with 5. Our lower ranked compatible elements, such as time management, still tallied 5,059 related searches per

121, 997. Within our identified generic skills, we have 6 out of 7 as being ranked within the top 25 demanded by employers.

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

- 1) Microsoft Windows
- 2) Technical support
- 3) Microsoft C#

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

- 1) Organisational skills
- 2) Troubleshooting
- 3) Planning

Having looked at the Burning Glass Data, has your opinion of your ideal job changed?

No, my opinion of my ideal job hasn't changed. Wanting to be a UX designer was more about the human-interface connection and subsequent design and psychology associated as opposed to an increased employment opportunity. Albeit, this is notwithstanding as having identified above, UX/UI Designers are in high demand. Having delved into a deeper understanding of demanded generic and required skill sets, I don't believe it's unreasonable to remain optimistic in acquiring the vast array of skills, specifically required, by the time of graduation. Moreover, having seen how interconnected each of our skills are regardless of our ideal jobs allows me to further focus and grow my skills in multiple upcoming platforms, especially since one of the most consistent trends within the Burning Glass Data is the continue growth of different, 'current' software platforms and innovations.

^[1]<https://joboutlook.gov.au/Occupation.aspx?search=Career&code=2321>

^[2]<https://www.seek.com.au/business-analyst-jobs?daterange=999&sortmode=ListedDate>

^[3]<https://au.indeed.com/salaries/Business-Analyst-Salaries,-Melbourne-VIC?from=serpsalaryblock>

^[4]https://www.hays.com.au/report/HAYS_1794623

^[5]<https://joboutlook.gov.au/Occupation.aspx?search=Career&code=2421>

^[6]<https://cybersecurityventures.com/jobs/>

^[7]<https://www.cso.com.au/article/645445/australia-only-has-7-percent-cybersecurity-expertise-it-needs/>

^[8]https://www.hays.com.au/report/HAYS_1898155

^[9]<https://www.hays.com.au/report/information-technology-16659>

^[10]<https://joboutlook.gov.au/Occupation.aspx?search=Career&code=2611>

Project Idea

TakaSeat

TakaSeat, a mobile application that assists students and staff members to efficiently move throughout a University.

Overview:

TakaSeat is a mobile application that tracks users location data to determine how busy areas are within a university campus. This data will be processed by the application and return an estimation/prediction on how congested that area is.

Users are tracked via a unique identifier thus providing the application with a dataset relative to their connection to the university. If the user leaves the area that was initially predicted the application will adjust the prediction (weights) accordingly.

TakaSeat includes features such as booking shared group study rooms, approximate wait times at elevators and food stall congestion within the university.

Motivation:

The motivation for this project comes from new students endlessly walking around campus to find an appropriate study area that isn't occupied. New students to the university are unaware of all study areas available throughout the campus. Once all study areas are known the chance of finding an unoccupied seat and table to study at is still very slim. This application will provide all university stakeholders valuable information about the university.

Description:

TakaSeat tracks users via location sharing once an individual is in close proximity to the university and has downloaded the application, location sharing must be enabled. GPS coordinates and barometric pressure will be recorded, pushed and stored to the application. The application will take this information and run it against an algorithm to predict congestion in nearby common areas. GPS will compute altitude based on the longitude and latitude coordinates of the device. Barometric pressure readings will run in conjunction with stored GPS coordinates to determine the building level the user is on. Once the application has determined the building level the device is on, it will prompt the user on which service they wish to use.

Understanding the users location:

The most challenging aspect of this project is accurately predicting the users location whilst in dense urban areas. Multi-path interference is a phenomenon occurring in dense urban areas where tall buildings are present. This phenomenon occurs when a GPS enabled device does not

have a clear line of sight to the sky. Tall buildings can cause devices to split signals into multiple thus causing errors in the application receiving an accurate reading.

The longitude and latitude coordinates along with the attitude of each point of interest will be hard coded into the application. Once the user is within 5 meters of the border of a point of interest and the application is receiving consistent location results (no major fluctuations in longitude, latitude and attitude) the user will be allocated to that area.

All predictions will be conducted client side against data that is already stored in the database.

Features:

Tracking Shared Study Areas:

Predicting the occupancy of shared study areas will be core feature of this application. A physical count of available seats in each study area will be conducted prior to release of the application. These numbers will be hard coded into the application as this variable is unlikely to experience major fluctuations.

Once a user has entered a study area, the application will allocate his or her unique ID to that location. This allocation will adjust the number of seats available in that area. Once the user is detected out of the boundaries of the allocated area for more than 10 minutes, the users ID will be removed from the area thus opening an available seat. This 10 minute buffer will allow users to use the bathroom, get food or have a cigarette without affecting the applications prediction.

Duration tracking will be implemented as this data will be used to refine the application in regards to how long a user is present in each location.

Tracking Food Court Areas:

Food court areas will be tracked similar to shared study areas. Food courts are generally located on ground floors with an outside seating area. Ground floor data will be easier to capture as nothing or no one is present below this elevation.

Tracking Elevator Wait Times:

Elevator wait times will be predicted by how many users are in the university along what time of the day it is. Location tracking in close proximity to elevators will provide inaccurate readings. The metal used in elevators and the structural support in elevators shafts will block or severely limit signals being transmitted to or from the users device. The time of day will be the backbone of this algorithm as users tend to be more active 10 minutes before classes or lectures begin. The application will run the time of day against users within the university and return an estimate on approximate wait times for nearby elevators. If the users altitude drops or rises quickly the

application will know that the user has used an elevator. This dataset will be logged and used in future predictions.

Booking a Group Study Room:

Users will be able to book a group study room via TakaSeat. This feature will ensure all group study areas are being utilised at all times. If an area is not occupied a notification will be pushed to nearby users. The notification will only be pushed to a number of users that the room can hold. A first come, first serve basis will be implemented when making a booking.

Visualising predictions:

Predictions will be visualised by displaying a colour behind each 'point of interest' tile within the application. The number of users in a certain location won't be made public to ensure application usability and protect the universities intellectual property. A prediction will be made and displayed to the user regarding how long they'll have to wait for a seat. Green tiles will indicate an area is under occupied while red tiles are experiencing more activity than usual.

Outcome:

A successful outcome of this project will be visualized by increased productivity within the university. Stakeholders moving throughout the university with ease, students finding new and underutilized study areas and easing lunch time food court congestion.

Group Reflection

Upon reflection, our group was cohesive, respectful and systematic. Having been assigned our separate parts early on, we were able to work individually at our own pace until close to the assignment deadline whereby we collaborated on Google Docs and communicated primarily through Discord. Regarding a potential improvement, we could have put a timeframe on when the group were to collaboratively finish the assignment. Albeit, given peoples specific timetabling it is often difficult to agree on a time that is consistent for everyone.

The surprising, yet best part about working in groups is the ability to have so many multiple ideals and interpretations of the one assignment and to have quick, easily accessible responses to queries by your peers. As a collective, we often consulted the Discord chat for wording within the assignment that we found ambiguous and were met with prompt, insightful answers. All collaboration was done through Google Docs. Github was used solely for hosting the team website which was handled by Alex.

Website Link: <https://streatcoffee.github.io/>

GitHub Repo: <https://github.com/streatcoffee/STREATcoffee.github.io>