Team Valiant

Website: https://mitchell-38.github.io/Assignment2/

GitHub Repository: https://github.com/Mitchell-38/Assignment2

Personal Information

Mitchell Broadbent (s3858182)

Mitchell's interest in IT was not formed by a particular event or person; rather it was formed by a conglomeration of known figures and works both fictional and existent. Mitchell is a natural born Australian. He is interested in the problem solving and diagnostic aspects of programming, and potentially systems administration. In his spare time, Mitchell likes to read and look after his two pet rats.

Tim Osborne (s3860099)

Tim's interest in IT started from a young age; watching his family start using computers and playing interactive games where he could colour, draw, point and click. He continued to explore this interest by taking IT classes in high school and would like to learn more about software. Tim is a second-generation Australian, knows a little German from his grandmother, and in his spare time, likes to read high fantasy and alternate history fiction. He has also recently taken to cooking.

Eenu Monga (s3858815)

Eenu's interest in IT started with the data science boom and continued growing after seeing firsthand how IT could be used in the workplace to provide solutions and efficiencies. She is interested in programming, development and testing. Eenu is a first-generation Australian, born to Indian parents, knows some Hindi and Punjabi. In her spare time, she likes to read, watch episodes of Air Crash Investigation and think about a making a wall-sized aquarium.

Tyson Carroll (s3660241)

Tyson's interest in IT started when he got his first computer at the age of ten and started playing games and was re-ignited after he started building computers for some of his friends. He is currently interested in cyber security and game development. Tyson is Australian born, and his father's side of the family is from Turkey. His interests include basketball, video editing, gaming, and of course, computers.

Wenjun Bi (s3858029)

Wenjun's interest in IT started after he saw SQL data presented visually in a creative and intriguing manner, and he hopes to be able to analyse data and present it in the same way

to others. Wenjun is of Chinese background, and can speak English, Cantonese and Intermediate Mandarin. In his spare time, he likes to play basketball, video games and surf the web.

Team Profile

For our previous individual assignments, each team member had to complete three online personality tests:

- Myers-Briggs Type Indicator (MBTI) test

- Learning style test

- A test of their own choosing

Each team member used 16Personalities for the MBTI test and different providers for the Learning style tests.

Team Member	MBTI Result	Learning Style result	Miscellaneous Test & Result
Mitchell	INTP-A Logician	• 50% visual • 30% auditory • 20% kinaesthetic	**Enneagram test** Result: Type 3 – Performer.
Tim	INFP-T Mediator	Visual	**Emotional intelligence test** Result: 14/20
Eenu	ISFP-T Adventurer	Multimodal learner: • Visual • Aural • Read/write • Kinaesthetic	**Big Five Personality Test** Result: • 69% openness • 58% conscientiousness • 35% extroversion • 67% agreeableness • 60% neuroticism.
Tyson	ISFJ-T Defender	• 40% visual • 30% auditory • 30% tactile	**Big Five Personality Test** Snapshot report result: Extroversion 58%; "fall[s] into the middle of the introversion and extroversion continuum…"

Wenjun	INFP-A / INFP-T Mediator	Visual	**What hobby should I have test?** Result: photography.

Table 1. Personality test results for each team member

The 16Personalities test determines personality types by measuring five different personality aspects. These aspects are:

- The mind aspect (**I or E**) measures if someone is more introverted or extroverted.

- The energy aspect (**S or N**) measures if someone is more observant or intuitive.

- The nature aspect (**T or F**) measures if someone makes decisions based more on logic or emotions.

- The tactic aspect (**J or P**) measures if someone is more structured or flexible in their work approach.

- The identity aspect (**A or T**) measures if how self-assured a person is.

When the aspects above are combined, a five-letter result corresponds to a particular personality type (16Personalities 2020).

The common result for the team is the mind aspect; all members are more introverted than extroverted. This suggests that all team members, when provided with the option, may prefer to pick individual work tasks than those that involve teamwork. This could mean as a team, we are likely to divide group tasks so that each person is working on a task individually, rather than having more than one person working together on a task.

The team scored differently for all the other aspects – this is excellent, as diverse working styles and viewpoints can broaden the way in work is approached and completed. Our team may brainstorm and may share different ideas for how to complete our group tasks.

The learning style tests determine how a person best learns – whether that be through visual, auditory or kinaesthetic means. While each team member used a different learning style quiz, the results indicate that almost all the members are entirely visual learners or prefer visual learning over the other styles of learning.

This suggests the team will be most comfortable to communicate, plan and relay information with each other in a text-based format, rather than through an online video chat or voice call.

As the third test result is different for almost every team member, it would be unfair to single out individuals and discuss how a particular personality result would affect how the team works as a whole. However, these results could be a good point for discussion between team members to ensure everyone feels comfortable contributing, sharing and interacting together as a group.

Ideal Jobs

Team member	Ideal job	Industry
Mitchell	IT Operations & Infrastructure Administrator	Manufacturing
Tim	IT Manager	Manufacturing
Eenu	Application Support Analyst	Insurance
Tyson	Cyber Security Analyst	Emergency services
Wenjun	Biostatistician/Data Analyst	Medical research institute

Table 2. Ideal jobs (and the industry they belong to) for each team member

When comparing and contrasting our ideal jobs, it is clear that they are all IT roles in industries that that are not primarily focused on information technology. This does not mean, however, that the businesses and organisations of our ideal jobs do not benefit.

For instance, Wenjun's ideal job involves data analysis that would provide the medical research team useful insight on their work. Likewise, having an IT department in almost any organisation is useful, as the right technology can assist with keeping record of useful data to identify trends, provide solutions for work to be completed more efficiently and allow businesses to be innovative. Managing an IT department to benefit the overall business is a key responsibility of Tim's ideal job.

An IT department (and the related business) can only be successful if the right infrastructure and software is in place, is kept up to date, and the users are supported with any difficulties they may have; these are responsibilities of the ideal jobs picked by Mitchell, Tim and Eenu. Lastly, an IT system should always be secure and safe from external threats, and that this the purpose of Tyson's ideal job.

Our career plans as a team will differ, as each ideal job requires a different mix of qualifications, skills and years of experience. For example, Tyson's ideal job as a Cyber Security Analyst, is specialised and states he will need at least 5 years of experience in information security roles. In contrast, Eenu's ideal job as an Application Support Analyst requires no experience, as it is aimed at university graduates.

With the exception of Eenu's ideal job, the ideal jobs chosen by the team require some prior experience and knowlege, and are indicative of having a long-term goal/career plan in place.

The longest career plan is likely to be Tim's, as in his ideal job as an IT Manager, he will be responsible for the multiple IT teams at the workplace and the 3-8 staff working under him. He will be required to liaise with other business units in his workplace, and will need

experience and understanding of different sections of IT – infrastructure, security, data analytics, etc.

Only Eenu and Wenjun's ideal jobs state a degree is required, however, having a degree or educational background in IT would be useful for all our ideal jobs.

Tools

After forming a group on Canvas, our team introduced ourselves to each other in the discussion forums and decided on what we would use as our primary means of communication.

We used a private server on Discord to communicate. Over the course of our project, three text channels were established:

General – for general discussion of the assignment.

Websites – to share our individual websites from Assignment 1.

Checklist – to check that all the different tasks for Assignment 2 have been completed before submission.
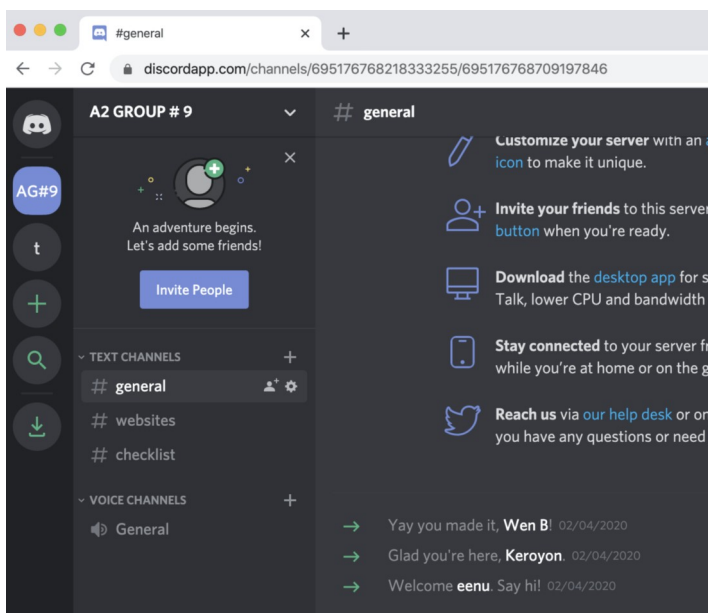

Figure 1. A screenshot of our text channels in Discord.

As a group, we divided project sections between ourselves, and once we completed our assigned parts we uploaded them as files to our GitHub repository (https://github.com/Mitchell-38/Assignment2). When we made commitments to the master

branch, we did our best to ensure the comments and files clearly showed what part we had completed.

Our audit trail shows when we completed each part and when team members made updates to their sections. The audit trail also shows the initial creation of our team website: https://mitchell-38.github.io/Assignment2/. As each individual is the main contributor to the files they uploaded, the audit trail is a good reflection of the team's work. If the work was divided differently (two people needed to work on one file) then the repository audit trail would not be an accurate reflection.

Our usernames in the GitHub repository:

Mitchell Broadbent:	Mitchell-38:
Tim Osborne:	DaftVaderDev
Tyson Carroll:	T-rmit
Eenu Monga:	S3858815
Wenjun Bi:	MichaelBye

Industry Data

Ranking of skills and frequency in job posts from Burning Glass Technology.

Common Skills Require in IT	
General	**IT Specific**
- Strong communication skills - Problem solving - Critical thinking - Ability to work in a team - Leadership skills - Analytical skills	- SQL - Java - Business/data analysis - Business support

After analysing the IT skills require for our group members' website, the commonly require skills are SQL, programming language (java, C++, python), business support and business analyse.

Referencing from the data given the top 3 ranking base on frequency of job post for IT specific skills follow in this order:

1. SQL (3,570)
2. Java (2860)
3. Business analyst (2096)

$$Percentage\ specific\ skills = \frac{SQL + Java + Business\ analyst}{Total\ IT\ skills} 100$$

$$\frac{3570 + 2860 + 2096}{58675} 100 = 14.53\%$$

The ranking of top 3 general skills is ranked in the following order:

1. communication skills (9,362)
2. writing (3,614)
3. problem solving (3,375)

$$Percentage\ specific\ skills = \frac{Communication + Writing + problem\ solving}{Total\ soft\ skills}$$

$$\frac{(9362 + 3614 + 3375)}{48458} 100 = 33.74\%$$

The top three ranked IT specific skills not required in our skillset are as followed:

1. JavaScript (2,946)
2. Microsoft Windows (2,699)
3. Project management (2,252)

$$Total\ unselected\ IT\ specific\ skills = \frac{(JavaScript + Microsoft\ Windows + Project\ Management)}{Total\ IT\ Specific\ skills} 100$$

$$\frac{(2946+2699+2252)}{58675}100=14.46\%$$

The highest ranked general skills not require in our skillset are as followed(Burring Glass Technology, 2018):

1. Organisational skills (3,513)
2. Planning (2,639)
3. Troubleshooting (2,372)

$$Percentage\, of\, not\, selected\, general\, skills=\frac{Organisational+Planning+Troublshooting}{Total\, skills\in demand}100$$
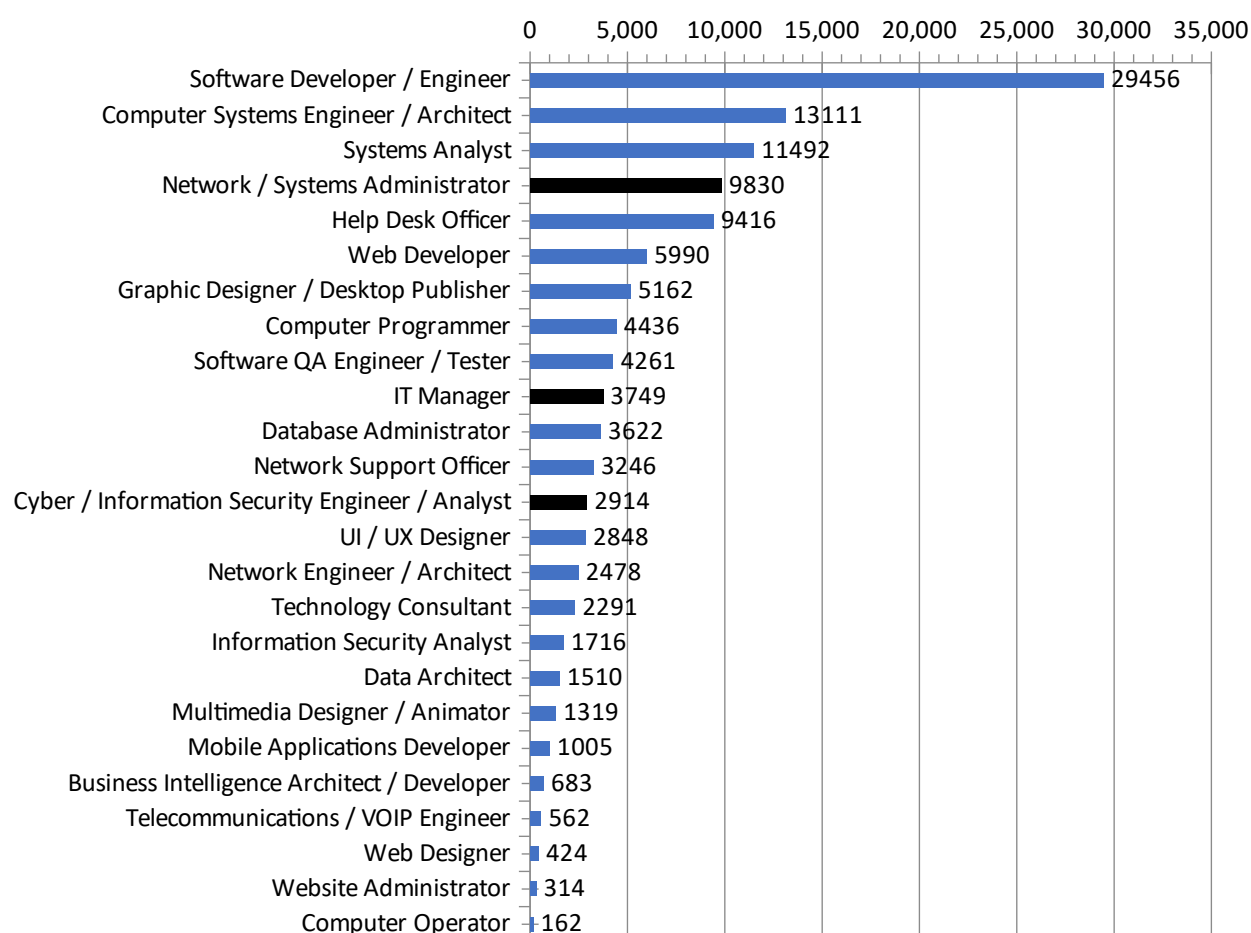
$$\frac{(3513+2639+2372)}{48458}100=17.59\%$$

The observational information gathered from the data and utilising calculation we can make a comparison in general skills that are require and skills were not required. Overall our team members understand the soft skills that is expected of them order work in their ideal career. This can be seen in the 3 skills we listed (SQL, which is rank in the top 5 most in demand.

The difference between required and unrequired in the general job listing is quite high with a percentage of 16.15%. This demonstrate our team member understandably knows the general skills that is require of them to be the ideal candidate for their chosen career. However, there is noticeable lack of emphasis put in organisational skills or planning. This is a skill that our group can work on.

The difference between our group's require IT skills and unrequired IT skills has shown only a marginal difference of 0.07%. This propose a hypothesis on current skills and knowledge they have on IT skills are quite low. This is understandably due to fact we are taking a first-year undergraduate subject. Our current knowledge does not meet the demand of their ideal job with an overall low percentage which as a group we need sufficient improvement.

Top Burning Glass Occupations (BGTOCCs)

Occupation	Value
Software Developer / Engineer	29456
Computer Systems Engineer / Architect	13111
Systems Analyst	11492
Network / Systems Administrator	9830
Help Desk Officer	9416
Web Developer	5990
Graphic Designer / Desktop Publisher	5162
Computer Programmer	4436
Software QA Engineer / Tester	4261
IT Manager	3749
Database Administrator	3622
Network Support Officer	3246
Cyber / Information Security Engineer / Analyst	2914
UI / UX Designer	2848
Network Engineer / Architect	2478
Technology Consultant	2291
Information Security Analyst	1716
Data Architect	1510
Multimedia Designer / Animator	1319
Mobile Applications Developer	1005
Business Intelligence Architect / Developer	683
Telecommunications / VOIP Engineer	562
Web Designer	424
Website Administrator	314
Computer Operator	162

The red colour bar graph represents our team member ideal job and their number job posting on public forum (Burning Glass Technology, 2018)

Ranking and titles of individual member's ideal job.

Name	Job title	Amount of job post	Job ranking (total 27)
Mitchell	Operation and infrastructure administrator	9,830	4
Eenu	Application Support Analyst	7,113 (Seek,2020)	6
Wenjun	Data analyst	4,783 (Seek,2020)	8
Tim	IT Manager	3,749	12
Tyson	Cyber Security analyst	2914	19

*Insufficient data on Eenu and Wenjun ideal job.

As we can see from the table presented above 3 members have selected job titles rank in the top 10 and the lowest rank 18. The total amount of job post is 28389 out of 133,893.

This equates to a percentage 21.20% for the chance for the team to have their ideal job be open for hiring base on the data provided. While, this percentage can be higher for example if software developer was to be included than our chance of finding our ideal job increases as well.

However, we believe another alternative to increase our percentage of finding our ideal job is to continue improve the soft skills and IT skills that is require but also skills and knowledge that may not be require for example continue to improve our other skills like organisational skills, learning python.

Overall, we are currently lacking in skill and knowledge to be hired for our ideal job, but we have a clear understanding of the expectation on us. We utilise this knowledge by further looking for ways to improve so our chances of getting hired increase. While it is important to acknowledge that changing our ideal job can certainly increase our chance finding a job, but it will not be our ideal job. Therefore, continuing to improve is the best is the best chance to getting into our ideal job.

IT Work

The job title of the professional that was interviewed was network technician.

What kind of work is done by the IT professional?

The network technician's main role is to make sure that everybody in their business can connect to the internet, servers, applications or whatever they need to connect to. Their main tasks in this objective are to configure switches (connects computers within a network), routers (connects computers between networks), and wireless access points (allows devices to connect to the network wirelessly). The network technician may also engage in minor network security services, such as whitelisting (trusted entities) and blacklisting (malicious entities), to connect/be banned from connecting to the network.

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

The network technician works as part of a team, working both remotely from different sites, cities or even countries. The network technician may work directly under a network engineer responsible for designing and implementing the network – focusing on high-level design and planning. Other professionals the technician may work with include an enterprise architect (Applies architecture principles to guide the organisation through technology changes necessary to execute strategies), system administrators (installing/supporting/maintaining servers), and the service desk (providing level 1 and 2 IT

support). Technician can also be required to engage with users within the business such as a sales team, app delivery and app support teams.

The IT workplace can be supportive and other professionals will be helpful, making up for technical weaknesses with a diverse range of strengths. The network technician will work in a cluster of desks within an office setting similar to cubicles sitting next to other technicians or similarly skilled professionals. The main interaction with people outside the direct vicinity will usually be phone calls, either liaising with other members of the team in remote locations, or speaking directly with users regarding network difficulties or their service provider (in this case, Telstra).

Where does the IT professional spend most of their time?

The network technician spends most of their time monitoring the network. This includes pinging the servers and connected computers to detect any network outages, monitoring traffic and keeping up to date. The network technician also does a lot of reporting and SQL queries throughout their day. External site visits are also required to configure switches and routers which means driving to and from business sites throughout the day. Sometimes, the network technician may also assist with the IT service desk to help tackle support overflow.

What aspect of their position is most challenging?

One of the more challenging aspects of the network technicians daily routine is complying with bureaucracy, reporting, sending requests and organising meetings. This takes a lot of time within the workplace and is a source of frustration. Working with internet service providers to fix issues is another challenging aspect of working as a network technician.

Some examples of this are internal router fixes, changing router code and website access. To expand on this, in the event of a loop in the system, modern routers will automatically shut down the port responsible for the loop. Once the loop has been resolved however, the port needs to be manually re-opened which can only be handled on the service providers end. Service providers can seem slow to act from the network technician's perspective and delays are common. Furthermore, a business usually keeps a monitoring server which receive log files packaged by the routers on the network. This process is automatic, however in the situation of a monitoring server being changed, code within the router must be accessed. This is a single line of code that could be handled by the technician themselves, however they must contact their service provider and request the alteration to be made on their end. As mentioned before, delays and slow service are common.

As a publicly traded company, there are a lot of additional rules and regulations that must be followed or the company will be fined. This enhances the security and integrity of the business, but also severely hampers productivity and efficiency. Even a simple change such as unblocking a user's access to a website means going through the following process:

- Change request (who, what, why?)

- Step by step planning

- Redundancy plan

- back-out plan if something goes wrong

- testing-plan (expected results)

  - If unexpected results, reporting on why this is the case

- Proof of action (screenshots of each step)

- Organise meeting which only takes place once a week to present report

- If something was missed, or further queries come up, this is another week long delay before it can be resolved.

A potentially 30-second job can take weeks to enact due to the rules and regulations in place.

IT Technologies

Cybersecurity

What Is Cybersecurity?

Due the extreme popularity of the internet over the past 30 years or so, Cybersecurity has always been and always will be a major aspect that needs to be considered when using internet. Basically, Cybersecurity is the defense of malicious attacks against computers, servers, mobile devices, electronic systems, networks, and data. Cybersecurity is usually divided into 6 categories: Network security, application security, Information security, operational security, Disaster recovery and business continuity and End-user education.

Network Security is the security that is put in place on a computer network to protect from intruders. These intruders can be either targeted attacks or malware.

Application Security is the method of keeping software and devices free of threats. This is important as if threats can easily breach the software or device, then data can be easily accessed e.g. personal information, credit card details and more. This security needs to be in place before the program or device is given to the public.

Information Security is designed to protect the privacy of data whether it is in storage or transit.

Operational Security focuses on the permissions certain users have when accessing a network containing data assets. How they may access this data, what data will be shared and what data may be stored is all part of Operational Security.

Disaster Recovery and Business Continuity is the plan that is put in place given the circumstance of a cyber-attack. This plan is set to help prevent the loss of more data, and to help reinstate the business to the working standard they had pre-cyberattack. Basically, this is the plan that is set that the company must rely on when needed and try to operate without certain resources to stop data from being leaked.

End-user education is basically security to reduce the human error of introducing malicious viruses onto a system by teaching users about possible situations that can happen. Users can introduce these viruses through sceptical email attachments when opened, plugging in unknown USB, and other lessons that a user must learn so that security is not breached (What is Cyber Security?, 2020).

Development and the impact it will have?

Cybersecurity will constantly continue to develop as the internet will always be around and users and companies will always be needing it. This means that the development of new strategies to help defend against new malicious attacks will continue to be established to stop their attacks.

There are plenty of newer technologies that keep being instated that is helping the step forward for cybersecurity. Some of these technologies include: Cloud technology, Hardware Authentication and User-Behavior Analytics (UBA).

Cloud Technology: An increasing amount of companies and even government organisations are making use of cloud technology day to day to store crucial information. This is due to the revolutionary techniques and methods that cloud based technology has introduced. Cloud based technology has virtualised firewalls, virtualised intrusion detection, and prevention systems, and virtualised systems which can be all accessed and made use of from the cloud. This cloud based virtualised security systems really help both companies and government organisations keep their data safe away from malicious intruders (New Technology to Improve Cyber Security that You Should Know About, 2019).

Hardware Authentication: This type of Authentication requires a physical device accompanied to a password; this is known as 2-factor authentication. This allows a user to keep their data protected because if a hacker knows the users password, they will still need a unique token to enter the account. This unique token is changed and given to the user each time they try to enter their account. The only down fall to this method is if the user loses their device which will make it hard for the actual user to enter their account with their hardware. This technology really helps all users of the internet to keep their

accounts on lockdown from unwanted hackers. This can work for almost any service that requires a password for an example a client's email (Hardware Authentication, n.d.).

User-Behavior Analytics (UBA): UBA analyses and stores substantial amounts of data from consumers behavior when using their service. This is important so if their account were to be hacked it will trigger the system to detect unusual activity. This helps companies to detect suspicious activities on their consumers accounts, for example when withdrawing large quantities of money, a bank may hold your purchase as it is not normal user behavior (New Technology to Improve Cyber Security that You Should Know About, 2019).

Unfortunately, as the advancement of security increases so will the malicious viruses that plan to attack organisations and users. Due to this factor this keeps the number of positions in Cybersecurity at a very high level as companies require specialist in this area to keep their data safe.

How does Cybersecurity affect you and your family and friends?

In a business aspect this will not affect me personally, however, anyone using the internet can be susceptible to cyber-attacks. The types of cyber security that is important to me and most users of the internet would be Network Security, Information Security and End-user education. Due to not being in a working environment security like Â'Disaster Recovery and Business ContinuityÂ' is not as important as I do not need plan to protect a large amount of data, however, most computer do have restore points if needed when a computer is compromised. Network Security is important to stop these attacks from accesses my devices like my computer and mobile device to keep my information private from attackers. Usually, home computers are not targeted directly when attacked like big organisations, however, they can be. When using the internet we really need to be cautious of what data or information that we give out and what the obtainer of that data will do with it, whether that be a website like Facebook or any other applications you might use. If the organisation or person that we give our data has weak security in place, we could potentially get our credit card numbers stolen or our information stolen for example full name, address, and tax file numbers. A good antivirus/spyware will help reduce the attacks that cyber criminals may try to inflict on you to steal your details and information. To reduce attacks for myself, family, and friends, we should all make sure that we do not download suspicious files, follow sketchy links, plug in USB devices from unknown sources, and trust random people online with our computers/devices. Also, we should all make sure that our computer software is up to date, our anti-virus/anti-spyware is up to date and always running to protect us from viruses and attackers.

Autonomous Vehicles

What does it do?

An autonomous vehicle or driverless car is where a human driver is not needed to monitor the surrounding environment nor required to carry out any driving tasks or provide input (Australia & New Zealand Driverless Vehicle Initiative; SAE International 2014; Parliamentary Library & Information Service 2017).

To understand how close humans are to having driverless cars, we need to understand the level of automation. The Society of Automotive Engineering (SAE) International has a standard (J3016) in which six levels of automated driving are detailed. Level 0 (no automation) means a car has no functionality to drive by itself and the human driver has to monitor the driving environment (Australia & New Zealand Driverless Vehicle Initiative; Parliamentary Library & Information Service 2017; SAE International 2014). Level 5 (full automation) is where the car can drive itself, by carrying out driving functions, such as accelerating and breaking, and continuously monitor the driving environment, so a human driver is not required (Australia & New Zealand Driverless Vehicle Initiative; Parliamentary Library & Information Service 2017; SAE International 2014).

Currently, vehicles are currently at Level 3 of the SAE International J3016 standard (Australia & New Zealand Driverless Vehicle Initiative; Parliamentary Library & Information Service 2017; SAE International 2014). Level 3 cars are those where some driving functions are automated in particular environments and examples include cruise control, alerts to the driver when cars or other objects are too close, and automatic emergency braking (MIT Technology Review Insights 2019; Parliamentary Library & Information Service 2017). Progress to Level 4, where are car achieves automated driving and minimal human action only under some conditions is under development (MIT Technology Review Insights 2019; Parliamentary Library & Information Service 2017; SAE International 2014). It is predicted that Level 4 cars will be available by 2025 (Parliamentary Library & Information Service 2017).

Replacing the monitoring of the surrounding environment by humans when driving is one of the biggest roadblocks for why Level 5 cars have not yet been developed (Parliamentary Library & Information Service 2017). Cars can already travel from one location to another without a human driver, however, this cannot be done if a safe manner where there is no harm to human passengers (Parliamentary Library & Information Service 2017).

To replace human monitoring, the car has to be fitted with technology that observes the surrounding environment and then understands what action has to be taken next (Davies 2018; Thompson 2016). For example, if there is a pedestrian ahead on the road, the driverless car needs to identify it, and understand the situation requires either braking or swerving to avoid an accident.

The technology for the car to sense what is happening around it involves sensors, cameras, radars and lidars (Davies 2018; MIT Technology Review Insights 2019; Parliamentary Library & Information Service 2017; Thompson 2016). The data from the sensors, cameras, radars and lidars are fed into a computer system, where images of the surrounding environment are created, however, these images have no meaning, until machine learning is applied and the car can identify what it is seeing (Davies 2018; Thompson 2016). GPS technology, and networking infrastructure also need to applied, as the car should be able to determine where it is, and be able to connect to sources of other

useful information, such as speed limits and traffic conditions (Davies 2018; MIT Technology Review Insights 2019). The driverless car should also be able to connect to other driverless cars on the road, so they can signal and communicate to each other (MIT Technology Review Insights 2019).

What is the likely impact?

The automotive and technology industry are likely to see an increase in jobs and growth, while employees who drive vehicles are most likely to experience unemployment as their skills will no longer be necessary (Accenture Digital 2014; Parliamentary Library & Information Service 2017). Related to this are employees who investigate crashes, repair cars and monitor roads - they may also lose work as it is predicted that autonomous vehicles will prevent thousands of deaths and road accidents (Accenture Digital 2014: Parliamentary Library & Information Service 2017). Paramedics in the emergency services industry would be also affected with less work, and the possibility of self-driving ambulances (Accenture Digital 2014; Parliamentary Library & Information Service 2017).

At the moment, in Australia, owning a car or having access to a car is considered necessary because of the way our cities have been planned – it assumes car is the primary means of transport (Parliamentary Library & Information Service 2017). However, researchers predict that the widespread use of driverless cars could result in a change to this mindset, and a future where carpooling/use of cars as another form as public transport could result (Accenture Digital 2014; Parliamentary Library & Information Service 2017). This could also change the way cities are planned; data collected from driverless cars could provide valuable insight (Accenture Digital 2014).

Carpooling or the use of driverless cars as another form of public transport would also mean less cars on the road, which would be good for the environment, and the driverless cars themselves may be created to use alternate forms of fuel (Accenture Digital 2014; Parliamentary Library & Information Service 2017). If driverless cars could be designed to be lighter in weight, drive with less distance between cars (freeing up road space), and in an efficient manner (not idling in traffic) then less fuel would be used (Accenture Digital 2014; (MIT Technology Review Insights 2019).

How will this affect you?

I catch public transport to commute to work, but to reach the train station, I still use a car. If carpooling and ridesharing becomes widespread, I could commute to the train station with other people in my local area. I could also do the same to commute to other places; however, there may be a waiting time, like public transport, and this would feel like I have lost some independence to be mobile when I want.

For others, having an autonomous vehicle may grant independence. Relatives and friends who cannot drive for a variety reasons (for example, disability, chronic health conditions, driving anxiety etc) often have to rely on public transport or friends and family. A completely autonomous vehicle that is self-owned would allow them greater mobility - to

travel without relying on other people. It would also be safer. Driverless cars would also allow for greater mobility for those that are vision impaired.

If autonomous vehicles do become widespread, then younger family members or their children may no longer need driving licences. Years into the future, getting your Learner permit ("L's"), your Probationary licence ("P's"), full licence and first car may not be as an important rite of passage as it is today. Furthermore, it is also interesting to think what level of knowledge a driver would need, and what a driving test (if they still exist) would look like in a future where the majority, if not all, vehicles are autonomous.

Natural Language Processing and Chatterbots

Natural Language Processing (NLP) is a type of Artificial Intelligence which allows computers to read, decipher and derive meaning from natural human languages (Robots 2019). Machine learning algorithms, using soft probabilistic decision making, allow computers to be able to perform competent language translation nigh instantaneously as seen by Google Translate. Word processors, such as Microsoft Word are able to perform spelling and grammar checks (even accounting for slang and informal usage), as well as suggestions to improve prose. In recent years, digital assistants (such as Siri, Cortana, OK Google and Alexa) have emerged, furthering the implementation of this technology in leaps and bounds. Chatterbots, programs designed to engage in conversation, are the result of effective NLP implementation and have become impressive tools for digital marketing and customer service in recent years (Campbell 2017).

While the feats of NLP technologies are impressive, they're far from perfect yet. Natural languages are difficult for computers to comprehend due to their inherent abstract nature (Garbade 2018). In fact, the preceding sentence is a perfect example of a sentence in which a computer would struggle to interpret correctly (is it the language or the computer that is abstract?). NLP applies algorithmic techniques to identify words and extract meaning based on these rules and word definitions.

In order for computers to derive meaning from natural human languages, they need to be modelled by converting them into a mathematical framework (Nigam 2019). N-Grams (the process of grouping nearby words together to foment representation) and machine learning algorithms such as recurrent neural net (RNN) models have fuelled the development of NLP and brought the technology to greater heights in recent decades (Foote 2019). When it comes to NLP and machine learning, neural network models are considered cutting edge technology (Foote 2019).

Apple's Siri was an innovation in NLP utilisation as the first major AI assistant, which stoked the flames of competition leading to renewed vigour in NLP development (Foote 2019). Since then, voice-command based systems have gone from needing specific commands, to being able to interpret the needs of the user based on their questions (Foote 2019). With sentiment analysis, chatterbots are able to even detect tone and emotion by complex linguistic analysis to varying degrees of success based on the

approach (MonkeyLearn 2020). Some chatterbots use machine learning algorithms to fine-tune their analysis, while others rely on stringently designed rules based on human linguistic study (MonkeyLearn 2020).

With the advent of digital assistants and the development of NLP technology, the impact on modern society should not be understated. Ineffective communication on an international scale could be a thing of the past with idealised NLP technology. With on-the-fly translation and word processing to correct grammar and local slang; users from opposite sides of the globe would be able to engage in almost natural conversation despite not understanding a word of each other's languages. This could result in the obsolescence of careers in translation as a human could not hope to compete with a machine translating entire documents in mere seconds; or an application that translated live video conferencing as it happens.

As NLP and chatterbots continue to advance, customer service positions could become obsolete as a human profession. Chatterbots utilising NLP would be able to interact with users in a way that a human would, anticipating needs and making users feel comfortable with more natural responses compared to older attempts without NLP. Perfected chatterbots could deliver a personalised experienced for every single customer visiting a business' website without the cost of human sales assistants, generating enormous savings. This would also leave customers more satisfied with the experience as they do not have to email a business and wait for answers to any quick question they can come up with — instead receiving instant answers and support with any difficulties they may be having.

NLP and chatterbot technology could significantly impact retail workers and call-centre related jobs (when paired with natural human-sounding voices like modern digital assistants) if successfully developed further.

Robots

Robots are machines that are programmed to carry out certain tasks automatically with swiftness and high accuracy (Rouse, 2016).

We use robots for a wide range of matters ranging from; manufacturing of products and assembly and packing of the goods to surgery and space exploration. Robots help reduce human error that can occur as robots are very precise when programmed correctly (Robot, n.d.).

Development and the impact it will have?

Due to the extreme outbreak of the corona virus (covid-19) we can now see hospitals taking advantage of and trialing robots in the medical industry. An example of this type of

robot is being used in Australian and Chinese hospitals during this outbreak. The name of this robot is 'Cruzr' it was designed and developed by a company called UBTECH. This robot helps detect the possibility of hospital patients having the virus by being able to scan and track the temperature of 200 humans within 1 minute. This will help reduce workload for nurses and doctors by a dramatic amount and it will allow them to focus on other areas of treatment or analysis. Not only does it reduce their workload, it will also reduce their chances of catching the virus themselves and inherently getting sick. This is also due to the robot having the capability of having video conferences between patient and doctors and the ability to disinfect assigned areas. Doctors being able to talk to patients without having a face to face consultation is important to stop the spread of the illness while still treating patients. Also disinfecting areas of need is essential to stop the spread of the covid-19 virus. This is very crucial especially at this time of need as the less spread of the corona virus the better. This demonstrates that robots can be a dramatic help in terms of hospitals. Bringing in this type of robots during this time of need may illustrate on how matters could be running in the future, with the help of robots to reduce workloads and the risk of spreading diseases and viruses. The continuation of the development of medical robots should be prioritised especially for moments like these. They really can save a huge number of lives right now and in the future if the progression of technology allows it. Due to the Covid-19 virus more than likely we will see the fruition of these types of robots in all hospital in the future (Thomas-Sam, 2020).

There is a huge commotion in reference to robots being replaced or used instead of humans for certain jobs. Individuals do not agree that robots should replace humans as it will reduce the amount of jobs for the people. In accordance to the robot mentioned above that especially for the medical industry robots are definitely critical for our survival. According to an evaluation performed by Oxford University in approximately 20 years almost half of the jobs done by people will be now done by robots (Stillman, 2017).

Despite this evaluation, from past statistics it is demonstrated that robotics took over 80,000 jobs within the U.K. within a 15-year time period, however, this also created 3.5 million new job opportunities. From this past evidence it suggests that more jobs will come available to the public rather than making less jobs for the population due to the increase of robotics taking over jobs (Neiger, 2018).

How does Robots affect you and your family and friends?

Currently Robots do not affect me that much as I do not currently work a job that can be substituted by a robot. However, this can affect me from pursuing certain jobs in the future that I will be replaceable by robots. Due to my family being mostly retired or not of age to work, this currently does not affect them either. As the younger generation of my family grows up, they may see more and more common jobs replaced by robotic processing. Although this might be the case, it has been evident in the past that more jobs have come out of certain jobs being replaced by robots. Therefore, when the younger generations of my family grow up, they will have plenty of new job opportunities to investigate and apply for. My career goal is to work in Cybersecurity so personally I do not believe I have anything to worry about in terms of robot development. If anything, I do not think anyone should be worried about the development of robots illustrated through statistics there will

still be jobs, and there will be better quality occupations as robots usually replace the tedious positions, like packaging and handling products. With the development of robots in the medical it could help several patients and whomever, may be working or visiting the hospital. The innovation of this technology could help stop the spread of disease in future, hence making the world a safer place to live.

Project Idea

KeepOut

The project will be a collection of security programs and will serve as a secure hub of sorts containing a VPN, a password manager, an anti-virus, a secure web browser and a secure cloud based encrypted file storage. To begin with I'm going to talk about account management.

Right off the bat it might seem counter-intuitive to want a secure service to protect your privacy only to give it away to the person saying they can give you your privacy back but the account is only for 2 things. First it's there to identify you not personally only by email or username so that if you need to install it onto a new computer since the base program will be a one time purchase and will include everything but the cloud file storage however will have the structures to allow those competent to set up a local secure server and the expanded VPN servers that are more likely to get around a government or companies attempts to stop proxy's. The reason for this is because servers for both proxies and cloud file storage can get expensive very quickly and without constant cash flow from those that wish to use them the service would quickly sink. The password manager would be local or cloud based using Microsoft Azure with no extra charge but might implement a simple storage limit given that for the most part most people would only need a max of around 15 passwords and given that it's a choice not all will be comfortable having their passwords stored elsewhere. It will also have the ability to generate unique passwords itself that are made of random text made locally so that there is no worry about interception in any way. The VPN or Virtual Private Network functions as a proxy allowing you to essentially trick websites into thinking you're somewhere else which allows you to either get access to content you couldn't otherwise or stop your internet provider or someone intercepting your traffic from being able to see exactly what you do. The base version will include access to a few VPN servers in most countries that have modern internet infrastructure allowing access to content in other countries however being limited to a few servers means that it isn't too hard to be blocked by governments or companies. The subscription model will give access to constantly updated servers in an effort to avoid being blocked and allowing all content to be accessed and watched. The anti-virus will function like other market leaders providing from files or programs hidden in websites, emails or downloads that are likely to harm your computer. The base program will have the ability to scan your computer and quarantine and delete flagged items that it detects while the paid version will let you protect up to 5 computers with real-time flagging of spam or websites that are likely to contain malware as well as parental controls that will allow parents to easily set active

hours for all apps or services such as internet as well as restrict some completely. It will also allow you to encrypt folders and work with the password manager to make sure that only you and those you want to share access to are able to get into these folders.

Group Reflection

Mitchell Broadbent

The overall group experience was positive from my perspective. Everyone in the group was eager to assist others and get the job done once we had started. I was surprised by how willing everyone was to help each other out when we were having difficulties and nobody had to be 'pushed' into doing their sections.

One area I would improve upon if given the chance again would be to get more organised earlier on. I did not expect the difference in work/life schedules to have as much impact. Although everyone was doing their best to get the work done, it would be hard to get feedback from one another without a considerable delay.

This group assignment experience has taught me the value of effective communication and open dialogue amongst contributors.

Tim Osborne

What Went Well

The way the group effortlessly fit the roles they chose and quickly and effectively did their work and then offered to help with anyone with their tasks was really good as well as how well the team was communicating

Could Be Improved

We could easily have started the project earlier but others and especially myself were very lax and waited until the last week and half to get things into gear. There was also an issue of schedules, we had a rough idea of everyone else's but we never got into the groove of working around them and just pushed through them

Something Surprising

How well the group worked together. I was worried that there would be a period of awkwardness and timidness as there normally is with any group project but I think the lack of any face to face meeting helped alleviate that.

What I Learned

This is my first university course and my first online course so I learned to try and be more active in group discussions since they take place online and can be easy to ignore or neglect which I realised would only cause me to fall behind the rest of the group not only academically but also socially since I wouldn't have as good a relationship as the others would.

Eenu Monga

I think our team worked well; everyone was respectful and polite to each other. We asked each other questions about the assignment when we needed help, and everyone completed their parts before the deadline.

That being said, I think if we had started the assignment earlier, we would have had more time to talk to each other about the assignment itself and provide each other with feedback about the sections we've worked on individually. We also would have had more time to talk to each other about the final product and what we wanted it to look like.

This was the first time I've collaborated on a project entirely online with team members I've never met in person before, and it surprised me that we managed to complete this project working remotely. Another thing that surprised me was that providing feedback (SparkPLUS) to those you've only met and worked with online is just as challenging as it is in person.

I have learnt that group work is possible entirely online and that it can be done, as long as everyone understands what they need to do and tries their best.

Tyson Carroll

What Went Well?

The communication between team members was great, we got our work done on time, worked well together and supported each other if we had any problems.

What Could Be Improved?

Finalising the assignment a little bit earlier than the due date.

What Was One Thing That Surprised You?

I've never done an online course before so it was surprising to see that we worked well together and got the work done on time without ever working with each other before.

What Was One Thing You Learned About Groups?

Even if someone has not worked with a group of people before does not mean it can't work. This is illustrated though our completion of Assignment 2.

Wenjun Bi

From the formation of the group to the completion of the assignment, has overall been a positive experience. Individual members took part in forming group, setting communication method, GitHub and websites. There was no issue with the allocation of work, personally took initiative starting on industry data and everyone just follow suit. However, there is always room for improvement for example set time allocated for team discussion, so questions posted were usually delayed. From start to finish it was smooth sailing project which quite surprisingly, there wasn't drama or any passive aggressiveness people offer helped and questions or issue were dealt with in a good manner. There is a large spectrum of skills that is utilised to help cover each other weakness, some are better with website, research and communication.

Group

After seeing how everyone felt about our progress on the assignment, it is clear that the overall experience was a net positive. Team Valiant as a whole felt that everyone was generally communicative and that the level of effort from everyone was great.

The team felt that everyone easily fell into the roles where their strengths were greatest. No one felt that they were taking on more work than was fair, and when someone needed help, the other team members were eager to lend a hand.

The fact that the GitHub commits do not fit within one webpage is testament to the collaborative effort of the team. With over 30 commits, the team kept their contributions updated and documented, allowing the other members to see how each person was progressing through their sections. This was especially important as some pieces of the assignment required using other people's work to do their own (for example, formatting the team profile section onto the website using HTML). The team also utilised Discord to discuss relevant assignment topics, share information and keep track of our progress. This was mentioned in the Tools section, but it demonstrates the effective communication between members of Team Valiant during this assignment.

The only real regret shared by the team as a whole was related to not having started as early as we could have. If the team had initiated progress on the assignment earlier in the assignment period, there would have been more time to review and refine our work. The incompatibility of schedules within the team deceptively increased the time necessary to complete the assignment. Feedback and review would take time before it got back to the contributor could then start their editing process. However, the team felt that the work was completed on time and was done to a high standard.

The sentiment among the team seems to agree that the cooperative spirit was both surprising and unexpected. It was felt by each member when forming the team that

communication might become difficult or awkward, however we were surprised by how easy it was to delegate tasks and work cooperatively.

References

1. 16Personalities 2020, *'Our Framework'*, https://www.16personalities.com/articles/our-theory [Accessed 17 April 2020].

2. Burning Glass Technology n.d., *'Labour Insight Jobs – Top Titles',* electronic dataset, Burning Glass Technology [Accessed 18 April 2020].

3. Burning Glass Technology n.d., '*Labour Insight Jobs – Skills in Greatest Demand (General skills)',* electronic dataset, Burning Glass Technology [Accessed 18 April 2020].

4. Burning Glass Technology n.d., *Labour Insight Jobs – Skills in Greatest Demand (IT specific)', electronic dataset, Burning Glass Technology, [Accessed 18 April 2020].*

5. SEEK 2020, '*SEEK - Data Analyst',* https://www.seek.com.au/data-analyst-jobs?daterange=31 [Accessed 18 April 2020]

6. SEEK 2020, *'Seek – Application Support Analyst'*, https://www.seek.com.au/Application-Support-Analyst-jobs?daterange=31 [Accessed 18 April 2020].

7. Optiv n.d., '*Hardware Authentication',* https://www.optiv.com/cybersecurity-dictionary/hardware-authentication [Accessed 15 April 2020]

8. Neiger, C., 2018. *'9 Jobs That Are Being Taken Over By Robots',* https://www.fool.com/slideshow/9-jobs-are-being-taken-over-robots/?slide=11 [Accessed 17 April 2020].

9. Ecpi. 2019, *'New Technology To Improve Cyber Security That You Should Know About,* https://www.ecpi.edu/blog/new-technology-to-improve-cyber-security-that-you-should-know-about* [Accessed 16 April 2020].

10. Wikipedia. n.d., *'Robot',* https://en.wikipedia.org/wiki/Robot [Accessed 16 April 2020].

11. Rouse, M., 2016. *'What Is Robot?',* https://searchenterpriseai.techtarget.com/definition/robot [Accessed 15 April 2020].

12. Stillman, J., 2017, '*21 Future Jobs The Robots Are Actually Creating',* https://www.inc.com/jessica-stillman/21-future-jobs-robots-are-actually-creating.html [Accessed 16 April 2020].

13. Thomas-Sam, A., '*2020Robots Touted As Answer For Overwhelmed Hospitals Due To Coronavirus',* https://9now.nine.com.au/a-current-affair/coronavirus-robots-trialled-to-assist-during-covid19-outbreak/db5305ab-d46e-4287-86e9-21fe3f382d20 [Accessed 16 April 2020].

14. Kaspersky. 2020, 'What Is Cyber Security?', https://www.kaspersky.com.au/resource-center/definitions/what-is-cyber-security [Accessed 17 April 2020].

15. Accenture Digital 2014, *'Realising the benefits of autonomous vehicles in Australia'*, https://www.accenture.com/au-en/insight-realising-benefits-autonomous-vehicles-australia-overview [Accessed 15 April 2020]

16. Australia & New Zealand Driverless Vehicle Initiative n.d., *'What is a driverless car?'*, https://advi.org.au/driverless-technology/ [Accessed 18 April 2020]

17. Davies, A n.d., *'How Do Self-Driving Cars See?(And How Do They See Me'*, https://www.wired.com/story/the-know-it-alls-how-do-self-driving-cars-see/?mbid=GuidesLearnMore [Accessed 18 April 2020]

18. MIT Technology Review Insights 2019, '*Self-driving cars take the wheel*', https://www.technologyreview.com/2019/02/15/137381/self-driving-cars-take-the-wheel/ [Accessed 18 April 2020]

19. Parliamentary Library & Information Service, Department of Parliamentary Services, Parliament of Victoria 2017, '*Automated Vehicles No. 7, December 2017'*, https://www.parliament.vic.gov.au/publications/research-papers/send/36-research-papers/13839-automated-vehicles [Accessed 18 April 2020]

20. SAE International 2014, '*Automated Driving | Levels of Driving Automation are defined in new SAE International Standards J3016'*, http://templatelab.com/automated-driving/ [Accessed 15 April 2020]

21. Thompson, C 2016, '*Why driverless cars will be safer than human drivers'* https://www.businessinsider.com.au/why-driverless-cars-will-be-safer-than-human-drivers-2016-11?r=US&IR=T [Accessed 18 April 2020]

22. Robots 2019, *'Natural Language Processing: What It Is and How It Works'* https://robots.net/it/natural-language-processing/. [Accessed 18 April 2020].\

23. Carah Campbell 2017, *'Why Use Natural Language Processing for Customer Support Chatbots'* https://masterofcode.com/blog/why-use-natural-language-processing. [Accessed 18 April 2020].

24. Dr. Michael J. Garbade 2018, *'A Simple Introduction to Natural Language Processing'* https://becominghuman.ai/a-simple-introduction-to-natural-language-processing-ea66a1747b32 [Accessed 18 April 2020]

25. Vibhor Nigam 2019, *'Natural Language Processing: From Basics to using RNN and LSTM'* https://towardsdatascience.com/natural-language-processing-from-basics-to-using-rnn-and-lstm-ef6779e4ae66 [Accessed 18 April 2020]

26. Keith D. Foote 2019, *'A Brief History of Natural Language Processing (NLP)'* https://www.dataversity.net/a-brief-history-of-natural-language-processing-nlp/ [Accessed 18 April 2020]

27. MonkeyLearn 2020, *'Sentiment Analysis'* https://monkeylearn.com/sentiment-analysis/ [Accessed 18 April 2020]