



Techstra-One

Assessment 2: Team Project

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Benjamin McDonald	S3851983
Andrew Wendt	S3858515
Rebecca Barnett	S3856827
Adrian Foti	S3857888
Adrian Ferrara	S3856304

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Techstra-One is a group of like-minded students from RMIT coming together with the goal of producing a project with real world purpose and to demonstrate our commitment to developing the necessary skills required for the Information Technology industry in the 2020's.

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1. Introduction

The Techstra-One team was formed by students from RMIT who shared an interest in creating a project that would allow us to develop and demonstrate skills relevant to our interests in Information Technology. The students met during the Introduction to Information Technology course as part of the Bachelor of Information Technology offered by RMIT.

In the following report, you will learn more about the Techstra-One team members, what their interest in Information Technology is and how their personality's and learning styles will impact the team. We will also discuss what each team member's ideal job is and the required skill set that they would like to develop and how that relates to industry demand.

We will also discuss IT Technologies that are of interest to the team and what influence this may have on the future of Information Technology.

Finally, we will reveal our project idea in detail and discuss our approach to its development and implementation in the future.

2. Team Profile

2.1 Team Introduction

2.1.1 Timothy Hall S3851553

Tim has always had an interest in IT from a very young age and continued to follow this interest by pursuing a role in IT in the Navy.

Completing 15 years of service following this interest he has found his passion for IT revolves around networking. Tim has continued to follow his passion by completing his CISCO CCNA qualification and continues to educate himself. With his 15 years of experience in the Navy, Tim brings project and team management skills as well as a raft of IT knowledge to Techstra-One to help see the goals of the company come to life.

During his spare time Tim is an amateur home chef and loves to go to the gym and rock climbing with his partner Tiffany.

2.1.2 Benjamin McDonald S3851983

Ben is a student at RMIT studying a Bachelor of Information Technology. Prior to beginning his degree, Ben had pursued a career as an audio visual technician working for companies in Canada and Australia.

Working in the AV industry for seven years helped Ben develop his knowledge of networking as well as hardware and software. This led to an interest in IT and AI (Artificial Intelligence) and the possibilities of what AI could hold not only for the AV industry but for every industry.

Ben strives to work as an AI developer, working with the top teams on creating sentient AI, as well as working on smaller AI inclined projects. Ben is semi-fluent in HTML, CSS, and is currently learning java script and python which will all be of benefit to the Techstra-One team.

2.1.3 Andrew Wendt S3858515

Andrew's career started out at a data centre, where he administrated the facilities access control and building management systems.

He successfully completed a certificate 4 in IT networking and a certificate 3 in electronics, he applied the knowledge he learnt by becoming a technical specialist for an electronic security company. He has worked in the field for 5 years, with his responsibilities and experience including fitting off field devices, running cables to programming advance access control systems, IP CCTV, biometrics and intercom systems.

One of Andrew's goals is to further his knowledge with cyber security - a career in cyber security is very interesting to him. Andrew brings an array of technical knowledge to Techstra-One, including IT networking, electronics and hardware, Linux based operating systems, SQL database management and cisco routing and switching.

2.1.4 Rebecca Barnett S3856827

Rebecca has been interested in Software & Website Development for many years, teaching herself how to code HTML in high school before choosing to commence a Bachelor of Technology degree after graduating.

Although her life took a different career path early on - working as a retail manager for fifteen years, Rebecca has always had a passion for technology and is excited to pursue new opportunities in Information Technology, hoping to work as part of a Software Development team in the future.

Rebecca enjoys the problem solving aspects of Information Technology and loves pursuing the “ah-ha!” moment of getting something difficult to work. Rebecca loves to break down problems into manageable parts and can spend endless time perfecting her work whether it is when coding or writing documentation.

Rebecca brings some project management and Java development experience to Techstra-One, which she acquired whilst studying for her Diploma of Information Technology and from a six month industry based scheduling software project. She considers herself excellent at documentation and enjoys producing reports and experimenting with data to create graphs and charts.

In her spare time Rebecca enjoys strategy games, reading and going for long drives with her husband David.

2.1.5 Adrian Foti S3857888

Adrian is an enthusiastic, hardworking individual recently obtaining his VCE certificate after completing year 12. Adrian was previously an apprentice Cabinet Maker where he acquired a Cert II in Furniture Making and is now a Building Construction worker looking to further his career.

Adrian's interest in IT began at a young age, experimenting with and tweaking Windows XP machines. Adrian developed a curiosity in how machines worked and how their output could be manipulated.

Adrian intends to learn the skills required to be part of a business ICT team and also programming skills that he can utilise in passion projects and as part of the Techstra-One team.

2.1.6 Adrian Ferrara S3856304

Adrian's interest in IT stems from a young age when his father brought home the first family PC in 1997. He found himself a natural at navigation and immediately was drawn to the world of video games. In his teenage years he spent a lot of time in music production using programs like FL Studio and Cubase as well as the introduction of the internet where he dabbled in HTML coding unknowingly thanks to MySpace.

He is currently enrolled in a Bachelor of Information Technology at RMIT University through OUA. He hopes to find his place in the world of IT by pursuing all aspects and finding a true passion. Adrian is driven to learn as much as possible about all things he takes interest in and has vast experience in retail sales as well as holding a 2nd degree black belt in taekwondo.

2.2 Team Personality Test Results

2.2.1 Myers Briggs

The Techstra-One team each took a Myers-Briggs Type Indicator test from the 16 Personalities website.

The Myers-Briggs Type Indicator tool was developed in the 1940's by Isabel Briggs Myers and was based off of C. G. Jung's psychological theories from the 1920's and attempts to make insights into peoples behaviours and personality traits.

Isabel Briggs Myers described sixteen types of personalities that every person could be categorized by. This Information is useful to a team as it can highlight areas of strengths and weaknesses and may provide insight into how the team will perform together.

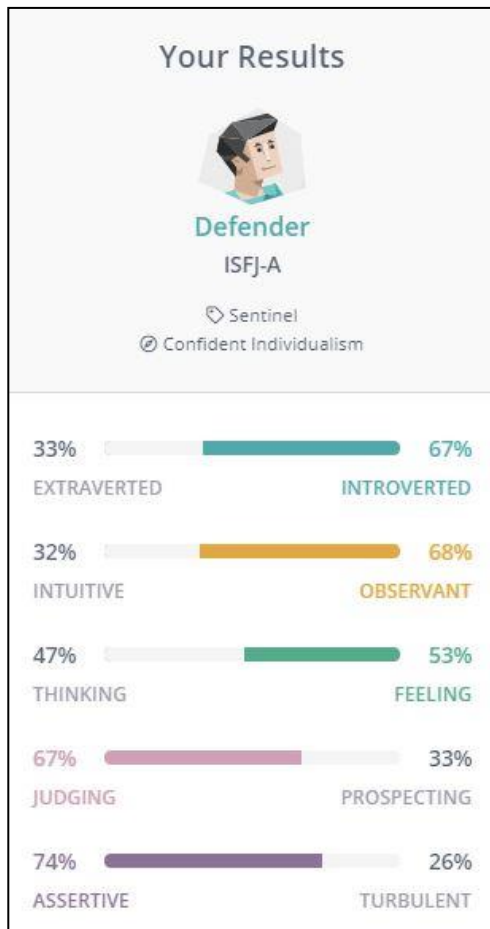


Figure 2.2.1.1: Timothy Hall: Defender

Benjamin McDonald ENFP - T

Ben is a Turbulent Campaigner (Figure 2.2.1.2) according to the Myers-Briggs test and means once he has his sight set on a goal nothing can stop him from achieving it.

Campaigners possess curiosity and energy that allow them to read between the lines and seek deeper meaning in what they encounter.

A weakness of a Campaigner may be that they may have poor practical skills relevant to what it is they wish to achieve.

Ben will be an asset to the team, possessing the drive to see the project's completion as well as helping the team to better understand what is required of them.

Timothy Hall ISFJ-A

Tim is an Assertive Defender (Figure 2.2.1.1) which is a character who is supportive, reliable and patient.

Defenders in general are often in the background of a team and get the jobs done that are allocated to them as well as often taking on extra work which is often a detriment to themselves but are happy to do it.

A weakness of a Defender may be that they take things too personally and may take criticism more harshly than it is intended.

Tim will be a solid foundation for the Techstra-One team to rely on, supporting the team with his strong work ethic and reliability.

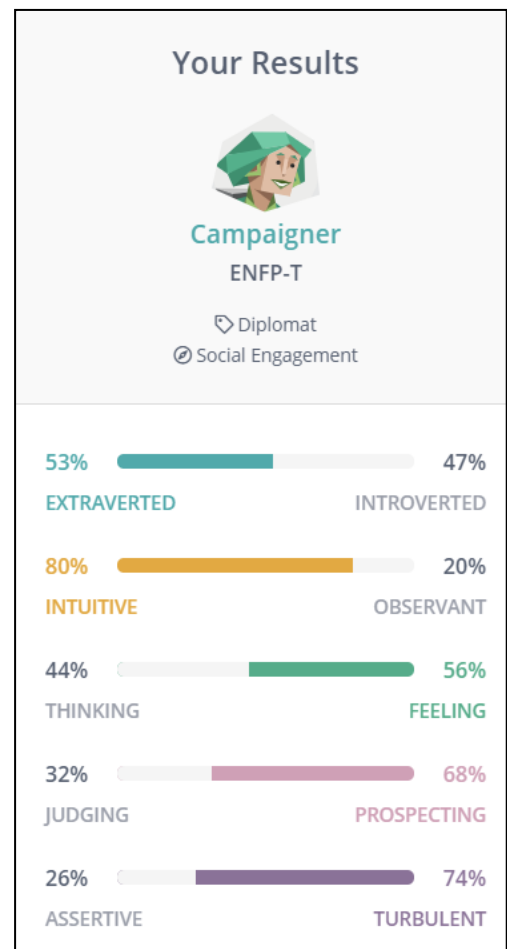


Figure 2.2.1.2: Benjamin McDonald: Campaigner

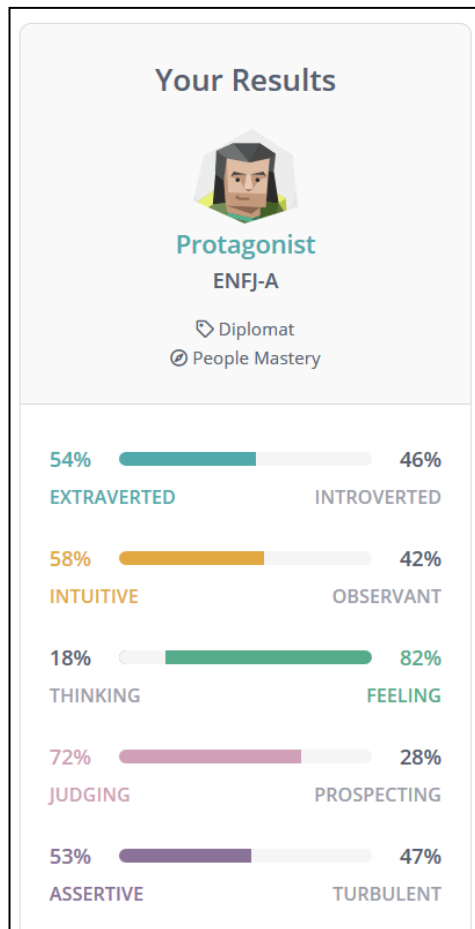


Figure 2.2.1.3: Andrew Wendt: Protagonist

Rebecca Barnett – INFJ - T

Rebecca is an Advocate type (figure 2.2.1.4), forming strong opinions about what she feels is the best way to proceed and also excelling at helping others to reach their potential.

A weakness of an Advocate may be that they can be sensitive when challenged or criticized.

In a group situation, Rebecca will bring out the best in her peers and approach tasks with a strong understanding of the requirements and possible solutions.

Andrew Wendt ENFJ - A

Andrew is labelled as a Protagonist (Figure 2.2.1.3) meaning he has a strong sense of feeling and judgement and is intuitive and altruistic. He is a believer of a strong team effort and prides himself in being reliable, tolerant and charismatic.

A weakness of a Protagonist may be that they can be perceived as being naïve.

Andrew will help to support the team in working better together and provide vision and guidance to seeing the team succeed.

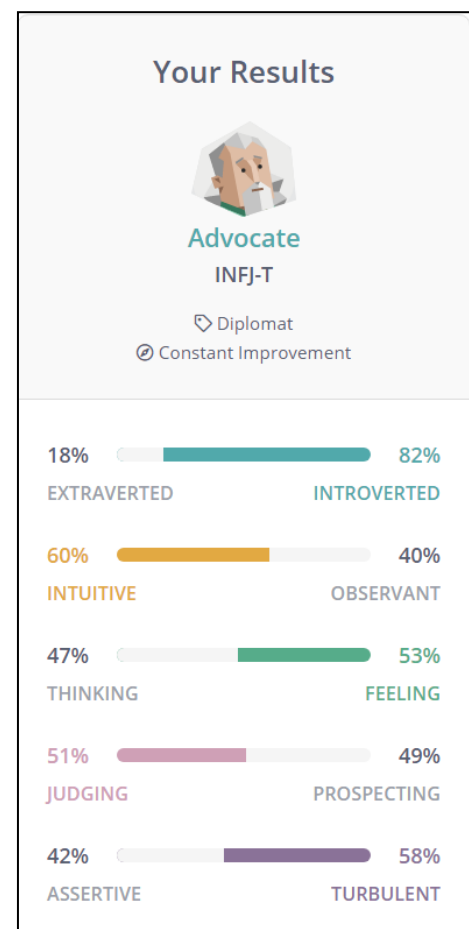


Figure 2.2.1.4: Rebecca Barnett: Advocate

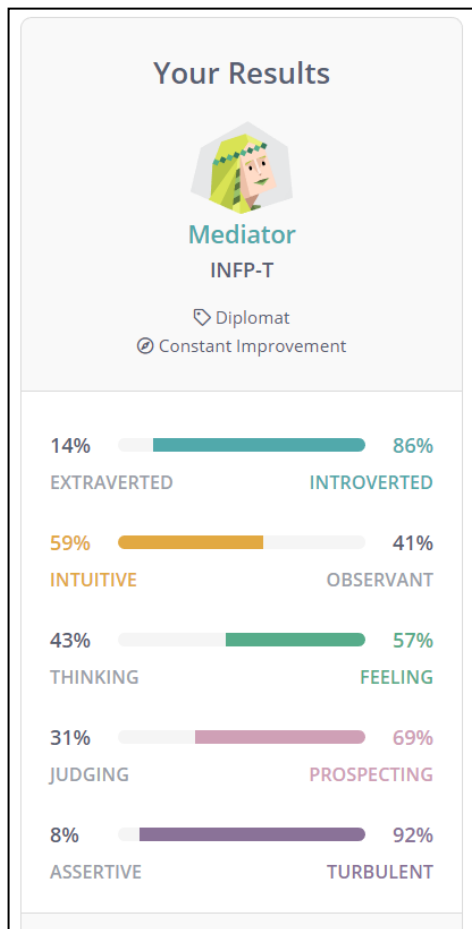


Figure 2.2.1.5: Adrian Foti: Mediator

Adrian Ferrara ENFP - T

Adrian is a Campaigner (Figure 2.2.1.6), identified as being approachable, enthusiastic and observant, not missing details that others may. Campaigners also possess the drive to see their ideas succeed.

Campaigners may lack the practical skills required for achieving what it is they set their sights on.

Campaigners are fantastic at motivating others and Adrian will be a good addition to any team as he can adapt easily and work well with anyone in the right circumstances.

Adrian Foti INFJ - T

Adrian is a Mediator (Figure 2.2.1.5) and possesses the introverted, intuitive, feeling and prospecting personality traits. Mediators are open-minded, caring and creative in their approach.

A weakness of a Mediator personality type may be that they can be too idealistic and too altruistic.

Adrian will bring creativity to the project team as well as an open-minded approach to completing tasks.

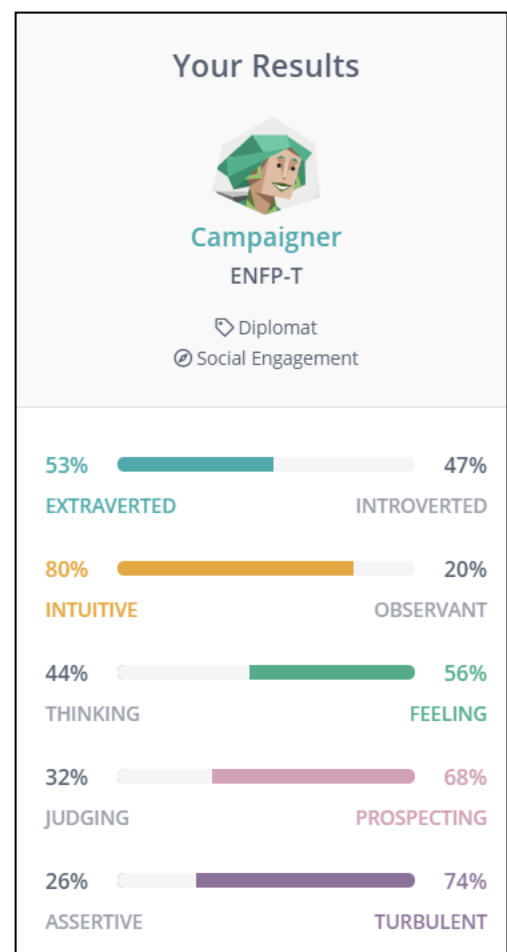


Figure 2.2.1.6: Adrian Ferrara: Campaigner

2.2.2 Learning Style

The team also each took a Learning Style test from EducationPlanner.org which reveals what style of learning each team member prefers and how they handle information and problem solve.

The three different learning styles include Visual, Auditory and Tactile and it is possible to have more than one preference.

Visual Learners prefer to see pictures or read in order to understand information and concepts.

Auditory style learners learn by listening and hearing and excel at remembering information that they have heard.

Tactile learners are “hands-on” and learn by touching and attempting what it is they are trying to learn.

Timothy Hall and Adrian Ferrara both identify as Auditory learners. Benjamin McDonald, Andrew Wendt, and Rebecca Barnett all identify as Visual/Tactile learners. Adrian Foti Identifies as a Visual learner. The results can be seen on the below chart: (Figure 2.2.2.1)

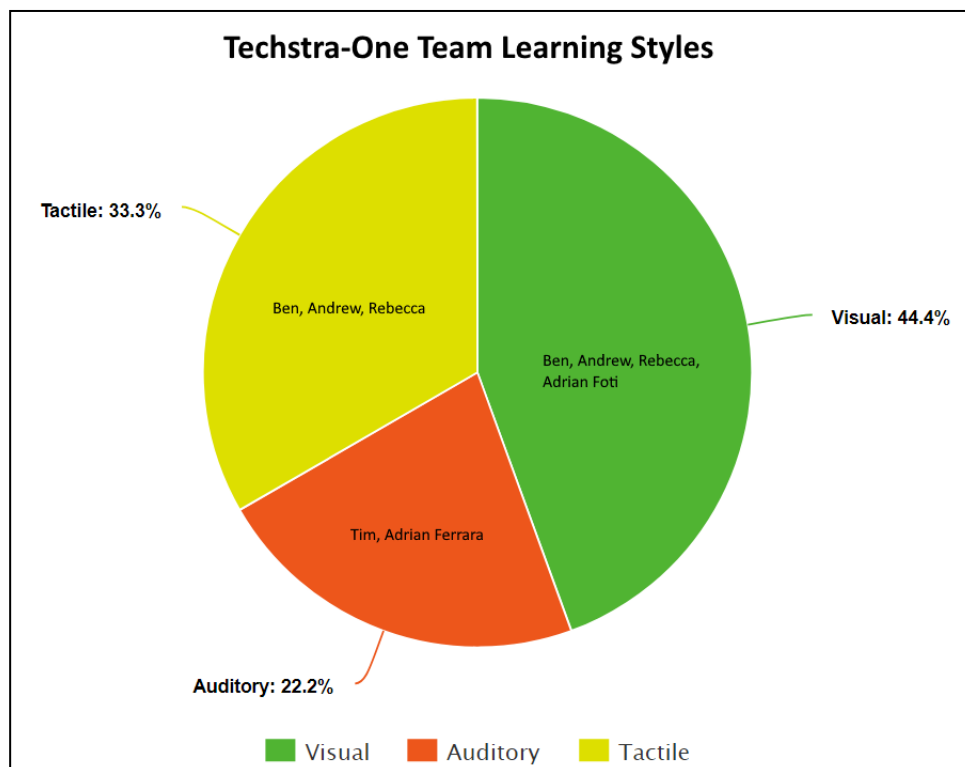


Figure 2.2.2.1:
Techstra-One Learning
Styles

Knowing what each team member prefers, it is apparent the most popular learning style is Visual and the team may benefit from sharing pictures and videos when discussing information.

Ideally, videos demonstrating concepts and discussing how it is done would be the best format as it would appeal to auditory style learners like Tim & Adrian Ferrara too. Ben, Andrew & Rebecca will also benefit from attempting tasks and getting “hands-on” with their project work.

2.2.3 Creativity

The last personality test the team did was a creativity test from Test My Creativity.

The metrics used to measure a person's creativity by this test include:

- **Abstraction:** Ability to abstract concepts from ideas.
- **Connection:** Ability to make connections between things with no apparent connections.
- **Perspective:** Ability to change one's perspective of a situation.
- **Curiosity:** Desire to improve and change things that are accepted as the norm.
- **Boldness:** Confidence to push boundaries beyond accepted conventions.
- **Paradox:** Ability to simultaneously accept and work with statements that are contradictory.
- **Complexity:** Ability to carry large quantities of information and manage it.
- **Persistence:** Ability to force oneself to keep trying.

Timothy's results show him as well rounded, possessing a creativity score of 58.08, and it is evident that Tim is not afraid of large quantities of information and is able to manipulate that information to his advantage. Not only is he able to work with this large amount of data he can simultaneously work with things that are contradictory to the norm to his advantage.

Benjamin has a creativity score of 64.9, with him having a high score in Boldness, Connection and Persistence. This means that Ben has the self-assurance to challenge perceived boundaries, find similarities in data sets and the persistence to see things through.

Andrew has the team's highest creativity score at 73.89 showing a strong result for Complexity, suggesting he has the ability to deal with lots of data and making it work for him.

Rebecca has a creativity score of 58.57, also showing fairly well rounded results although lacking slightly in Boldness. A weak score in Boldness might suggest Rebecca is against pushing boundaries and would likely stick to the norm.

Adrian Foti scores the lowest for Creativity with a result of 49.79. The areas in which he is lacking most is Persistence and Boldness. Like Rebecca, he might also stick to normal conventions and may be discouraged easily.

Adrian Ferrara also scores high in this test, with a result of 72.01. His stand out areas include Complexity, Paradox and Abstraction. This means Adrian is likely capable of simultaneously working with contradictory information and take away new concepts.

The results of the team's tests are displayed in Figure 2.2.3.1.

Figure 2.2.3.1: Team Creativity Results



2.3 Team Career Goals

2.3.1 Ideal Jobs

The Ideal jobs of the group have vast differences and contrast amongst each team member. Most members have chosen a career that can be achieved sometime in the near future following the end of their bachelor's degree or soon after. These positions would be a great start to anyone's career in the extensive world of Information Technology.

Timothy Hall – Senior Network Engineer

Timothy's Ideal job for the future would be a Senior Network Engineer at Fujitsu Located in Sydney. The job includes becoming a manager and become part of a group of network engineers to design and develop various network designs to meet the constraints of the employer. This would also entail passing on valuable knowledge to the team via mentoring and guiding and providing the team with seamless opportunity for professional development. This position will require prior experience such as

- CISCO CCNP Enterprise/Security, CISCO CCDE, CISCO VOIP services.
- 3-4 years working in ISP or corporate level network engineer roles in a various amount of positions.
- The ability to produce a variety of documents from high level technical documentation as well as more simple operating practices for users on various network topics.
- Understanding of virtualisation with Microsoft Hyper-V or VMware.
- High understanding of routing concepts including BGP and OSPF.
- Certification in current ITIL practices.
- Knowledge of satellite and cellular technologies.

A position like this is of high importance to the fundamentals of a workplace. This job can be very attractive to those who are looking to take charge of team and guide them in a direction toward success. This jobs wage is also around a median of \$106k in the state of Victoria.

Benjamin McDonald – Artificial Intelligence Architect/Software Engineer

Benjamin's Ideal job is to become a Software Engineer – Java Developer at VROC. This job involves plenty of teamwork working with a vast team of developers to improve their data processing framework to make use of the latest data programmes and technologies. This position would help the employee on how to overall improve extensive AI Technologies and would present great opportunity to develop and work with AI technology. The skills and prerequisites needed for this position are quite extensive in terms of experience and would be needed prior to applying for this job. These would include:

- Moderate skill and experience with JavaScript, TypeScript, REST, API design, Grafana Plugin Development as well as Angular.js
- Past experiences in coding and creating prototypes for different projects
- Working in a fast-paced environment.
- Have a decent understanding of current and upcoming trends across new fields for technology solutions in the big data and AI industries.

Benjamin McDonald (Continued)

This job can be appealing to a person who is looking to get into a very unique field of IT. This can keep the person very interested and engaged by learning the behaviour of AI and developing and maintaining certain projects. The salary included in this type of position is quite sustainable and appealing averaging at a median of \$78k-\$111k in and around Australia.

Andrew Wendt – Network Security Engineer

Andrew's ideal job would be a Network Security Engineer, working on the design of large networks with security as the priority. Andrew already possesses some Networking and Cisco qualifications and has some exposure to small and large infrastructure. A Network security position that Andrew is interested lists the following required skill set:

- Network Security
- Palo Alto Certification
- Linux Based Operating Systems
- Python for networks
- Virtualisation
- SQL Database Administration
- Azure applications
- Cloud based technologies

Rebecca Barnett – Software Developer

Rebecca's ideal job would be a full-time position on the Gold Coast. It would be to develop software for a company called In the Code Pty Ltd. They are offering a position for junior to intermediate software developers with ideally some experience in a MEAN stack development. However, this is not all necessary. This position will also require a great attitude with willingness to learn and develop your own skills as well. The skills and experience that would be needed for this position include:

- MEAN stack (JavaScript & Java)
- Native iOS (Objective C)
- Native Android (Java)
- Effective problem-solving skills.
- A great attitude towards tasks provided.
- A willingness to co-operate, listen and learn.

This position has its responsibilities such as completing tasks withing a time frame and sticking to specific deadlines, further testing on the existing projects and the ability to start on completely new range of projects also with respective due dates. This job may be very appealing to Rebecca because it could be both challenging and rewarding to be able to solve problems withing the set task. Also, the company In the Code Pty Ltd claims to be a relaxed and flexible work environment which can be essential when looking for a new job in the workforce. The salary of this position can also be appealing, its average being around \$100k per year being the most common salary in the state of Queensland in Australia.

Adrian Foti – IT Manager / Web Developer

Adrian Foti's ideal job is to gain a position as a web developer for Yet Fair Pty Ltd. This job includes the responsibility of web platforming that combines eCommerce and offline shopping experiences bridging the experiences of both the eCommerce world of online shopping and traditional retail throughout Victoria. The key responsibilities and experience needed for this position needed for this job consist of

- Undergraduate degree or diploma in IT and or equivalent education.
- Software development certification.
- Good knowledge of coding and programming concepts.
- Excellent documentation skills.
- Knowledge of Amazon Web Services & Data Analytics
- Understanding of CSS, HTML5 and JavaScript.
- Minimum 3 years' experience with software design.
- High end communication skills.

This job is a very rewarding experience and is a high paying position that would be in the interest of those looking to pursue a career in Information Technology. This however could be a difficult job in the workforce due to its high skill level. This position can pay on average approximately \$110k as the average salary in Victoria.

Adrian Ferrara – PHP Web Developer

Adrian Ferrara's Ideal job would be a full-time position as a PHP Web developer in South Melbourne Victoria. The company Divy Associates Pty Ltd. This job entails working with different departments of the business to help produce a website that is user friendly, efficient and attractive to the eye that can potentially build up a brand. To be eligible to apply for this job some extensive skill and prerequisites will be needed to ensure the skill required for the position will be met. These include:

- 4+ years of commercial experience.
- Knowledge of HTML5/CSS3/PHP.
- Skilled in JavaScript coding language.
- Various templating languages such as Twig, mustache or handlebars.
- Search engine optimisation skills.
- Understanding version control using Git.
- Effective communication and teamwork abilities

This job and be attractive to due to its high skill requirement and responsibility toward certain projects. This gives the employee a sense of accomplishment when completing a set task and being able to produce it visually for a particular product and or brand. The salary of this kind of position is also quite appealing to a person wanting to get into web development, paying upwards of \$61k-\$87k on average around Australia.

2.3.2 Overview of required skills

The ideal jobs among our group have plenty of similarities in the way that most of these positions require prior knowledge and high skill in coding such as JavaScript and CSS. Adrian Foti, Adrian Ferrara, Rebecca and Benjamin would all need to know the fundamentals of coding including the ability to comprehend and write the respective coding language to a high standard. All Ideal jobs have a similar pay grade the average being around the \$90-\$110k margin. Also, all jobs are to include the trait of good communication practices and the ability to work within a positive team-based environment.

There is plenty of difference in the jobs our group members are striving towards. This would include Benjamin's deep interest in Artificial Intelligence and the measurement of its behaviour. Tim's is interested in gaining a Senior Network management position and Andrew is interested in Network Security. These jobs are quite different to Adrian Ferrara's interest in web development positions and Rebecca's interest in a software development position.

Overall, the careers of our group members are quite vast with some choosing to focus on web development and others preferring the development of software. Developing moderate to high skill in coding languages would be ideal for most employers in the Information Technology industry.

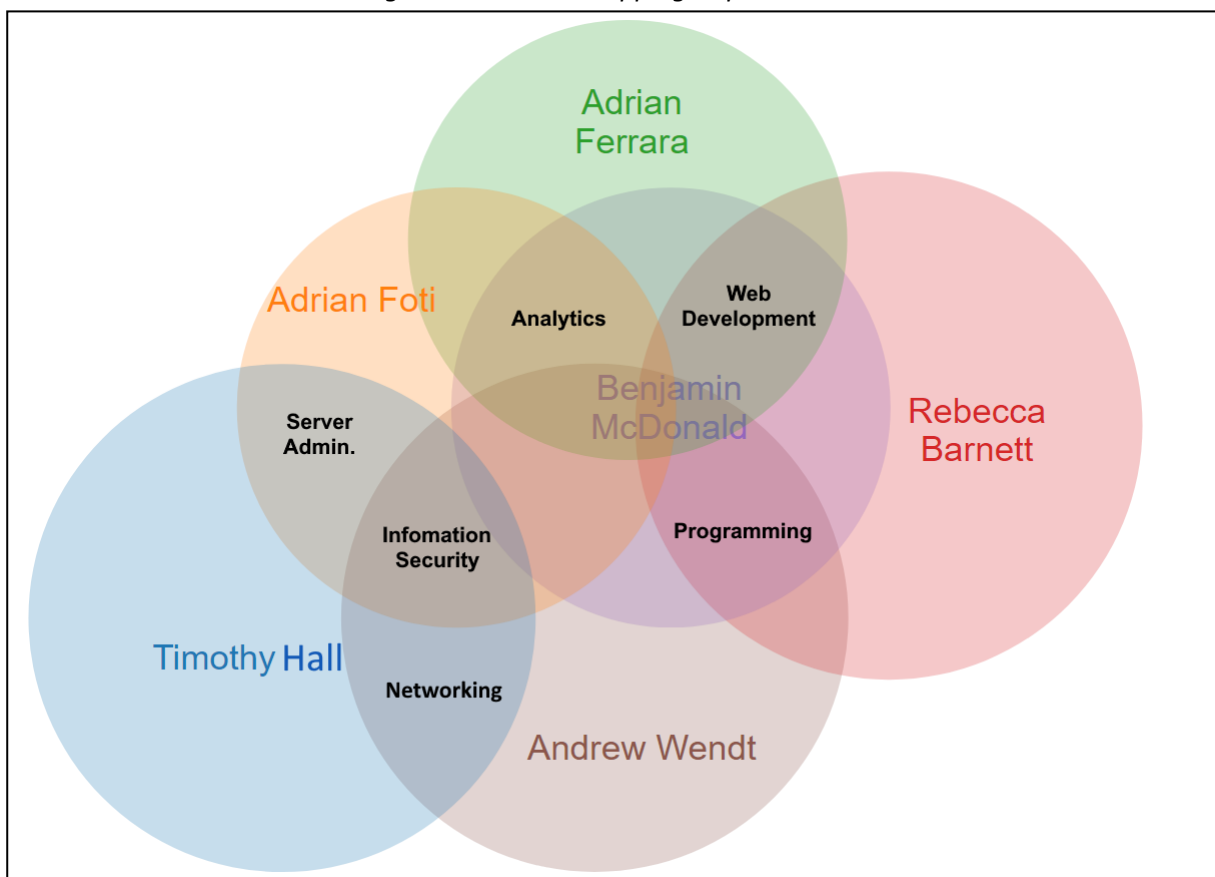
With the team having different passions for specialties such as the extensive and growing mystery behind Artificial intelligence, Networking and Security, Developing software or landing a management position shows just how vast the Information Technology sector is and the possibilities of career advancement is endless.

Categorising these skills that are required for each team member's ideal job into a broad collection of technologies, the following general areas can be identified:

- **Networking:** Timothy and Andrew both require Networking certifications and knowledge.
- **Information Security:** Timothy, Andrew and Adrian Foti all desire skills and knowledge in Information Security.
- **Server Administration:** Timothy and Adrian Foti will both require Server Administration knowledge and experience.
- **Data Analytics:** Adrian Foti, Adrian Ferrara and Ben all desire to learn data analytics.
- **Web Development:** Adrian Ferrara, Ben and Rebecca will all require web development skills in their chosen professions.
- **Programming & Software Development:** Ben, Rebecca and Andrew will all be required to learn programming languages and develop coding skills.

In the following diagram, it is possible to see the overlapping skills each team member is interested in. (Figure 2.3.2.1)

Figure 2.3.2.1: Overlapping required skills



2.3.3 Career Plans

The ideal job of each team member spans multiple fields of interest in information technology. Where Andrew and Timothy will require specialised certifications and qualifications in Networking such as CISCO recognition and Palo Alto certification for networking hardware and telecommunications equipment, Rebecca, Benjamin and Adrian Ferrara will need to focus on Software Development technologies and programming languages such as learning Java, Python as well as database languages such as SQL.

Many members of Techstra-One plan to learn the required skills for their ideal jobs during the course of the Bachelor of Information Technology degree studies.

Tim already has a lot of experience in many of his fields of interest, and is now seeking formal qualifications to solidify his knowledge and develop new skills.

Ben plans on perusing a Master's degree in Artificial Intelligence after completing his Bachelors.

Andrew intends to do work experience or an internship in Cyber Security after completing his Bachelor's in order to gain relevant experience.

Rebecca plans on continuing to build her project portfolio whilst completing her Bachelors and may look for relevant work experience when confident in her abilities.

Adrian Foti plans on applying for internships while completing his degree.

Adrian Ferrara plans on choosing relevant electives during the course of his Bachelors in order to develop website developing skills.

All team members hope to learn something relevant to their ideal careers during their project work with Techstra-One.

2.3.4 Industry Data Review

The team was provided data from Burning Glass Technologies which shows what job listings were posted in the Information Technology sector and what skills were in demand for a twelve month time period from March 2017 - March 2018. Comparing our ideal jobs against the data gave the team insight into how in-demand their desired career may be upon graduation as well as how relevant their skillset would be.

Timothy Hall

Looking at the IT data provided by Burning Glass Tim's ideal job of being a Senior Network Engineer is 20th on the list of top IT Job titles. While this position is networking heavy it often requires additional skills to supplement that position. Tim believes he will have to supplement his skillset with various virtualisation software/environments to provide a competitive edge.

When looking at the in-demand skills the following skills would be required or deemed beneficial ITIL, CISCO, Citrix and Hyper-V, ranking 21st, 27th, 78th, 164th respectively.

The following non-technical skill which would assist Tim's ideal job include Communication Skills, Problem Solving and Troubleshooting, these skills had a total of 72283 job offerings.

Reflecting on the above information and the Burning Glass data, Tim's opinion of his ideal job hasn't changed. While there was not a lot of Senior Network Engineer positions compared to the total jobs offered it is like other senior positions which requires a significant commitment to that profession. What this data does provide is that the experience that Tim will need to obtain through various positions to reach the level of Senior Network Engineer is possible as there are 15,554 network jobs offered which is 13.2% of the total jobs offered during the 2017-18 period. With this many job options across multiple network positions across a range of areas at different experience levels which will give Tim the breadth of experience required to increase his skillset.

Benjamin McDonald

The required IT specific skills for an artificial intelligence architect rank rather high in the desired skills on the burning glass report, the highest of which being Software engineering with 5852 job postings requiring this skill. JAVA, Python, and C++ also ranked high in the desired IT specific skills chart. This works out well for Ben plan as these skills will allow him to work in other and related IT fields while he completes his master's degree latter on. Working in other IT fields will give him the opportunity to learn and gain the experience needed to attain a career as an AI architect.

The general skills needed for an artificial intelligence architect rank a lot lower in the general skills report. The highest of which being big data which is around the mid-range of the graph with 1939 jobs requiring experience in this field. That being said, there is still lot of opportunity in this field. The rest of the general skills rank from mid-range to the lower end of the scale of desirability, though the lowest number of job postings for one of these skills was still relatively high with 954 jobs requiring skills in client-based relations.

The three highest ranked skills in both IT specific skills and general skills on the Burning glass report that are not part of Ben's required skills are SQL with 3570 job postings, JavaScript with 2946 and Microsoft Windows with 2699. The fact that these skills are at the top of the list for both reports indicates that they are of great importance in the IT industry. Thankfully these are all skills ben will be learning in his degree of Information Technology. Ben believes these skills will help toward his career goal in many ways, such as helping him attain a job once he finishes his degree.

Andrew Wendt

According to the burning glass data, some of the desired skills Andrew would like to possess are currently in high demand, his idea job as network security engineer requires knowledge in multiple fields in Information Technology. He believes that cyber security is quite broad and for his success he is highly interested in obtaining a broad knowledge base.

Andrew is also highly motivated to learn SQL Database Management, as this required skill continues to grow demand and is listed as the highest desired skill. Expanding his knowledge base will allow for flexibility and desirability for future employers. Andrew aims to continue his studies in all areas of Information technology that he has interests in. Some of these interests are Linux based operating systems, programming languages such as Python, C++, SQL, networking and virtualisation.

Rebecca Barnett

Reflecting on the Burning Glass data, which represents what required skills were listed for job postings for the twelve months between March 2017 to March 2018, it is obvious that Rebecca's desired career as a Software Developer has great job outlook as it is listed as the top occupation in Information Technology, and the 19th most common job title in the data set.

Rebecca's ideal job's skill set includes JavaScript, Java and Objective C which is the 2nd, 4th and 78th most in demand technical IT skills respectively with JavaScript having 15368 job listings in the twelve months studied. Non-technical skills of problem solving and time management ranking 2nd and 12th with problem solving being mentioned in 16445 job postings.

In-demand technical skills that are not a part of Rebecca's required skill set include SQL, Microsoft Windows and Microsoft C#, ranking 1st, 3rd and 5th respectively with SQL having 17570 job listings.

In-demand non-technical skills that are not listed in Rebecca's ideal jobs include Communication Skills, Organisational Skills and Writing with Communication Skills being mentioned in 44367 job listings.

After reviewing the data, Rebecca feels assured that her chosen career path will be in demand when she graduates. Rebecca thought it was interesting to see what other technical skills are in demand and recognises it will be beneficial to have knowledge in a wide variety of programming languages in order to appeal to employers, however specialising in a high demand skill such as SQL may be very advantageous.

Rebecca feels that during the course of her education and project work she will be able to develop many of the other technical skills that are in demand but not listed as a requirement for her ideal job such as experience with Microsoft Windows. The same applies for non-technical skills and Rebecca feels that communication, organisation and writing skills will be advantageous for any career and that these skills are already a part of Rebecca's repertoire.

Rebecca is still uncertain of what she might like her job title to be but knows that a career in Software Development is what she wants however it is a very wide field with many specialities as the Burning Glass data suggests.

Adrian Foti

Some key skills that would be in demand from Adrian's ideal job include communication skills, knowledge of JavaScript, CSS and HTML5. Communication and the ability to convey information is in the highest of demand among the industry by a fairly large margin. This is an essential part of all successful businesses and their direct practices.

Having exceptional knowledge of JavaScript is also in high demand for a business, this skill ranking second in the tested data. JavaScript is a first-class programming language used for most functions in web design and is one of the core languages alongside CSS and HTML5. It is high in demand due to it being an essential tool needed in higher end programming. HTML5 is reasonably low on the list of demand for a business ranking in the lower half of the demanded skills. This could be due to its simplicity over some other languages such as JavaScript which is decently more complex. The skills needed for Adrian's ideal job could be especially useful in the field of IT.

The three highest ranked IT skills not in Adrian's skill set according to the Burning Glass data would be SQL, Java and Microsoft Windows.

The Three highest ranked General skills not in Adrian's skill set needed according to the database would be writing skills, organisational skills and problem solving skills.

Regardless of demand, Adrian would still like to pursue his ideal job as a Web Developer and the demand for certain skills such as JavaScript and Communication skills would make them exceptionally beneficial to learn extensively to help aid in looking for a position in the workforce.

Adrian Ferrara

Adrian's opinion of his ideal job has changed after looking at the data in the Burning Glass reports. A PHP Developer is a lot less in demand than initially he had originally thought at 277 jobs, even though the most in demand skills are essentially everything a PHP Developer needs to know eg. JavaScript (2946) and SQL (3570)

This was very surprising as the skills Adrian would need to obtain can be utilised and transferred over to a lot more in demand jobs such as Front End Developer (738), Java Developer (713) and Web Developer (381). With that in mind, utilising SQL and JavaScript being the highest in demand skills to a more in demand role seems like a better long-term option. Adrian is also a creative type and would be suited for a Front End Developer role.

Team Ideal Job Title rankings

1. Software Developer - 19th - Rebecca Barnett
2. Senior Network Engineer - 20th - Timothy Hall
3. PHP Developer - 24th - Adrian Ferrara
4. Technical Architect - 95th - Benjamin McDonald
5. Network Security Engineer - 120th - Andrew Wendt
6. IT Operations Manager - 192nd - Adrian Foti

Team Skill Set rankings

Observing the top three in-demand skills for each team member's ideal job we can rank their required skill-set:

1. Rebecca Barnett (2. JavaScript, 2. Problem Solving (Non IT skill), 4. Java)
2. Andrew Wendt (1. SQL, 9. Linux, 20. Python)
3. Adrian Ferrara (2. JavaScript, 17. HTML5, 33. PHP)
4. Benjamin McDonald (4. Java, 20. Python, 33. PHP)
5. Timothy Hall (13. ITIL, 23. Cisco, 49. Network Engineering)
6. Adrian Foti (66. Business Intelligence, 73. Cyber Security, 95. Data Analytics)

2.3.5 Interview with an IT Professional.

Introduction

As an additional tool for analysing the relevance of our desired career goals, we were tasked with conducting an interview with an IT Professional.

It interests the team to learn about the ups and downs of what a career in IT might entail and speaking with industry professionals may influence each team member's decisions on what their ideal job may be.

Benjamin McDonald conducted the following interview with David Herod, a Software Development Manager who works for Aware 3, a company which provides IT services for Churches and Schools in the US. The company developed an application that organises group gatherings and events for the institutions that use it. David has worked in the IT industry for thirty years in many rolls - from data analyst to now managing a team of programmers. When asked, David was more than happy to answer any questions we had.

Interview with David Herod

Q. What company do you work for?

A. Aware 3, manage groups and connectivity in the church market. Fun fact, they started with restaurants and bands and then they just found a niche in the church market. They provide group activities through a mobile application that's available on both Android and IOS. The company I work for gains a 5% kick back on every dollar that's donated through the application.

Q. How long have you worked there?

A. I have been with aware 3 for 1 year and the parent company Nelnet for 2 years.

Q. What was your first IT job?

A. Fritolay research and development for 30 years.

Q. How did you get into the industry?

A. My boss needed some marketing analysis and I learned I could go into the mainframe and pull data down, and then I was just organizing that data into a spread sheet. That was really mundane and boring. Then I found out I could automate it through something called Macro's on an old program called Lotus 123. Then I extended that to my next thing when we moved to Colorado which was doing spread sheet analysis for an engineering firm. I took a recording of my spread sheet actions in Microsoft XL and I learned that the language that it was writing, how it interpreted my machine selections, followed a simple rule that was easy to read. It was in English, Visual Basic was the language. Then I learned I could manipulate it, replace it with more generic variables so that I could make it do more analysis for me, then that kind of kicked me off and launched me in to a career in IT.

Q. What made you want to get into IT?

A. I am smart but lazy and I wanted a way to exploit a mundane process to achieve my goals. I found that I could use a language to automate and do repetitive tasks pretty efficiently, and that is how it started.

Q. what kind of work do you do? What is your job title?

A. My technical expertise is as a full stack software developer, but in my thirty years in IT I have been a software developer for twenty-five years, and I have owned my own company where I did everything start to finish, analysing business requirements, designing the software, develop it then see it through to a production environment where it is used fully. That's how I spent half of my career. The other half of my career I have spent focused on one or more of those disciplines.

My current roll is I am acting as a software development manager. I organise teams that do all of the various stages of software development

Q. What kind of people do you interact with? Are there other IT professionals, clients, investors, general public?

A. In my case we have business analysts that work as an interface between us and the actual public. Also the product owners (clients) who define what we do to deliver a software product, which is great because that keeps us from having to talk to the public.

Q. Where do you spend most of your time?

A. I am 100% remote from home. My corporate office is in Kansas City and what's really neat is that about half of us are located in Kansas and the rest of us are all over the country so we're coast to coast all over the US.

Q. What aspect of your position is the most challenging?

A. For me the greatest challenge is that I had to learn a completely new language. I was trying to find everything that resembled a pattern in languages I already know and it turned out there were a lot of aspects in this new language PHP that I knew really well. What is always fun and interesting is learning the business nuance of the different companies.

Q. How did you get in to this position?

A. So I am with the company Aware 3. That company was acquired by my company, which is a larger, multi-billion dollar company called Nelnet. Nelnet made their money through providing student loans. I have been with them two years and I jumped over with this company a year ago. So I brought with me another vertical for them to acquire which was schools. I brought a program that would bring one thousand churches and schools as clients over to this new platform Aware 3. Each school has an average of about ten thousand people. Every donator donates an average of three hundred dollars each year. We get 5% of each donation, so it is a very large segment of business we are providing. There were a new set of requirements that managing a school organization brought and I happened to know all of those. So I brought this inherit business knowledge across with me and translated it in to this new company.

Q. How does your job measure progression/up scaling?

A. We have a simple spread sheet of what the rolls are and the different levels of software developer. It is really based on people who have the right skills for the job based on the project. The person in the management roll, in this case me decides when a person is ready to move up based on their work.

Q. Is there any in house training offered to employees so that they can progress in the company?

A. We promote external training but leave it to the individual to create improvement plans, whether through continuing education or online learning. We have online accounts for Plurinsight.com and safari, I use these resources myself. The company does have a fund for reimbursement of continuing education but it is not yet at the level I would like to see.

Q. How do you find working remotely, is it easy enough to collaborate with your team to ensure work is getting done? Do you use a platform like GitHub to track progress and changes to the program?

A. Working remotely is successful due to the tools we use to collaborate. Slack, Zoom, Webex for face to face meetings, screen sharing, remote control, pair coding, all embraced by Aware 3. We use Jira (Atlassian) for project management, ticketing and tracking our efforts, through a novel mixture of agile practices (Scrum and Kanban). We use Git hub as our source code repository for our half a dozen code bases.

Conclusions

This interview was very informative to the team. It is interesting to hear about the ins and outs of the programming field. It sounds like David got his start as a programmer doing what many of us enjoy, automating processes to make life easier. It also sounds very lucrative being able to charge a commission for each client brought to the platform.

The biggest challenge of his work according to David is constantly having to update his skills and learn new technologies in order to stay relevant and on top of trends. This means it is important as an IT professional to be constantly learning and adapting to the requirements of industry.

There are many tools used by David that allow him to work remotely not unlike the tools the team is using to collaborate on Techstra-One. David collaborates regularly with his team and clients using those tools including Git hub for their code repository – this allows David's team the freedom to work effectively together while never actually being in the same building.

3. Project Tools

Team Website

Techstra One's webpage is hosted on GitHub pages and can be found [here](#). This page will be the main front of the project which is developing our collectable trading software. At present it has a basic breakdown of what the project is as well as a profile page of all the members who make up part of the Techstra One team along with their individual webpages.

GitHub

To host the website files and pages GitHub was chosen to be our repository. As it has inherent integration with GitHub Pages and the fact that it was a simple and easy product for the team to use.

From an early point Tim was the only one who was using the repository as he was the one creating the webpage but as you can see in the below image (figure 3.2.1.1) he (Bugzy088) wasn't the only one to use it.

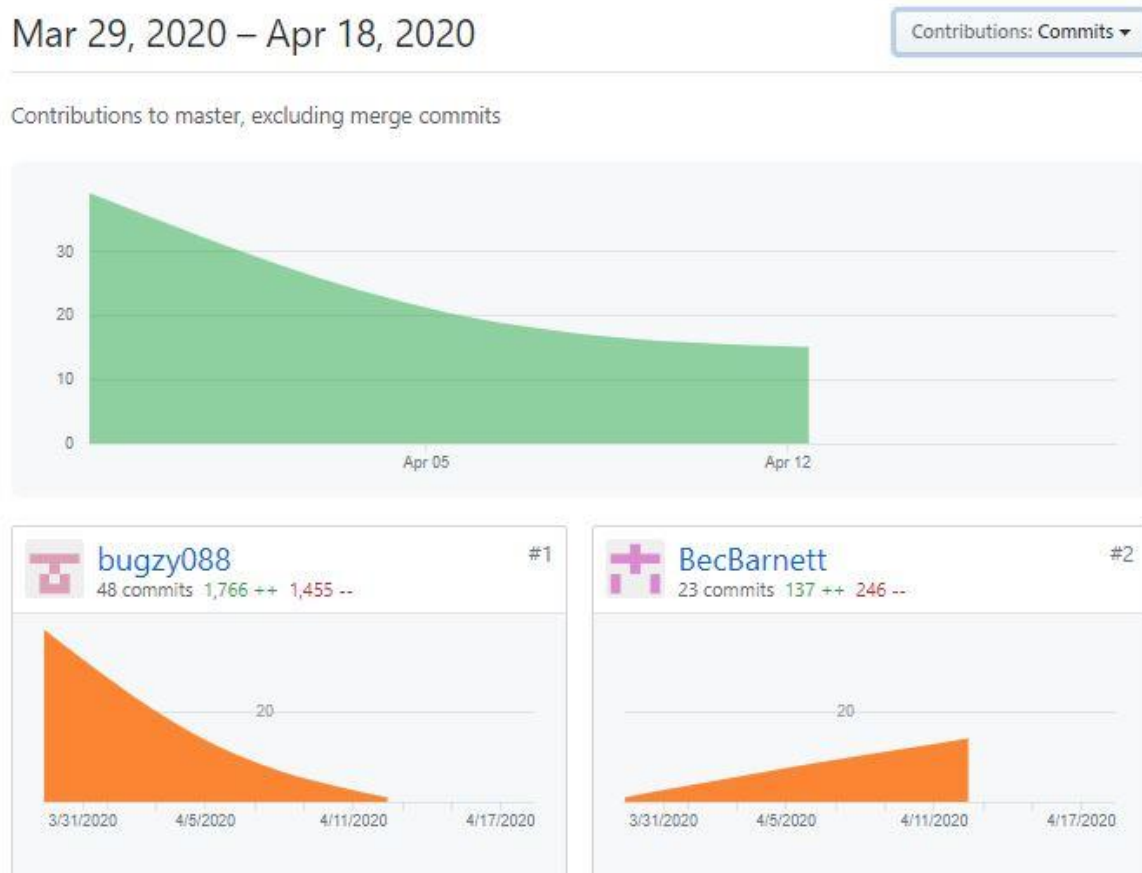


Figure 3.2.1.1 – GitHub Contributions

Canvas

To form the team for this group RMIT's Canvas was used initially to setup the team. However, due to Canvas' limited communication features and file sharing the team decided to move to Microsoft Teams for all future collaboration on this project.

Microsoft Teams

Microsoft Teams was our primary collaboration tool. We used it extensively for its chat, file sharing and conferencing features. Most of the discussion was done in the 'Chat' feature with individual posting their own files (seen in figure 3.3.1.1) to the A2 Report and Website Team pages as required depending on what we were discussing or sharing.

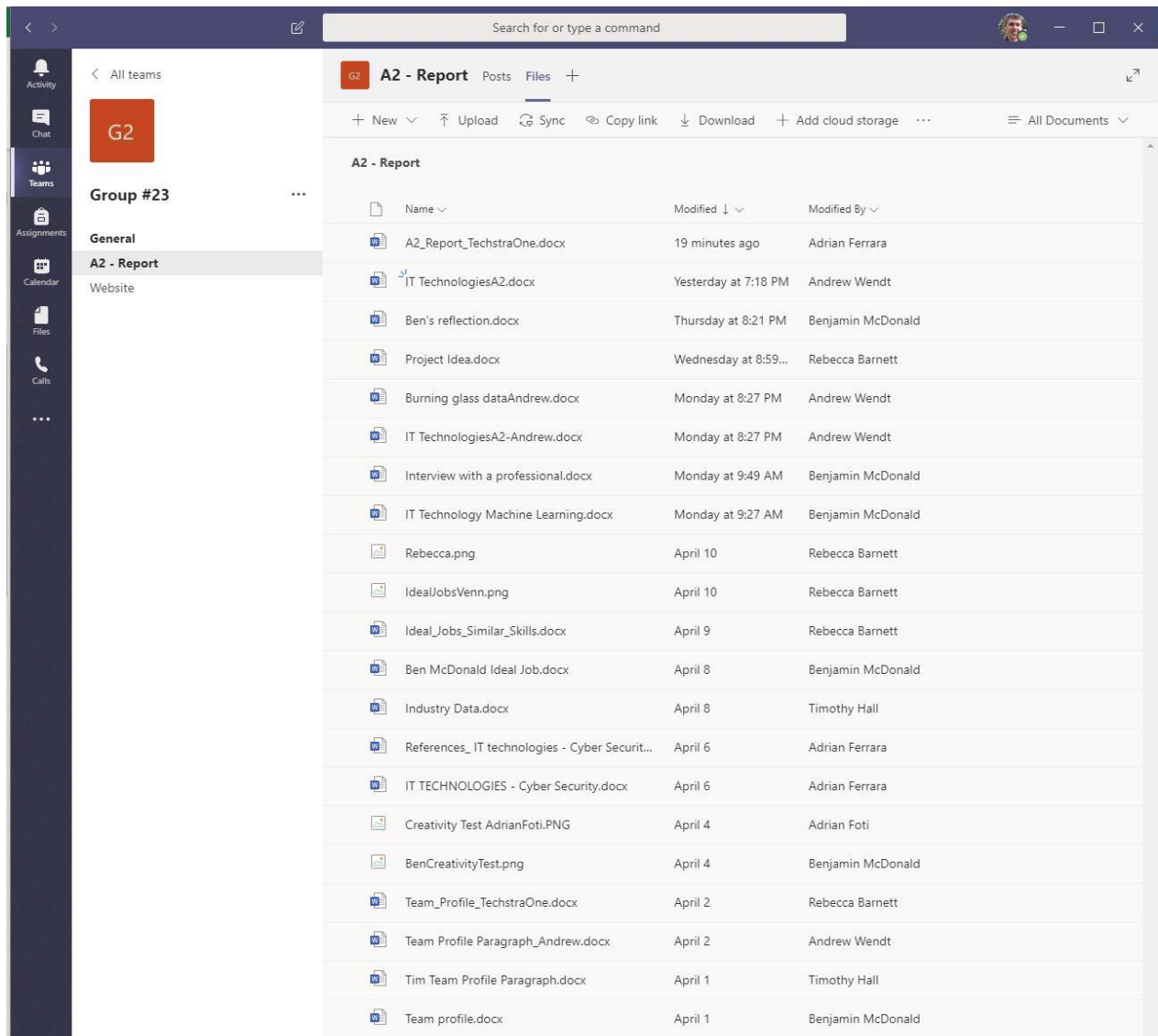


Figure 3.4.1.1 – MS Teams Contributions

Overview of Project Tools

Looking over the past 3 weeks with how the group has interacted with each other using the various tools mentioned above, there are definitely some things we have done well and some areas that need to be improved on for future work.

The things we have done well were deciding to move on from using Canvas early on and moving to Microsoft Teams as it is a better collaboration tool, as it has integration with nearly all the Microsoft Office applications. Not only has that, but it all so file sharing with version control via SharePoint and conferencing capabilities.

Areas that we need to improve on for future work is that we need to use version control to our advantage. While Microsoft Team's does have the feature through SharePoint everyone in the team just ended uploading their individual files instead of just updating one parent document. Rebecca moved away from Microsoft Teams for updating files to GitHub as the version control seems easier as she has used it before. The other problem was that Microsoft Teams was new to some people so they did not know that they could do this.

As a team moving forward on future work, we need to help each other reduce the workload by working smarter by using one parent document. Also, if there is some education that needs to be passed on to those that do not know, then we must take the time to teach them which will benefit all of use in the long run.

4. IT Technologies

The team researched four different technologies that were of interest to them, perhaps for use in the project or in our future work.

4.1 Cyber Security

With the IoT (Internet of Things) becoming more prominent in everyday life, it is becoming more and more important to secure these types of devices which are generally left vulnerable and easy to hack. These devices may be running on unpatched software, are misconfigured or use unsecured communication protocols.

Check Point Software Technologies has recently released IoT Security offering a cyber-security solution for different IoT environments using components provided by Check Point, including Check Point Security Management, Checkpoint Security Gateways, IoT Discovery Engine (using third party partners) and IoT Nano agent.

The solution has three capabilities, the first being IoT Risk Analysis.

IoT Risk Analysis continuously performs risk analysis of the IoT environment and can provide details of devices on the network based on their risk level but can also be utilised for risk analysis on a certain device. It integrates with third party IoT discovery platforms and auto-identifies devices, tags them and analyses their behaviour in real time to detect anomalies. It can also perform Firmware Risk Assessments to expose security flaws of every connected device such as; weak credentials, known vulnerabilities, suspicious listed domains and hardcoded security flaws like OS misconfiguration. It can also identify IoT specific threat trends and malicious patterns via Check Point's ThreatCloud which collates threat indicators from 100 Million gateways, endpoints and IoT devices worldwide.

The second capability is Auto-Segmentation.

Auto-Segmentation uses data from the IoT risk analysis to automatically generate and enforce a policy for each connected device which saves time from manually configuring policies and ensures the devices are protected as soon as they connect to the network. The auto-generated policies minimise IoT attack surfaces by allowing only authorized access to and from IoT devices and ensures devices only use protocols they were designed to use. These policies are adaptive to changes in devices' attributes, risk level and behaviour but can also be manually modified within the Check Point Security Management console in a separate policy management layer to avoid confusion and conflicts with the auto-generated policies. The third capability is Threat Prevention.

Threat Prevention uses data from the IoT risk analysis to automatically activate security protections against known and Zero-day IoT related attacks at both a network and device level. It uses on-device runtime protection to monitor behaviour of devices and blocks known and unknown attacks before the device is compromised. It can also protect unpatched devices from known exploits by utilising virtual patching by installing appropriate IPS signatures on the gateways. This allows protection against unpatched devices or devices using old operating systems and software without disturbing critical processes and operations.

This software is based on previous network monitoring tools such as Wireshark and Splunk as well as Metasploit Framework to find exploits to protect against.

Some of the future applications of this technology could include native security policies installed on the IoT hardware making the software even more accessible. The risk analysis protocols could be

installed on the IoT hardware from manufacturing to give users more peace of mind when buying a device without concern that it is easily exploited. It also has the potential to be used for government and military applications. Especially as 5G networks are rolling out making data transfer quicker, this software can be used in conjunction with cyber security experts to decrease workload on producing new security policies for connected devices.

This type of technology is helping to keep a secure connection to devices and maintaining those devices to act and behave in the way they do. This technology could allow more things to be automated as IoTs become more prominent in daily life. Coupled with developments in A.I and machine learning the technology has the potential to save time and money by reading and learning unstructured data and protecting devices that would need to be manually protected by a human or a team of cyber security specialists. This outcome would result in making fewer jobs available in the cyber security field when AI becomes more cognitive and can make better and more human decisions. Companies would benefit greatly by having effective protections on their devices and ensuring that the devices connected are doing the job they are supposed to as well as effectively analysing if a certain device is at risk. If new devices are purchased by the company they can be added to the network immediately with no need to add security policies and will be constantly monitored and analysed from the start. If the company owns devices that are no longer being patched by the manufacturer then the technology will create its own patches for it ensuring that it remains protected from potential attacks.

In daily life this technology may change the outlook of automated living and create risk free environments to make life more efficient and easier. People would no longer have to worry about their devices becoming compromised as they are constantly being analysed to find potential flaws and security risks. If this technology was more available on a consumer level, people would be more willing to add IoT devices to their network, most people are generally concerned with vulnerabilities in the device themselves, data leakage, access control and asset management. If these issues are addressed from the moment the devices are packaged, people would understand that the device is completely secure and will be continually analysed to remain secure throughout the entire time it is connected to their network. IoT devices collect data such as location, status and automation. This makes people reluctant to purchase IoT devices as the data is stored in a potentially insecure way. This would provide peace of mind that one's personal privacy is protected and attacks on that data would be stopped. Ultimately it would create a safer more secure device with no stress about keeping personal information and data on that device. It would decrease the amount of potential attacks that can be made to compromise that data. It would ensure that the device is up to date with the latest ways attackers can penetrate and stop the attacks in its tracks.

4.2 Machine Learning

Introduction

Artificial intelligence has become a big part of everyday life. Siri sorts out our calendar and reminds us about appointments, Alexa orders online purchases and plays our favourite party mix, businesses send out personalised catalogues based off your previous purchases and search history. All of these technologies are the result of advances in artificial intelligence. Of course none of these technologies would be possible without three key components, Data mining, Deep learning and machine learning. In this report we will be exploring Machine learning, the latest technologies based around machine learning and the future impact that machine learning could have on our society.

What is Machine learning?

What is machine learning? Machine learning is a method of data analysis. This method of analysis allows systems to learn and improve from experience without having to be constantly reprogrammed by a human. But how does machine learning work? Machine learning uses an algorithm to look for and learn from patterns in data. The aim is to allow computers to learn automatically without human intervention. There are four main categories of algorithm that are used in machine learning. They include the following;

Supervised algorithms: Uses labelled examples to learn (e.g. an input with a known output). This data is then used to predict what future output values will be. After enough training the algorithm will be able to determine the target for inputs by comparing with the previous inputs with known outputs that it has gathered. Supervised algorithms are commonly used where past data predicts future events such as consumer patterns, or fraudulent behaviour with banking.

Unsupervised algorithms: Uses unlabelled data to train the algorithm. As the algorithm only uses unlabelled data, it has no examples to compare with new data. The reason for this is not to solve the problem but to find some structure inside the data.

Semi-supervised algorithms: Uses both labelled and unlabelled data to train the algorithm. This algorithm usually uses a small amount of labelled data and a large amount of unlabelled data. Semi-supervised algorithms can be used as an alternative to supervised algorithms. As semi-supervised algorithms use a large amount of unlabelled data and only a small amount of labelled data, this method works out cheaper than supervised algorithms in most cases.

Reinforced algorithms: Uses more of a trial and error method to find the best way to learn and improve. There are three main components involved in reinforced algorithms, the agent (the decision maker), the environment (everything the agent interacts with), and actions (what the agent can do). The idea is to have the agent choose the actions that achieve the greatest reward. Reinforced algorithms are commonly used in navigation, robotics and games.

The latest machine learning technology

As mentioned earlier, machine learning has become a part of everyday life. Some examples of this include household chat bots such as Amazon's Alexa or Apple's Siri are virtual assistants. They can help you by setting reminders, adding items to lists, playing your favourite music or video, searching the internet for any information you may need, and many more helpful tasks. Not only can chat bots perform tasks but they can also find patterns in your request and customize settings as a result. One of the great things about chat bots is they are voice activated and can easily understand anything you ask them.

Google's self-driving car is an amazing example of machine learning. This car is equipped with an arsenal of sensors such as sonar, radar, GPS, and lasers to help it determine distance from pedestrians and other vehicles, read road signs and traffic lights, and just keep everyone safe in general. Of course none of these features would be useful if it wasn't for the autonomous cars ability to put this information to use. Through machine learning and AI technology, this car has been taught to identify potential hazards and read signs to abide by road rules. Not only that but this car can follow the navigation settings to get you where you need to go.

With the leaps and bounds in technology that have involved machine learning and artificial intelligence, the future is looking like something out of a science fiction movie. There are labs around the world working on robot's that can mimic human behaviour such as Sophia, who is one of the world's most sophisticated humanoid robots to date. Created by Hong Kong company Hanson

Robotics, Sophia has an advanced neural network that lets her discern someone's emotions from their tone of voice and facial expression as well as react to it. Sophia is still a long way from being completely mistaken for human; however she is definitely a sign of the exciting breakthroughs to come.

The impact of Machine learning

As discussed, future breakthroughs in machine learning could lead to some exciting advances in current and future technology. However, it could also lead to some serious issues as well. Let us look at some of the good and bad possibilities of machine learning in regards to Future advancements.

Good: Self-driving and semi-self-driving cars once perfected could lower the road death toll substantially. Drunk and under the influence driving could be almost eliminated as the car will not be operated by a human. That being said, I am sure there will still be some form of limitation on the consumption of alcohol as the driver may need to take control if something goes wrong. There will also be fewer accidents as a result of speeding and not paying attention to the road.

AI in the workplace will be able to further increase the security and productivity of companies around the world. Over the past decade we have seen the growth of artificial intelligence in big firms around the globe. The AI is mainly used for sorting through data and improving the way a company operates based on the results. AI is also a big part of security, helping to keep hackers from attaining important or harmful information. In future years we could see artificial intelligence play a much bigger role in the workplace - from helping a customer in a more understanding way, to performing surgery with a more effective and precise method that only an AI could do.

Bad: Redundant jobs and retraining staff will undoubtedly be more of a problem as artificial intelligence takes on a bigger role in the workplace. This has already been seen in China with fully automated factories becoming cheaper to run than a factory full of paid workers. A McKinsey Global institute study of eight hundred occupations in nearly fifty countries showed that nearly eight hundred million jobs or twenty percent of the global workforce could be replaced by AI and robotics by 2030. This could be one of the biggest issues regarding machine learning in the future.

How will this affect you?

We believe this will improve a lot of things for a lot of people in the long run. There will initially be some loss of jobs as well as some other problems that will need to be ironed out. However the evolution of machine learning, AI and robotics will undoubtedly create more jobs and education opportunities. The end result could be a highly advanced society, with improved living conditions and more time to live and be with family. Of course there is the other opinion that we could destroy our self with this technology that still loom's in the shadows. However we have had the power to do so for almost a century and yet we still exist. There is no doubt that it could happen, but when you think about the possibilities how could we not pursue this future. Machine learning is a huge technological advancement any way you look at it, and the lives it could improve and even save are countless.

4.3 Robotic Prosthetics

Introduction

As prosthetics have continued to evolve over time in the last twenty years, Robotic Prosthetics have come a long way from their non-robotic cousins. Robotic prosthetics are an artificial limb that is computer controlled through various sensors to give the wearer the ability to have more control in the limb and thus have more mobility. While there are many types of Robotic Prosthetics out there this article will focus on lower leg prosthetics.

For people which require a lower leg prosthetic the most common type of prosthetic that is available right now is a non-robotic prosthetic. These use a range of materials from metals, carbon fibre and plastics to fashion a device that gives the wearer some restricted movement back. Currently there are several state-of-the-art robotic lower leg prostheses like the PowerFoot BiOM and Springactive Ankle. Both of these prostheses are similar in design and I'll discuss how the PowerFoot BiOM works below.



Figure 4.3.1: PowerFoot BiOM

What does it do?

The PowerFoot BiOM (Figure 4.3.1) works by providing ankle movement that mimics its biological counterpart. It does this using a custom-made carbon spring motor to apply additional force (like a calf muscle and Achilles tendon) and robotics. The robotics in the prosthetic has 3 microprocessors which use inputs from a range of sensors that measure the foot's position, speed, the amount of force applied to the heel and acceleration. With this information the proprietary algorithm determines how much force is to be applied to the carbon spring when it strikes the ground. It is this force that catapults a person forward with each and every step.

The other part of this prosthesis is how it interacts with the wearer's nervous system. It does this using myoelectric control. This is where we use the existing electrical signals from the wearer's muscles from the residual limb to provide additional data to the algorithm. When the wearer thinks about walking that electrical signal from the nervous system is interpreted by the algorithm and can move the foot on its own. While it is good that we can still get the brain to move these prostheses the wearer does not have a sense of feeling from them.

The next step to make Robotic Prosthetics close to their biological counterpart is to close out the feedback loop. Currently we can get the mind to control prosthetics by means of myoelectric control, but we unfortunately cannot get the mind to receive the feedback in the sense of touch or force. Currently there is research in this field to provide this feedback back to the user to assist with walking more comfortably and in a hope to reduce phantom pain that many amputees have. The way this works is the same as myoelectric control using existing nerves to send electrical signals back to the brain. While it may seem easy enough to do the problem lies in knowing what type of electrical signal to send to the nerves, so the brain interprets it for the correct feeling. The research that is being done is looking promising however further in-home studies are needed to refine the technology.

To make these prosthetics there are numerous technological advancements which have made them possible. With the manufacturing of such items none would be more prevalent as in 3d printing.

3d printing gives many people the easy capability to design and 'print' items at a relatively small cost compared to getting a company to make them. On the robotics side is the invention of the microprocessor and its ability to process information at a substantial rate is what enables all of the sensors and motor to work to provide the wearer the ability to move with this prosthetic.

Impact of Robotic Prosthetics

With the addition of robotics to prosthetics the impact they have on people's lives is tremendous. Having gone from a static prosthesis that just looks like a foot or an arm to one that can actually move and be used has had a profound impact on the wearer's life. Take a low leg amputee for example; having a PowerFoot BiOM would not only restore their ability to walk but it would do it in a way which would mimic their natural foot. In the near future not only would it give them back their mobility, but it would also feel like their foot once the research and development on closing the feedback loop is complete.

While everyone with a missing limb could benefit from having a Robotic Prosthetic, it would be the people who are either full leg or full arm amputees who would benefit from these the most. This is because there is more use from having a Robotic Prosthetic than say someone with a low leg prosthetic due to the amount independence it could give them back. No longer will someone have to rely on someone else for the basic tasks as they will have their independence back.

With Robotic Prosthetics it will create new jobs and technologies for many years to come. It will do this with on-going research into Robotic Prosthetics to make them easier to control and more like their biological counterparts. Also, the manufacturing methods will improve over time due to technological improvements with how materials are made for these prosthetics. While Robotic Prosthetics are expensive with the technological advancements we have had (3d printing for example) it will reduce the manufacture cost so more people will be able to have these superior prosthetics and will make the old non robotic prosthetics redundant.

How will this affect you?

If you were to be missing your lower leg and using a non-robotic prosthetic, moving to a robotic prosthetic would have a profound effect on your wellbeing. With the advantages that the PowerFoot BiOM provides through being able to be controlled with your mind and the advance sensors assisting with movement, it would take some of the struggle out of daily life. Also having only one prosthetic to do all tasks (walking/running) would be a relief as you don't have to change out your prosthetic to meet your needs.

The biggest difference between using a Robotic Prosthetic vs. a non-Robotic prosthesis would be how much more functionality it would bring to your daily life. Walking in general would not be tiresome nor painful because the Robotic Prosthetic would aid in moving forward similar to how a normal foot, ankle and calf muscles does. Furthermore, with its ability to automatically decide how much torque to apply would mean you would no longer have to consciously decide on what surface you walk on. As the technology develops it will only become more like their biological counterparts and at some stage may even surpass it terms of efficiency, strength and speed.

With the use of Robotic Prosthetics, the effect of having one of these devices over a non-robotic one would as previously mentioned give back independence. If we look at someone who is missing an arm and has a Robotic Prosthesis, it will enable them to be self-sufficient and wouldn't make them a burden on their friends and family. Family and friends wouldn't have to worry about the person with the missing limb as much and you would be able to do most things for yourself once again.

4.4 The Cloud

Introduction

Cloud computing dates as far back as 1960s, back then the technology was called 'cloud networking' recently the technology has skyrocketed with popularity and demand, this is due to many major technological advancements that have progressed in the last two decades and more so in the last decade. In the modern era of cloud computing the technology made its mark in the early 2000s, with amazon and Google services setting the precedent for many others.

What is Cloud Based Technology?

Cloud technology is a network of remote servers connected by the internet, to provide end users and businesses the ability to manage data remotely from anywhere in the world. The data that can be stored on the cloud is limitless, some well-known examples are social media applications, such as Facebook, Instagram, Twitter and YouTube, some other well-known examples are Dropbox, OneDrive and streaming services such as Netflix and Stan. These businesses heavily rely on cloud-based technology for their global reach, and success.

It is not just social media or streaming services that heavily rely on cloud-based technologies, small to large businesses are starting to use cloud-based technology for a magnitude of reasons. An average office space could use a pool of virtual resources to replace the need for bulky power draining desktops. A typical office worker could conduct their work by using a 'thin client session' to establish a remote connection to an offsite data centre.

Data centres can provide a virtual pool of remote shared resources, such as database systems, virtual machines and storage and networking systems. Cloud technology opens the doors for easily centralised IT infrastructure, scalability for business growth, savings in IT infrastructure and the ability to minimise on-going costs such as sustainment of hardware and building costs such as electricity and cooling.

What can be done now?

The growth of cloud based services in 2020 according to Forbes is expected to net approximately \$411 billion US dollars, that sum is larger than the GDP's of some countries around the world.

In some form or another all the world's continents (including Antarctica) have some connection to cloud-based technology. If someone created a network diagram of how cloud-based technology is connected all around the world it would look like a messy cloud, hence the name.

With cloud technologies in every continent around world the demand and growth has dramatically increased. Now everyone can connect something to the cloud, whether it is a smartphone in your pocket or a tracking station in Antarctica. Everyone is now connected. In recent years small to medium businesses have started to utilise cloud-based tech for business efficiency and productivity, this is due to increased availability and affordability, also practicality due to cost saving measures.

Below are some dot points of what is achievable now, with a basic description outlining each point.

- Cost effective
- Constant innovation
- Scalability
- Backup & Disaster Recovery
- Reduction in onsite IT staff
- Shared responsibility

Businesses are reaping the rewards when it comes to moving to the cloud and with affordability and practicality it makes sense that in the future the majority of businesses infrastructure will be located on the cloud.

What will be done in the future?

It is very clear that everyone who has a smart phone, laptop, tablet etc. is connected to the cloud in some instance or another, even if they are aware of it or not. Mobile devices and cloud technology seamlessly go hand in hand, reinforcing each other as time goes on.

While most end users are connected to the cloud, many businesses are still operating IT infrastructure on premises. It is estimated somewhere in the future that almost all small to large businesses will be operating some type of cloud-based service.

Implementing systems such as 'Desktop as a Service' (DaaS) as mentioned earlier businesses would save money installing 'thin clients' that establish connections to a cluster of shared resources. The applications, computing power and desktop appearances can be handled internally or externally depending on the type of service the business requires.

The success of cloud-based technology for the future is dependent on physical infrastructure and technological advancements. These further advancements will include updated virtualisation technologies, higher speeds of internet access, data compression, increasing the volume of memory that can be stored on hard drives and further investment in research and development. The success of cloud computing also relies on the physical construction of data centres.

What is the impact?

With the increased trend of cloud computing in the IT industry, companies all around the world are moving to the cloud. When these companies make the move, there may potential risks that each company must be aware of before moving. With cloud technology continuously expanding and a market that is clearly dominating the information technology sector, the move for some is inevitable.

While there is an abundance of reasons as to why a company should move to the cloud there is also quite a few risks and potential disadvantages. These risks and disadvantages range from security and privacy to loss of jobs and dependency.

Network connection dependency – the backbone of cloud computing is the networks they travel on, and this is always going to be a variable as to how cloud technology preforms. While internet speeds and networking technology is gaining traction, it can also be highly unreliable at times.

Loss of control – moving to the cloud will mean that some aspects of their IT infrastructure may not be handled internally; this can result in the loss of some employees due to their jobs being made redundant. Entrusting a third-party cloud vendor is a risk for some, due to the potential management of sensitive data.

Security – Cloud technologies greatest flaw is security; cybercrime is prevalent in cloud-based computing. Compromised data and leaks are of course large risks, cloud-based computing can travel on public and private internets providing opportunities for hackers.

Cloud Service Providers – trust, reliability and security are all issues that can vary from service providers. It is important for a business to conduct research into a service provider before moving to the cloud.

Cloud computing can be a powerful and cost productive tool for many businesses in this technological era, although these risks may seem intimidating for some, risk mitigation and planning can see some issues potentially minimised or eliminated. Unavoidable issues such as network connection dependencies, the unfortunate loss of employment and some security issues are all impacts that cloud technologies can have for a business.

How will this affect you?

In your daily life, how will this affect you? What will be different for you? How might this affect members of your family or your friends?

For the average user cloud computing is nothing more than their smart phone uploading a daily backup to the cloud, some end users are completely unaware that some of their personal information is transported virtually to the cloud, located on a hard drive in an undisclosed location. For other end users, cloud technologies such as OneDrive and Dropbox may increase productivity with the ability to work on a document in the palm of your hands while travelling to work or the peace of mind that your data is stored somewhere other than the device that you are using.

Personally, speaking I use a variety of cloud-based technologies including OneDrive and iCloud, this document was edited on multiple computers including my laptop and work pc. According to Bankcell in 2020, approximately 45.04% of the world's population had some type of access to a smartphone, which percentage wise equates to roughly 3.5 Billion people. Out of those 3.5 Billion people many of them have access to the internet, unknowingly using services and applications that use cloud-based technology.

Many cloud users have increased accessibility to whatever information they store on the cloud, a personal example of cloud accessibility was when I was travelling Europe, I stored all travel itineraries on OneDrive, so if I was to ever lose my bag, my phone or laptop, I could easily go to an internet café and grab whatever information I needed.

As cloud technology rapidly expands and continues to dominate the Information Technology sector, cloud usage will continue to be a part of daily life in the years to come. Cloud technology already has some impact on anyone that owns a smartphone or has an internet connection. Whether you own a business or a smartphone the future is the cloud.

5. Team Project – Collectables Trading App

5.1 Introduction

Based off the project idea from Techstra-One team member Adrian Ferrara, the project team have settled on developing an application that makes it possible to buy, sell & trade collectable items such as trading cards in a highly sociable environment. Although many online platforms and mobile apps already make it possible to trade these items online, this application will primarily focus on users interacting with their friends or other nearby users by uploading their collections and sharing it with others.

Collectables are a multi-million dollar industry and many conventions and weekly meet-ups held around the world each year. This application aims to help its users find people with similar interests by allowing them connect based off of their location to each other. Users looking to buy or trade items are able to meet in person and connect with their peers. Incentives would be offered in-app to encourage participation and a rewards system will be developed to attract repeat use.

The app will not discern itself with one particular collectible but will allow for multiple types of collectables and traded media by utilising extensive existing online databases. By utilising available API's (Application Program Interfaces) the app will connect to online services such as Ebay in order to retrieve price estimates and Developer API's such as Magic: The Gathering's in order to gain item information.

This app aims to make it fun and rewarding to digitalise your items and make it easy to expand your collection.

Looking at what other platforms are currently in existence, most platforms focus on specific collectables, such as the "Colliibo" platform for Nintendo's "amiibos", "Retro Game Collector" for referencing retro games, and "Key Collector" for comic books. Our goal for this project is to incorporate as many collectables that we can find data for and help users to find others who might also share multiple collections.

Other platforms such as "Sortly" allow users to add as many collections as they like to the app, but lack the functionality to trade with other users.

A platform similar to our platform called "Gemr" allowed users to join collector clubs and offered multiple genres of collectables; however the platform was shut down in early 2020 after being unable to find additional funding to keep it operational. As our platform grows, a potential solution for securing funding for the increased demand on hosting and upkeep may include charging commissions on trades that are completed through our platform.

There is also a website, hobbydb.com which allows users with a large database of items and a marketplace. Our platform is different as it will focus on the social side of collecting and integration with upcoming events and conventions.

5.2 Functionalities

The app will feature a simple, attractive and easy to navigate UI with a menu which includes all features available and lists of types of collectibles (e.g.; trading cards, vinyl's, etc.). When a collectible is selected you will be displayed with all items available. The item's images will be shown as well as the name and will be shaded in grey if unattained. Selecting an item allows an option to "Mark as obtained" which will bring colour back to the image and a tick in the corner on the item screen.

When a collectible is selected you're given the option to filter, for example if you want to only see a particular set you would select set as a filter option. The search feature will also be located close by for specific options which can be based from filter options.

When the Trade option is selected, items from your collection that you own multiples of will automatically be registered as "available to trade" this can be manually modified so items that you wish to keep the multiples of aren't made available to trade.

When the Friends option is selected in the menu a list of users you have added will appear which you can select to view collection, send a message or request to trade. You may add users and accept invitations from this menu also.

The app aims to make it easy to add items to your profile, and in the future updates we hope to allow users to upload pictures of items they have acquired and use image recognition technology to identify the item and add it to your online portfolio.

Finally, the app will have Calendar functionality displaying upcoming conventions and events in your local area which might be of interest by connecting to the Facebook API.

The following is a list of planned functionalities the platform:

- Ability to create user accounts
- Chat and messaging functionality
- Location services
- Ability to add items to your collection
- Ability to view items & item information
- Ability to Search for items
- Ability to trade/buy items
- Ability to locate other users based on their collection and proximity.
- Website functionality
- Mobile app functionality
- Ability to upload pictures/Phone camera access
- Calendar functionality
- Connection to external databases for item information
- Rewards system

5.3 Technologies Involved

The following technologies and skills will be utilised in the platform:

- SQL Database (for information on user accounts, item listing, user portfolios)
- Java (GUI, Android development)
- PHP (required for database integration)
- APIs (Geo-location, eBay services and access to databases etc)
- Web server (store processes, databases and deliver web pages to the client)
- Database Security (to ensure safety to personal information)
- Graphic Design (aesthetics)

5.4 Implementation

Phase One

In the first phase of development we plan to produce a feasible project plan and detailed production schedule providing artefacts and mock up imagery. We believe that it will be possible to have a functioning website, database and connectivity to select API's in our first prototype. We intend to utilise skills that the team is currently developing to create an application written in Java and a website that will have functionalities to add items to users and connect to other services such as eBay to list prices for each item if available as well as offer connectivity amongst users.

Future Phases

In future phases we may require additional resources in order to develop the platform further such as business partnerships and funding. The following is a list of what may be developed in the future in order to grow the product.

- Advanced functionalities such as image recognition
- Location services
- Calendar integration with local events
- Advertising and marketing
- Business partnerships
- Open investment
- Event partnerships
- Exclusive items
- Become a brand and produce various promotional products

6. Conclusion

After analysing the personalities, desired skills and career plan of each team member we are confident that producing a project such as this is an excellent platform to begin to acquire the skills and knowledge we will require in the future.

By utilising each other's existing skillsets and focusing on technologies that are of interest to us and developing areas where we fall short, we plan on coming away from this project with a tangible asset to add to our portfolios.

Our project will offer unique features that will set it apart from other available apps and we are confident that we can develop or acquire the skillset required to see its success.

7. Reflection

7.1 Individual Reflections

Timothy Hall

Reflecting on how the group has performed over the course of Assessment 2 there are parts we have done well and some parts we can improve on for the next assessment. Initially once the group was formed we eagerly assigned individual parts and then departed to work on said parts. It has become apparent that we didn't spend enough time analysing what was required for each part as some people had more work than others.

Of the tasks that were assigned these have been done within a reasonable time frame but one area we can improve on for our next assignment is setting deadlines for when work is due. This should be done via an email to everyone so it is written down and everyone knows that it what is expected of them.

One thing that was surprising during this assignment thus far was how some people have taken on additional work. Rebecca has been the work horse of the group; she has collated all the individual parts into the final report and has added many final touches to give the report the polished finish that it has.

One thing about groups is you are constantly learning. Everyone has their own unique way of how they contribute things. Finding that thing they enjoy and are good at and making the most of that is how a group can excel at their task

Benjamin McDonald

Working with this team has been enlightening. There are many occasions where teams tend to lose productivity due to members not seeing eye to eye, members being inactive or because of a simple lack of communication. Thankfully, the Techstra-One Team Have not had many issues regarding absence of members, lack of communication or infighting. The team worked together as a cohesive unit to get the work done to the highest standards, in the most efficient way. It was reassuring working with a team who you can trust and rely on to finish a task without having to be pushed.

The only real fault the team had was a lack of timeline in regards to when certain work had to be submitted to the group. Improving on this would make for a stronger, more efficient team.

One thing Ben learned about teamwork while working with Techstra-One was to focus on his work and let other people do their work. Ben has had trouble working with teams in the past. On many occasions former team members chose not to do their share of the work leaving the other team members to pick up the slack. As a result, Ben had issues relying on other team members. Working with Techstra-One has helped remedy those issues.

Andrew Wendt

This assignment has given a great insight into group work at a University level, Andrew's previous exposure to group work is usually in projects within his career, but this is the first time he has done a group assignment on this scale. Relating back to his career Andrew feels there are many variables of what can make a great project.

A very interesting part about the project was learning how all the different personality types integrated together; personally Andrew was always a little sceptical as to how much information a survey could capture about an individual, so it was interesting to see how different personality types work in a group environment.

In Andrew's opinion the only thing that he saw that could have been done better was time management, timelines for completion and expectations for certain items. The project was conducted online and not face to face and given the current circumstances that face the world in 2020 we have contributed a remarkable effort.

Andrew has been very surprised by the level of maturity that Techstra-One has displayed, working towards the same target and completing the assignment with 'breathing room'. Overall, Andrew believes that everyone in the team is very focussed to pursue a career in Information Technology and it has been a pleasure to work with this team.

Rebecca Barnett

Reflecting on how well we performed as a team for our first group assignment Rebecca believes we have produced a well-rounded report and accomplished all of the goals that we set for ourselves early in the process. We have communicated daily via Microsoft Teams and conducted weekly team meetings to keep each other updated on our progress.

Rebecca particularly enjoyed reviewing each team member's personality test results and for the most part found them very accurate in describing what each team member's strengths and weaknesses were. After working together for this report Rebecca believes we have further identified each team members strengths and weaknesses and believe we can use this to our advantage in future work together.

For example, Timothy has done excellent work on the team website and has helped to push the group towards completing tasks and understanding the requirements. Benjamin brought a strong positive attitude to the group and excelled at theorising how we could approach tasks. Andrew produced well written and well supported arguments for his work on the report. Adrian Ferrara surprised us with his graphic design skills and developed a team logo. Adrian Foti had some good ideas when expanding our project functionalities.

In the future I would like to better utilise git for version control as I personally found using Microsoft Team's file upload functionality to be lacking, with no easy accessible change log and no notifications when a file's contents had been updated.

Adrian Foti

Most aspects of the project went well, communication as well as setting times for meetings had a strong impact on the success of the assignment overall.

Our ability to brainstorm and extrapolate on ideas was well thought out making it quite detailed. Some things that could be improved would be sticking to deadlines when asking for things to be completed. Adrian feels that is something that can easily be addressed in the next assignment following.

Also, Adrian feels somewhat responsible for this as his time management at this time is quite difficult to manage and he will do his absolute best to improve this coming up to the next group assignment. A couple things I found was surprising is that we were able to get involved into a group quite quickly meaning we didn't have to lose time trying to coordinate ourselves within the teamwork environment. Another thing Adrian found interesting was the age difference of the other members and him is quite significant; it was really surprising to learn this. Something Adrian has learned about groups and group work is that some members will be more skilled and experienced than others and if help is needed one should speak about it as soon as they can. Also, not conforming to time constraints can put unnecessary pressure on other members.

Adrian Ferrara

Working with the Techstra-One team has opened Adrian's eyes about what teamwork should be like. In the past Adrian has worked in group settings (non-educational) but it seemed all over the place and unstructured, while working in this team it has given him more insight as to how to work effectively in a group thanks to the leadership qualities and experience in educational group settings of the members.

Adrian enjoyed researching Cyber security IT technologies and although it was a bit of a slow start to it, once he found his ground and knew what to cover, he couldn't be stopped. Coupled with Tim's ability to assemble the group and Rebecca's ability to organise the group, we immediately started splitting up the assignments and after the first meeting everyone knew what they were doing. Unfortunately, Adrian felt that the work was split up in a way that some people were doing more work than others. In future we should discern how much work is involved in each section and effectively split the workload more evenly.

Adrian felt that the Microsoft Teams file sharing became too cluttered and although Website and Report were split in two separate teams, there were a lot of crossovers with Report items being uploaded to the Website group and vice versa. Perhaps utilising git would be a better option in future.

Overall Techstra-One worked extremely well together and produced a high quality report and website but in future we will work to stricter timelines, even workload and use Git for version control.

7.2 Group Reflection

What went well?

Working together we believe that overall we came up with some really good ideas on how to approach the given tasks. During team meetings we would brainstorm together when trying to come up with ideas and we would regularly seek clarifications from our tutor during the weekly collaboration session. By breaking up the report and sharing the workload it was easy to set deadlines for completions and allowed ourselves plenty of time to revisit areas where we felt we could do better. Our communication was excellent and we provided each other with multiple updates each week on how we were progressing and also sought help from each other when we were uncertain.

What could have been improved?

In the future, we feel that we could do better at holding each other accountable for completing tasks. When trying to delegate tasks early in the project we didn't have a fantastic understanding of what the requirements were and so perhaps delegated more responsibilities to some team members than others.

It would also be beneficial in the future to have more consistency across areas where each team member contributed to the same task, we could achieve this by being more thorough when analysing task requirements early on and setting out what our expectations are, what areas to cover and length of response. For example, we each approached analysing our ideal job differently, with some team members focusing more on general skills and others delving deeper into specific specialised requirements.

Finally, our file version control could be improved. Microsoft Teams is a good platform for communicating with each other but our file uploads in Teams became a little messy with multiple versions of the same documents being uploaded and files all being dropped into the same folder. Setting out clear version control guidelines with each other and ensuring we are placing files in the correct place will make it easier in future work together. Better utilising our GitHub repository will also be of benefit for everyone as we will need to use it over the course of our studies and the more practice we get with it the better.

What was surprising?

Some surprising things we learnt about each other during the course of the project include that Timothy has a knack for creating websites and is an amateur tumbler. Ben also enjoys acrobatics and was approached to teach his dance moves to a circus troupe and has previously worked as an AV technician. Andrew is learning German in his spare time and is already an experienced IT professional. Adrian Foti is an experienced craftsman and makes really interesting items from timber such as a baseball bat. Adrian Ferrara has the best graphic design skills in the group and is an expert in Taekwondo. Rebecca actually enjoys writing reports and once had a career as a Nurse.

What have we learned about group work?

Working together as a group has proven that as a team we can achieve more than the sum of our own individual contributions. By utilising the strengths and knowledge of each other we have been able to produce something that would be significantly harder to create on our own. It has also highlighted the importance of accountability and not letting those who are relying on you down as the team is depending on each member to pull their weight, in some cases by delaying in completing your own work it can hold back other tasks from moving forward.

It has been interesting to get to know the team members and see what we can learn from each other. We can hold ourselves to a higher standard after seeing how each other member approaches tasks by taking on board the best ways to complete objectives.

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