2019

Assessment Task 2

IT INDUSTRY REPORT

PEAK PERFORMANCE

CONTENTS

SECTION 1 - Profiles, Team and Individual

Website: https://terminal-est.github.io/Intro-to-IT-Assessment-2/

Personal Profiles - Peak Performance

Peak Performance is a team comprising of Andrea, Tyson, Shaun, Chris and Britt.

Andrea Leah - s3802204

After beginning her career in IT in 1985, Andrea has spent a great deal of time involved in the industry starting with Word Perfect and has worked in various departments of the IT sector. Andrea has now discovered her true career path in Cyber Forensics and is working through a Computer Science degree at RMIT. Andrea is currently located in Perth.

Tyson Horsewell - s3799530

The second of our WA residents, Tyson has a resume that goes deep into the IT field. After stating off playing around with Commodore 64's, he has worked with various OS and hardware set ups. Tyson has travelled numerous Asian countries, having taught English in Thailand. He is an avid piano/keyboard player and music producer, and see his future being involved with UX.

Christopher Stephen - s3172455

Chris is originally from Coatbridge, Scotland. He immigrated to Australia with his family when he was five years old, settling in Melbourne. He enjoys hiking, camping and gaming. Chris's interest in IT also started at a young age with Commodore 64's. His focus for a career is to become a Systems Engineer as it would mean he will have direct involvement in many areas he has an interest in, those being Unix/Linux server administration, diagnostics/troubleshooting and scripting.

Shaun Hains - s3801693

Shaun is 32 years old, has two children and is based in Melbourne, Victoria. He is a follower of ice hockey but doesn't play. Shaun's interest in IT stems from its constant evolution and change, which has driven his choice to enrol at RMIT and purse a career as a Cyber security/Penetration tester. Shaun has a broad knowledge of IT, covering everything from OS in Mac, Windows and Linux, to programming applications such as Perl, Python, Java and C++.

Britt James Reid - s3176169

The last member of PP is Britt. Britt is 39 years old and currently resides in Geelong. He has chosen to change careers and enter the IT industry to secure a better future after working as a PT and labourer for the past 10 years. His hobbies include sports, writing and playing music, and playing around with computer hardware. Since his first interest in IT over 15 years ago, he sees his future career being based around computer engineering or software development in conjunction with AI.

Team members, learning styles and personality tests

Andrea Leahy

MYERS-BRIGGS TEST – ENTJ – The Reformer

Extraverted - 46%

Intuitive - 0%

Thinking - 72%

Judging - 28%

VARK Questionnaire

Visual 16

Aural 11

Read/Write 15

Kinaesthetic 15

Tyson Horsewell

MYERS-BRIGGS TEST - INFP-T - Turbulent Mediator

Role: Diplomat

Strategy: Constant Improvement

Learning Style: Visual learner

Chris Stephen

MYERS-BRIGGS TEST – INTJ-T – Architect

Can be independent worker, so must be aware of being more inclusive.

Learning Style: Majority Visual learner

Auditory – 35%

Visual – 40%

Tactile – 25%

Shaun Hains

MYERS-BRIGGS TEST - INTP-A / INTP-T – Logician

Learning Style: Visual Learner

Auditory – 30%

Visual – 45%

Tactile – 25%

Britt Reid

MYERS-BRIGGS TEST – INFJ-A – Assertive Advocate

Role – Diplomat

Strategy – Confident Individualism

Introverted - 51%

Intuitive - 66%

Feeling - 58%

Tactics - 76%

Assertive - 90%

Learning Style: Majority Visual learner

Auditory: 30%

Visual: 50%

Tactile: 20%

Team Summary

Going through our teams' overall results with regards to the Myers-Briggs Tests, it would seem we have a very well assembled team. Andrea is our quarterback, and has been running things accordingly, Tyson and Chris are our creative "brains" with the project.

SECTION 2 – Industry Data

Shaun Hains - Cyber Security/Penetration Tester

Demand

According to the Burning Glass data (Top IT Job Titles March 2018) supplied for this assignment, for the period of March 24, 2017, up until March 23, 201, the position of Cyber Security/Penetration Tester was not in the top 25 job postings for the IT sector in Australia.

Skill Set

Soft skills (Suciu, 2019)

1. Good communication skills
2. Self-motivated
3. Team player
4. Enthusiasm
5. Problem-solving

Technical skills (Roussey, 2019)

1. Certified Information Security Manager
2. Certified Information Systems Security Professional
3. Programming (C, C++, PHP, Perl, Java, and Shell, etc.)
4. Information analysis
5. Security analysis
6. Risk analysis and mitigation
7. Malware analysis and reversin

Skills compared to the demand

The rank of IT skills vs employer demand

(Burning Glass data Top IT Skills March 2018, from the period of December 24, 2017 to March 23, 2018).

Skill	Employer Rank
1. Certified Information Security Manager	Unranked
2. Certified Information Systems Security Professional	Unranked
3. Programming languages	Rank 3 (Java)
4. Information analysis	Rank 9 (a subset of Business analysis)
5. Security analysis	Rank 15 (a subset of Software Eng.)
6. Risk analysis and mitigation	Rank 25 (a subset of Business Process)
7. Malware analysis and reversing	Rank 15 (a subset of Software Eng.)

The rank of general skills vs demand from the employer

(Burning Glass data Top Generic Skills March 2018, from the period of March 01, 2017 to February 28, 2018).

Skill	Employer Rank
1. Communication skills	Rank 1
2. Self-motivation	Rank 24
3. Team player	Rank 5
4. Enthusiasm	Rank 18 (Subset of Team Building)
5. Problem-solving	Rank 2

The three highest ranked IT skills that are not required skills

According to the data provided (Top IT Skills March 2018), the top three IT skills not in the skillset for this job are SQL (rank 1), JavaScript (rank 2), and Microsoft Windows (rank 4).

The three highest ranked general skills that are not required

According to the data provided (Top Generic Skills March 2018), the top three general skill not required for this job are organizational skills (rank 3), writing (rank 4) and troubleshooting (rank 6).

Has your opinion of your ideal job changed?

Given the results of the burning glass data, I believe my opinion on my ideal still has not changed, given the provided data there is still a high demand for positions like these, Cyber Security engineers have ranked highly across there associated fields for the last number of years

the skill sets needed do I will hope to have learned during my studies at RMIT, the demand for Cyber Security and penetration testing will continue to rise.

Christopher Stephen - System Administrator

Demand

According to the Burning Glass data (Top IT Job Titles March 2018) supplied for this assignment, for the period of March 24, 2017, up until March 23, 2018, the position of System Administrator was Rank 8 amongst the top 25 job postings for the IT sector in Australia.

Skill Set

Soft skills (Lear, 2019)

1. Good Communication
2. Setting deadlines
3. Task prioritization
4. Time management

5. Customer service

Technical skills (Carabott, 2019)

1. Visio
2. Networking
3. Identity Access Management
4. Cloud Services
5. Scripting/automation
6. Security
7. Business analysis
8. Monitoring
9. Mobile device management
10. Project management
11. JavaScript
12. ITIL

Subset of skills

The rank of IT skills vs demand from the employer

(Burning Glass data Top IT Skills March 2018, from the period of December 24, 2017 to March 23, 2018).

Skill	Employer Rank
1. Visio	Unranked
2. Networking	Rank 24 (a subset of Systems Engineering)
3. Identity Access Management	Unranked
4. Cloud Services	Rank 24 (a subset of Systems Engineering)
5. Scripting/Automation	Rank 14 (a subset of Software Engineering)
6. Security	Rank 25 (a subset of Business Process)
7. Business analysis	Rank 9
8. Monitoring	Unranked
9. Mobile device management	Unranked
10. Project management	Rank 5
11. JavaScript	Rank 2
12. ITIL	Rank 20

The rank of general skills vs employer demand

(Burning Glass data Top Generic Skills March 2018, from the period of March 01, 2017 to February 28, 2018).

Skill	Employer Rank
1. Communication Skills	Rank 1
2. Setting deadlines	Rank 16 (Subset of Meeting Deadlines)
3. Task prioritization	Rank 7 (Subset of Planning)
4. Time management	Rank 12
5. Client service	Rank 18 (Subset of Team Building)

The three highest ranked IT skills that are not required

According to the data provided (Top IT Skills March 2018), the top three IT skills not in the skillset for this job are SQL (rank 1), JAVA (rank 3), and Microsoft Windows (rank 4).

The three highest ranked general skills that are not required

According to the data provided (Top Generic Skills March 2018), the top three general skill not required for this job are writing (rank 4), research (rank 6) and creativity (rank 9).

Has your opinion of your ideal job changed?

After reviewing all the data supplied through Burning Glass my opinion of my ideal job has not changed. The Job is in high demand according to the data, sitting at rank 8 amongst the job titles reviewed, this will increase the chances of me finding a job in this field in the future. The hard and soft skills required also line up well with my current skillset and with those skills I am interested in improving.

Tyson Horsewell - User Experience

Demand

According to the Burning Glass data (Top IT Job Titles March 2018) supplied for this assignment, for the period of March 24, 2017, up until March 23, 2018, the position of User Experience Designer was Rank 21 amongst the top 25 job postings for the IT sector in Australia.

Skill Set

Soft skills (Pillai, 2019)

1. Communication Skills
2. Passion
3. Patience
4. Curiosity
5. Team player
6. Flexibility
7. Open-mindedness
8. Assertiveness
9. Humility
10. Empathy

11. Storytelling

Technical skills (Chelbat, 2019)

1. Analytical thinking
2. Visual design
3. JavaScript
4. Project Management
5. Business analysis
6. Writing
7. Critical thinking

Subset of skills

The rank of IT skills vs employer demand

(Burning Glass data Top IT Skills March 2018, from the period of December 24, 2017 to March 23, 2018).

Skill	Employer Rank
1. Analytical thinking	Rank 17* (a subset of Analytical skills)
2. Visual design	Unranked
3. JavaScript	Rank 2
4. Project Management	Rank 5
5. Business analysis	Rank 9
6. Writing	Rank 4*
7. Critical thinking	Unranked

**There is significant crossover in UX between technical and generic skills. The article referenced listed these skills as hard skills.*

The rank of general skills vs employer demand

(Burning Glass data Top Generic Skills March 2018, from the period of March 01, 2017 to February 28, 2018).

Skill	Employer Rank
1. Communication Skills	Rank 1
2. Passion	Unranked
3. Patience	Unranked
4. Curiosity	Rank 9 (a subset of Creativity)
5. Team player	Rank 5
6. Flexibility	Unranked
7. Open-mindedness	Rank 9 (a subset of Creativity)
8. Assertiveness	Rank 15 (a subset of Presentation)
9. Humility	Unranked
10. Empathy	Rank 5 (a subset of Teamwork)
11. Storytelling	Rank 9 (a subset of Creativity)

The three highest ranked IT skills that are not required

According to the data provided (Top IT Skills March 2018), the top three IT skills not in the skillset for this job are SQL (rank 1), JAVA (rank 3), and Microsoft Windows (rank 4).

The three highest ranked general skills that are not required

According to the data provided (Top Generic Skills March 2018), the top three general skill not required for this job are Problem Solving (rank 2), Organizational Skills (rank 3) and Troubleshooting (rank 6).

Has your opinion of your ideal job changed?

Based on the information presented here I am still interested in perusing this occupation. It is in the top 25 job postings means there is a great need for people to fill this position. I already possess almost all the soft skills that Burning Glass said are required to do this job. I believe that over the course of my study at RMIT I will be able to expand my knowledge regarding many of the technical skills needed. I plan to do my minor in business which should give me a good start with project management, business analytics, and critical thinking. As this is a relatively new type of job then I believe that more companies will be hiring people in the field of user experience, this is because most companies are competing against many competitors and having a good user experience will give them an edge over the competition.

Britt James Reid - AI Software Development

Demand

According to the Burning Glass data (Top IT Job Titles March 2018) supplied for this assignment, for the period of March 24, 2017, up until March 23, 201, the position of Software Engineer was rank 9 of the top 25 job postings for the IT sector in Australia.

Skill Set

Soft skills (Medium, 2019)

1. Creativity
2. Critical and innovative thinking
3. Collaborative skills
4. Empathy
5. Adaptability

Technical skills (Varshneya, 2019)

1. Mathematical skills
2. Probability and statistics
3. Programming (Python/C++/Java)
4. Distributed computing
5. Unix
6. Signal processing

Subset of skills

The rank of IT skills vs demand from the employee

(Burning Glass data Top Generic Skills March 2018, from the period of March 01, 2017 to February 28, 2018).

Skill	Rank
1. Mathematical skills	Unranked
2. Probability and statistics	Unranked
3. Programming (Python/C++/Java)	Rank 3 (Java)
4. Distributed computing	Rank 24 (Subset of Systems Engineering)
5. Unix	Unranked
6. Signal processing	Unranked

Rank of general skills vs employer demand

(Burning Glass data Top Generic Skills March 2018, from the period of March 01, 2017 to February 28, 2018).

Skill	Rank
1. Creativity	Rank 9
2. Critical and innovative thinking	Rank 2 (Subset of Problem Solving)
3. Collaborative skills	Rank 5
4. Empathy	Rank 22 (Subset of Building Effective Relationships)
5. Adaptability	Unranked

The three highest ranked IT skills not in the required skillset

According to the data provided (Top IT Skills March 2018), the top three IT skills not in the skillset for this job are SQL (rank 1), JavaScript (rank 2), and Microsoft Windows (rank 4).

The three highest ranked general skills not in the required skillset

According to the data provided (Top Generic Skills March 2018), the top three general skill not required for this job are Communication Skills (rank 1), Organizational Skills (rank 3) and Writing (rank 3).

Has your opinion of your ideal job changed?

After reading through the supplied Burning Glass data, I am still confident that this is the career path I wish to pursue. To know that the position of Software Developer is sitting inside the top 10 of job demand in Australia gives me great confidence that the path I have set up for myself is

the right one to follow. I have a basic understanding or grasp of some of the skills required for the position, and with my studies at RMIT combined with some external work to brush up my math skills again, I have no doubt that I will succeed in my plan to gain a solid education to back me on the path to becoming a Software Developer and working with artificial intelligence.

Andrea Leah - Cyber Forensics (Incident Response Professional)

Demand

According to the Burning Glass data (Top IT Job Titles March 2018) supplied for this assignment, for the period of March 24, 2017, up until March 23, 2018, the position of Cyber Forensics was unranked amongst the top 25 job postings for the IT sector Australia.

Skill Set

Soft skills (Maryville Online, 2019)

1. Communication skills
2. Working in a team
3. Change management
4. Building strong professional relationships
5. Creative problem solving
6. Strong ethical framework

Technical skills (Hacker Noon, 2019)

1. Knowledge of NIDS and HIDS
2. Knowledge of secure software development
3. Cloud security
4. Encryption
5. Knowledge of data security laws

Subset of skills

The rank of IT skills vs demand from the employer

(Burning Glass data Top IT Skills March 2018, from the period of December 24, 2017 to March 23, 2018).

Skill	Rank
1. Knowledge of NIDS/HIDS	Unranked
2. Knowledge of secure software dev.	Rank 15 (a subset of Software Engineering)
3. Cloud security	Rank 24 (a subset of Systems Engineering)
4. Encryption	Rank 15 (a subset of Software Engineering)
5. Knowledge of data sec laws	Unranked.

The rank of general skills vs employer demand

(Burning Glass data Top Generic Skills March 2018, from the period of March 01, 2017 to February 28, 2018).

Skill	Rank
1. Communication skills	Rank 1
2. Working in a team	Rank 5
3. Change management	Unranked
4. Building strong relationships	Rank 22
5. Creative problem solving	Rank 2
6. Strong ethical framework	Unranked

The three highest ranked IT skills that are not required

According to the data provided (Top IT Skills March 2018), the top three IT skills not in the skillset for this job are SQL (rank 1), JavaScript (rank 2), and Java (rank 3).

Three highest ranked general skills that are not required

According to the data provided (Top Generic Skills March 2018), the top three general skill not required for this job are Organizational Skills (rank 2), writing (rank 4) and Troubleshooting (rank 6).

Has your opinion of your ideal job changed?

When analysing the burning glass documentation, it is evident that the prospects for a position in the Cyber Security field are good. The documentation shows that there were 2914 postings in this analysis (Top Burning Glass Occupations (BGTOCCs), 2018). The Cyber Security field was ranked in the top 25 jobs in Information Technology. My focus is on developing software development skills within this discipline, from the data presented, I feel that have made good choices. Software development is the highest ranked position required in the Burning Glass documentation. Taylor Armerding of Forbes states “Cybersecurity is very obviously a job sector of the future” (2018). There are endless articles that endorse this statement. Cyber Security and Forensics will always be a skill that will be in demand while the world of information technology is rapidly expanding. My opinion of my ideal job has not changed, the more I learn about my chosen future career the more excited I become. I look forward to the day I have acquired the skills required and developed the understanding of information technology behind the graphical user interface enough to be considered an expert in such a challenging and rewarding career path.

SECTION 3 - IT Work

An Interview with an Information Technology Professional

There are many different positions in the Information Technology field. These duties can vary in I.T., professionals are required to have various skills including software, hardware and networking (Open.edu.au, 2019. para. 4). There is a high demand for software engineers and developers, the demand for I.T. professionals continue to rapidly expand in the Cyber Security criteria. (Open.edu.au, 2019. Para.3).

On the 2nd July 2019, an interview was conducted by Andrea Leah with a person that is employed in a position in Information Technology (I.T.) to explore what a position in I.T. can entail. The individual that was chosen was Farasen. The interview was conducted by phone. Farasen is employed in a technical support position for Optus. It is company policy that employees do not disclose their surname. Optus is a large telecommunications consortium that began in 1982 offers many types of services to businesses and the public." Every day Optus serves more than six million customers. It employs 9,000 Australians and generates almost $6 billion in revenue" (Optus, n.d. p.1). Farasens duties are to assist customers with technical issues they are having with their service.

The interview consisted of four questions:

1. *What kind of work is done by an I.T. professional?*
2. *What kinds of people does the I.T. professional interact with? Are any of these interactions with other I.T. professionals?*
3. *Where does the I.T professional spend most of their time?*
4. *What aspect of the I.T. professionals' position is the most challenging?*

The Interview

Question 1.

Andrea: What kind of work/Duties do you carry out on a regular basis?

Farasen: Most of the time my duties are to take incoming calls from customers that are having issues with their home internet and phone services. These issues are resolved by asking the customer to perform a series of steps to try to correct the problem. The customers connections are examined using software to diagnose any issues that are present. If I am unable to rectify the situation, I am required to escalate the report to a team to then investigate.

Question 2

Andrea: What kinds of people do you interact with daily, are any of those people other I.T. professionals?

Farasen: Most of the people I deal with are the public. I do consult with other I.T. Professionals regarding service issues. We share strategies to help each other. I also consult with my superiors on how to contrive a solution for an issue or complaint.

Question 3

Andrea: Where do carry out your duties?

Farasen: I am only in the call centre. My position does not require me to be anywhere else. Rarely we have meetings that are held in the building.

Question 4

Andrea: What aspect of your position do you find the most challenging?

Farasen: The most challenging task I am engaged in is dealing with frustrated customers. They get very angry when I cannot get their service working for them straight away. They can be very abusive.

Interview closed

There are many different positions in the Information Technology field. These duties can vary in I.T., professionals are required to have various skills including software, hardware and networking (Open.edu.au, 2019. para. 4). There is a high demand for software engineers and developers, the demand for I.T. professionals are rapidly expanding in the area of Cyber Security (Open.edu.au, 2019. Para.3).

SECTION 4 - IT Technologies

Cloud Services

What does it do?

Cloud services are still new and are evolving very quickly. Cloud computing itself is where "computing is moved away from the personal computers or an individual application server to a cloud of computers" (Rehman, TB 2018). This is usually where the computers are centralized in one or distributed over a variety of data centres that are usually owned or operated by third parties. This could mean whole physical servers are dedicated to one task or there could be multiple virtual servers sitting on one physical server. This is like the mainframes that were popular in the 1950s to the 1970s before personal computers displaced them where all the computing power was stored in the server and people worked with terminals. Modern cloud computing is very flexible compared with the past with customers having the choice between cloud Infrastructure as a Service (IaaS), Software as a Service (SaaS) or Platform as a Service (PaaS).

Today, we already rely heavily on cloud computing. Many companies are deciding to either start their business or migrate their business to the cloud to host all, or some, of their shared data, communications and applications. Using cloud services like Microsoft Azure they can cut down on overheads of owning and maintaining their own equipment. Also, the cost usually reduces the more resources (CPU time, bandwidth and storage) that the company uses. Consumers also benefit from the cloud with many desktop applications moving to the cloud. Consumers access these cloud services via a website or a small app that they download onto their device. The most common cloud service used by consumers is Microsoft office 365 (Cook, B 2016) with data storage such as personal files but also streaming video and music also being very popular.

For businesses and consumers alike, social media and online collaboration services has been a game changer. Allowing online real time collaboration and communication across office buildings, cities and the world. It has reduced the time and hassle of being able to communicate with others. Many of these services exist completely in the cloud with either a small app download or a web-based interface. Many of these social media apps such as GitHub, Facebook, Slack offer many services including chat, voice and video calling, file storage, file sharing and other communication tools.

Today, we are only limited by the bandwidth for how we can use the cloud for computing. Once technologies like 5G mobile communication, faster internet speed and IP4 is fully replaced with IP6 almost everything would be able to be connected to the cloud. This would open the flood gates to almost unlimited possibilities. It could be possible to have all computing done in the cloud without a need for powerful local computers. Companies are already offering gaming from the cloud to any device (such as vortex.gg).

In the coming years we will see more companies and people opting to use cloud services to streamline their computing experience. The groundwork has already been laid. We will see more data centres with faster connections servicing more users. Over recent years there has been a huge growth in cloud services being offered and the uptake of these services by companies and individuals. We could only see that this will increase over in the short term. One

of the greatest obstacles is to ensure the privacy and security of data both by the cloud service providers and the companies building products on top of their cloud solutions.

What is the likely impact?

One of the biggest impacts of cloud services most people see is the rise of “pay as you go” (PAYG) software, storage and computing. Previously you would purchase software and hardware that you may use for many years after a new version has come out due to not needing or wanting to update. In addition to the completely cloud based solutions being a “pay as you go” model, many companies such as Adobe and Microsoft offer software such as Photoshop and Office to consumers on a subscription service with cloud storage and either downloadable or cloud-based versions of their apps. This has also made it so software companies can either push updates to the user’s computer or with completely cloud based software there is no need for the user to update the software at all.

The move to the cloud also meaning that there is less of a need to update local computer hardware. As the local computer is fast becoming just a display and input device for the application in the cloud. With more companies looking to leverage the cloud they will not need the latest computer hardware to be able run high powered applications as this will all happen on powerful servers.

I can see the ability for more devices to be able to talk to cloud applications. This is due to the processing power of the cloud servers increasing as computer components continue to get smaller and faster. This would mean that most of our devices would not have to have much processing logic in order to work.

How will this affect you?

Most everyone in the west use cloud services somewhere in our lives today. Everyone with a smart phone would have their data backed up to the cloud such as iPhone with Apple’s iCloud, Google Drive with Android and a host of other services. Many people use social media to stay in contact with friends and work colleagues. We can even order fast food for delivery or pickup via cloud-based apps.

In Australia we deal with the Australian Government increasingly through the myGov portal where many people do their tax, manage health records, connect with Centrelink and many other services. Many of these services are only available via the myGov website. This is a trend that is also being followed by many private sector organizations. Although many companies can still be contacted via the phone, these services are using cloud-based solutions to either solve your query with an automated response or guide you to the correct customer service representative which may be based anywhere in the world.

Even shopping is moving to the cloud. Coles and Woolworths offer to pick and send groceries that you select on their websites directly to your house. Almost every large retailer has a website that you can purchase things from and there are huge marketplaces like Amazon, eBay and AliExpress where you can almost buy anything. This is at the cost of the physical stores.

These days if you want to contact friends or family members you can use Facetime, Skype or Facebook Messenger, even with mobile devices. I rarely ever use my mobile phone anymore for mobile calls all of that happens over the internet with cloud-based services. No wonder why

most mobile phone service providers offer unlimited calls and text messages on all but their most basic packages.

Machine Learning

What does it do?

Machine Learning or (ML) has a plethora of uses in the day to day life of the modern internet user, and it's applications are now beginning to reach outside of the online environment as every day we find ourselves moving toward an era of facial recognition and targeted ads, we can see how machine learning is playing an integral part in this system behind the scenes.

The term Machine learning is a broad one there are numerous classifications that branch off from the original terminology and concepts, such as Data Mining, uses almost the same technique and their fields do at times over-lap, although where Machine Learning is more based on predictions, Data mining on the other hand uses a technique of discovering rather than the

predictive approach that Machine learning employs. I'm sure most people have heard of China's social credit score system, Machine learning has played an integral part in being able to implement a system that is able to do both the facial recognition side of it, and the Data of a user that is connected to it and of course the more dangerous side of it, Censorship.

Without Machine learning it would take a normal system and its user a large amount of time to trawl through the entire system looking for specific individual or piece of information but with Machine learning it can be done in an extremely short period of time.

A less serious aspect of Machine Learning is the Tag a friend of yours in Face-book, or the Snapchat Emoji's that are flooding the internet, though they may seem like they are simplistic features they still contain all the Data structures, sub-sets and algorithms that the more serious side implements that will allow the algorithm to find a user's face within a provided image.

Another aspect of Machine Learning that has been implemented by the Australian Government is CAD (Computer Assisted diagnosis) and have recently used Machine learning algorithms to create a Super-Flu Vaccine by using a Program called "Sam" Machine learning commonly known as a "Training Data" (Where we can teach a machine by giving a set of images and a description of said imaged and then with some input from a person) the machine will in time be able to predict with a success rate higher than that of most humans.

Along with the predictive nature of Machine Learning it can also over-lap into a number of areas like Data Mining (Supervised Learning) not only in video games but also the public sector and then as such everyday people find themselves using and training Machine Learning by using the spam filter in your e-mail, or by tagging your friends in Facebook each time we find ourselves doing tasks like this we are inadvertently training a Machine to do the complex tasks.

Some of the types of Machine Learning algorithms and their uses involved are

- *Supervised Learning*

Supervised Learning builds data known as "Training Data" that will consist of a set of training examples generally represented by an array or vector.

- *Unsupervised Learning*

Unsupervised Learning will normally take a data set containing only inputs and try to find

structure in the Data.

- *Reinforcement Learning*

This area tends to focus on an area concerned with Software agents or more so how they ought to take the actions within an environment.

- *Feature Learning*

Feature Learning can be either supervised or un-supervised/ Supervised learning

- *Sparse dictionary learning*

Is represented by a linear combination of "basis functions", and is assumed to be a sparse matrix

Though these examples are only a small sample set of the algorithmic uses

What is the likely impact?

Although the idea of Machine learning has been around since 1959, it's impacts are now only being brought to light lately with censorship playing a major part in the modern discourse as, sites or posts are taken down automatically or within moments thanks to the advancements in Machine Learning and A.I industries.

After the 2016 presidential race in America it has been stated numerous times that outside forces meddled with the election by using large quantities of social media data, filtering out the people that are believed to vote for a certain party.

Governments are now using Machine Learning to predict what legislation has the most likelihood of passing. Likewise, in the United Kingdom they are using Machine learning called H.A.R.T. to assess whether an individual is a risk whilst in custody.

Although one of the more impactful instances of Machine Learning of recent times in Australia, is the failed Centrelink Robo-debt scheme, which its true impact has still not been fully discovered but for all the negatives involved, the benefits still far outweigh the negative connotations that have at times been associated with onset of intelligent Machines.

The uses of machine learning are far reaching, across the globe we can now with the help of intelligent machines have fully automated systems such as the driverless cars that are being produced not only by giants of the Industry like Tesla but smaller companies such as Comma.ai who have been able to replicate the exact specifications up to a similar level.

With this technology being readily available it lowers the price for this technology to the rest of the world and this will likely impact the world on a giant scale not just on the online environment but moving into the real world.

How will this impact you?

The way this will impact me, is somewhat unforeseen at the moment although i have found many uses of machine learning to more beneficial than impactful, such as the use of home personal assistants, such as Google's Alexa, and your phones Apples Siri, or being able to ask- what is the weather in my location, and have the Machine run it's queries and then find your exact location

by using its own algorithms to call upon another application such as GPS to pinpoint my location, or the way we can have our GPS system be notified that there is a traffic jam ahead, or roadworks and then pre determine a route that will not only avoid the Traffic jam but avoid the Tolls as well, this will not only impact me but almost all the other road users, and emergency services as they are able to navigate certain situations whilst still maintaining the safety and speed needed to perform their jobs properly

Other ways we have been impacted is by the way Machine learning is at the front line of online Fraud detection, by making sure that as a customer you are only linked up with legitimate sellers and vendors.

As we edge closer to Deep learning the benefits will be ever reaching into all aspects of life, from the business side of things, such as large amounts of Data transfers that would generally be time intensive due to the possibility of duplicates and inaccuracies, to being able to facilitate accurate medical predictions with almost near perfect results and be able to transfer a patient's information instantly to the doctor at hand which therefore has the potential to save countless lives in the field.

Raspberry Pi

What does it do?

The Raspberry Pi is a computer the size of a credit card. It is a series of single board computers with the capabilities of a full-sized personal computer. It is a very minimal computer without a case, keyboard, mouse or monitor included which means the price could be kept down and it could be put in the hands of those that would not otherwise have a chance to have a computer. It can be connected to any HDMI compatible TV or display. The Raspberry Pi can be used to learn programming, run video games or rich media content, perform word processing and anything a full-sized computer is capable of. One of the major features of the board is that it has a 40 pin GPIO which allows hobbyists to easily connect the device to other electronics or hardware and have the Raspberry Pi be controlled or control the external hardware.

The first release of the device was in 2012 and in mid 2019 the 4 revision of the board has been released. The Raspberry Pi foundation in the United Kingdom produces the official boards, there are many companies that produce completely compatible or similar boards. The first models were manufactured with the focus being to supply technology at a low cost for developing countries.

The focus of the foundation was then to supply information technology education to schools and the developing world, which is still a high priority. The success of the Raspberry Pi made it the best-selling computer developed in the UK. There are Raspberry Pi boards that are sold for as

little as $10, this made the Raspberry Pi accessible to anyone that wanted to create their own computer.

The computer has got a little more powerful and capable with each iteration. Every version of the board has slightly better hardware, faster CPU, more RAM, etc. This will only continue as time goes by and better, more efficient hardware comes on the market. There are also a few versions of the board with each revision with the standard sized model and a smaller model that is less capable but cheaper and fits into a smaller package. The latest models have WIFI as standard where just a few years ago it was an extra that needed to be added. Due to the advances in technology we will see the Raspberry Pi become a more capable device long into the future. It is also inspiring a lot of other manufacturers to create competing products that are all compatible with the Pi with their own strengths.

The Raspberry Pi foundation has just unveiled the next generation of Pi models. The Pi 4 is a fully functional miniature PC with the focus of this model shifting from a hobbyist electronics platform to a more fully realised computer platform. There is a huge jump in the technology available on the platform with 2 mini HDMI ports available on all models allowing the Pi to run two 60fps 4k monitors, there is also a significant jump in the amount of ram available with 1gb on the base model and 4gb on the premium. The aim is to keep powerful hardware accessible to those in lower socioeconomic brackets, stimulating interest in software and hardware engineering amongst disadvantaged children. This new model will be the Raspberry Pi foundations focus for the near future. These improvements to Raspberry Pi's processing capabilities have been possibly thought the development of the new Broadcom BCM2837 quad core SOC.

What is the likely impact?

The main impact of the Raspberry Pi was always to get a computer in the hands of more people that would not otherwise be able to afford one. It has actually shown there is a need and a desire by many people to obtain one all over the world, in 2017 over 14 million Raspberry Pis has been sold (Tung L, 2017). We have seen the rise of the single board computers with a lot of other companies creating similar, compatible, devices for both lower and higher ends of the computer market. Even Microsoft has released a version of windows specifically for it (Microsoft, n.d.).

Its secondary impact is on hobbyist that want to be able to make and control things using a computer. The Raspberry Pi makes it easy for people to be able to enter this maker area of computers including robotics, 3D printing, automation, weather stations, video game machines, lots more and anything that you can do with a computer. It means that a lot of things that people couldn't justify having a whole conventual computer to do can be done with a Raspberry Pi, or a cluster of Raspberry Pi.

We will continue to see people creating innovative things with the device from the hobby level all the way to professional prototyping of products before production. The Raspberry Pi is helping a lot of development and research in areas that may not have been developed and helping a lot of people get computer and electronic skills that would not otherwise have been able to get experience due to the cost of the hardware and the complexity building something that interfaces with it. The Raspberry Pi is helping a lot more people get hands on skills in all areas of Information Technology.

How will this impact you?

The Raspberry pi have evolved over the years as a hobbyist machine to one that is capable of running numerous applications and devices, as someone who like to stream movies online the raspberry pi is an excellent at hosting applications such as OSMC or (Open source media centre) that is supported by the KodiOS, as well at the same time one is able to run a variety of 8bit games on a RetroPie as it sits on top of a full OS, you can install it on an existing Raspbian, or start with the RetroPie image and add additional software later.

The affect it will have on an individual will vary but the main benefits of the platform is the simplistic design and setup involved. The Raspberry Pi can be mounted behind a T.V or a cabinet and with it being only the size of a credit card its portability is also a prime feature. With the platform being extremely cost effective and having built in HDMI helps immensely when using the Raspberry Pi as a streaming platform. The Raspberry Pi is also silent when running and can be overclocked.

The effect the Raspberry pi is immense as it allows a person to individually customize each Pi box to their own needs which cannot be overstated and with the community providing endless help and support there is practically no limit to what can be done with the platform. Comparing the cost to other similar alternatives, the Pi (revision B) offers the best specs for the price in the hobbyist electronics sector.

It is one of the few devices in its group that offers 512MB of RAM. The Pi has come down in price since it first arrived and is affordable as a piece of hobbyist equipment.

Autonomous Vehicles

What does it do?

Originally an idea of science fiction fantasy contained in movies or books, Autonomous (driverless) Vehicles are closer to becoming a reality than ever before. With technology playing a bigger part in our daily lives in society and enhancing the evolution of a broad spectrum of products we all use daily, vehicles evolving from human operation to tech enhanced was only a matter of time. Major tech conglomerates like Google, Tesla and Uber have started paving the way with testing for vehicles to soon become completely autonomous. This not only covers passenger vehicles, everything from buses, taxis and mini vans, to trucks, forklifts and earth moving equipment could all eventually end up being completely autonomous.

As surmised by Davidson + Spinoulas in their paper “Autonomous Vehicles – What Could This Mean for the Future?” (Davidson P, Spinoulas, 2015), autonomous vehicles are currently generally divided into five (5) levels:

Level 0 - Completely human piloted, with no technological enhancement or assistance.

Level 1 - (function specific autonomation) – One or more control functions (i.e. ABS Brakes, traction control).

Level 2 - (Combined function automation) – minimum two (2) control functions that are designed to work together (I.e. cruise control in conjunction with motion sensors to keep vehicle in the centre of lane).

Level 3 - (Limited Self Driving Automation) – with this level of automation, this car requires minimal help from a human to “drive” the vehicle.

Level 4 - (Full Self Driving Automation) – This is a vehicle that can practically drive itself. It only requires navigational coordinates to put input into its system, and it will take itself there, no human input required at all.

As one can see from the information above, vehicles have now and will have into the future many levels of autonomy. This will range from helping the human driver and enhancing their driving experience, to full surrender of control of the vehicle to automation. At this current point in time (2019), the most technology enhanced vehicles that are commercially available to the public are models from Audi, VW and BMW passenger vehicles that have a “self-parking” feature. Tesla has been working on a “Summon” feature, that would activate your car and drive it to you from a parking lot to wherever you are located.

What is the likely impact?

The impact of autonomous vehicles will be far reaching throughout society. As the population of the planet grows, the development of lands previously used for farming or were uninhabited will continue. This will no doubt, in turn, lead to more traffic congestion on roads as infrastructure struggles to keep up with housing and land development rates. Fully developed and tested autonomous vehicles will no doubt lead to less accidents due to driver distraction or mishandling, a lowering of the road toll and in turn, a more ordered traffic flow.

Other ways autonomous vehicles will impact society will be numerous. Earth moving equipment will be able to function driverless, allowing these machines to operate on a 24-hour cycle. This will increase productivity leading to more projects completed on schedule. Trucks and delivery services will also be able to run on a 24-hour system, increasing delivery output and decreasing turnaround times for deliveries or returns. Public transport will also run on a 24-hour system, allowing people to commute to work at various times, enabling employers to drastically alter how their businesses run, making systems and process more appropriate and convenient for their employees.

On the downside, driverless vehicles would render Uber, DiDi and taxi drivers, along with all drivers of ride share vehicles almost redundant. The need for human drivers in ride sharing or taxi services will be minimal, putting many people out of work completely.

How will this affect you?

The advent of autonomous vehicles and their impact on myself and my daily life will be varied. Personally, I couldn’t see myself owning a technology enhanced car that I couldn’t control to some degree. I enjoy driving and all the experiences that personal control of a vehicle has to offer. Much the same as working on engines, the cars evolution towards being completely tech based doesn’t frighten me however the change in the dynamic of connecting with a vehicle will have altered to a point that I’m not sure I would enjoy owning a vehicle into the future. Part of the love of owning a car for me is the ability to service it and keep it up to top quality maintenance levels so it performs at its best. I fear that the love of owning a car that you look after yourself and that you can drive anyway you like will be lost when autonomous vehicles are the norm. Having personal vehicles that are completely autonomous takes that satisfaction of car ownership away from the end user.

There will also be large upsides to autonomous vehicles. Being able to enjoy alcoholic beverages and not have to worry about breath testing due to the car being totally autonomous is one benefit. The elimination of road accidents or having to remember directions to a destination are others. Having an autonomous vehicle pick up children from school or other events, as navigation data can be input into the car and it will complete the journey on its own with no need for a driver will add convenience to family life. Many of these benefits will come from complete vehicle automation.

SECTION 5 - Project Idea

Project Proof of Concept - Miniature home automation controller

Overview

The proposal for this project is a more focused iteration of two projects outlined in Tyson Horsewell's (https://horsewell-rmit.github.io/) and Christopher Stephen's (https://terminal-est.github.io/Project.html) project proposals from assignment 1. The concept is creating an IoT version of a CBUS controller with the added benefit of being able to retrofit an entire house for home automation using existing wiring and Wi-Fi. The project will be divided into two sections, the Master unit which will be prototyped using a Raspberry Pi 3 B+ with a touch screen, this will be packaged in an attractive custom CAD designed housing that will be prototyped using a 3d printer. The slave unit will be constructed from an Arduino board incorporating a Wi-Fi receiver, power supply and a 240v relay module. The slave unit will also be housed in a designed and printed box.

Motivation

Typical home automation systems have been out of the budget range for most families since their inception, the most notable of these systems (CBUS) requiring an expensive rewiring of a given building to incorporate the controller. This new home automation controller seeks to address this by using cheap and readily available Wi-Fi devices that will integrate with a buildings already existing electrical infrastructure.

Description

The system will be modular, allowing more slave units to be added into a home network as the user requires them and there will be a variety of different slave module configurations. For the purpose of the prototype and this assignment however, there will be only one Master and Slave unit.

Master Unit

The Master unit will control each slave unit via a touch screen interactive HMI and will be portable throughout the home. It will consist in the prototype stage of a Raspberry Pi 3.0 b+ and a PiTFT Plus 480x320 touch screen. A custom box for the Master unit will be CAD designed and 3d printed. Initially the Master unit will be able to send instructions to the slave unit via a web server. The example in the link (https://www.arduino.cc/en/Tutorial/SimpleWebServerWiFi) shows how this can be achieved to turn on an LED. Using this webserver, we can program in pre-selected behaviours for home devices connected to the slave such as light scheduling or motion sensor activation.

Slave Unit

The Slave unit in the prototype will consist of an Arduino board, an Arduino Wi-Fi module, a 240v power supply, and an Arduino 240v relay module. For the purpose of the prototype we will have an Arduino relay module connected to a simple 3 pin socket outlet mounted to an adaptable box. This will allow us to test a variety of different plug in devices that could be controlled by the system such as lamps or televisions. Each slave unit will have the advantage of allowing parallel control of your lighting and power circuits, the hard-wired switch can still operate your devices.

Equipment and Skills

For Controller

- A laptop or PC for programming
- Knowledge in Java and C
- 3d Printer
- Raspberry Pi 3.0 B+
- PiTFT Plus 480x320 Raspberry Pi touchscreen
- SD Storage
- CAD (Fusion 360)

For receiver

- Elegoo 8ch relay module (or similar)
- Arduino IDE
- Arduino board
- Ethernet module
- Realtime clock module
- Electrical license (Christopher Stephen)
- CAD (Fusion 360)

SECTION 6 - Feedback

Group Review

Peak Performance is a group of five hard-working individuals juggling their busy adult lives, with everyone over 30 years old, with their Information Technology studies at RMIT. They have all decided to broaden their horizons and expand their skills in IT in order to look for new and better working opportunities in areas as diverse as cyber forensics, artificial intelligence, penetration testing, server administration and user experience. The team is located in and around Perth, Western Australia and Melbourne, Victoria. Even with the vast space between each other, those who live in the same city having limited time to meet in person due to work and family commitments, they have come to become a cohesive team that can get things done.

The team was in constant communication via Facebook Messenger and has a weekly meeting on Friday afternoons in order to keep informed about what the others in the group are doing in regards to the current report. The other online collaboration tools they use to collaborate together including Canvas LMS, Zoom online conferencing system, Microsoft Office 365, Microsoft Sharepoint, Facebook Messenger and other ad hoc apps as needed.

As team Peak Performance are finishing the current report, they have already started making plans for the next project where they will design, document and develop part of a home automation system. This includes ordering parts in order to prototype the project, although Christopher and Tyson already have been playing with Arduino micro-controllers in a hobby capacity for a little while already. They are looking forward to being able to continue to work together and hope to build a functioning prototype even though they are in two locations. They will be taking their collaborative efforts to a new level in the next assignment looking into new and better ways of keeping in up to date and keeping track of tasks by using Trello a project management tool. This will make it much easier to give group feedback as all the tasks will have owners and a history of completion.

Team Individual Review

Britt Reid - s3176169

From the beginning, Peak Performance has operated as five individuals coming together from various parts of the country, to complete Assignment 2 for the unit Intro to Info Tech. We have all slotted into our assigned roles and completed all tasks required with minimal fuss or hiccup for the duration of the project.

Andrea has been a great organizer and assessor of all going on. She has been all over the rubric to make sure all workings were up to scratch, to provide the group with the best possible chance at succeeding in completing the task to gain a high grade.

Tyson’s contribution on the IT technologies was brilliant, well researched and written. His influence on the group, to make sure we stay focused om the task at hand and we are all moving in the one direction, has been fantastic.

Chris’s work with the Burning Glass data, as well as his contributions with IT technology research and written submissions has been amazing. His input towards group discussions has been faultless.

Shaun's work with the IT Technologies report was great and has also been a valuable contributor in our team meetings and through Messenger.

In summation, our team has had a very even performance, with everyone contributing well, and no complaints that we didn't manage and has been all in out as a solid unit. It's been a pleasure to work with these guys.

Tyson Horsewell - s3799530

The group worked very well together. We did have a problem with one member who in the end could not commit to submitting anything; however, the five active members all had high levels of commitment and generally got all their work done in a timely fashion. We had initially committed to getting the parts done with a week before the final submission date in order to have extra time to collate and correct any mistakes. In the first meeting, we did a split of the work and assigned sections for people to do. At that point, Christopher had already analysed the Burning Glass data. Andrea and I organised the meetings, and Andrea was very active with this initially, and I took over towards the end. Shaun and Britt are very laid back and not very active during the meetings that put the effort in with their contributions, as did everyone. I learnt that things always take longer than is initially thought. I was surprised at how stressful it can be trying to get everyone to do things; everyone has their personal timeline in mind. I think having a better task management system for the next project will be a significant improvement.

Andrea Leah - s3802204

Our team was made up of a group of nice people that all treat each other with respect and focused on the task at hand. In the beginning the assignment was broken down and people were given the opportunity to agree or disagree to the required tasks and their allocation. Everyone seemed happy with the tasks that had been allocated to them. Everyone tried hard to do the best job of their contribution. We were lucky to have members that were experienced in all the aspects of the team. The team project was chosen by the more experienced members and they seemed very excited with the opportunity to create bring the project to life. Tyson was exceptionally invested in a good outcome for the team. Tyson and I both live in Perth and after meeting Tyson personally I know that it was important to him to do well in the project. After much discussion and continual focus on the project he produced a great website. Britt and Shaun did a great job of their tasks and were at the meetings to discuss plans going forward. Chris produced the burning glass document, project and the final pdf with Tyson. I look forward to finding out our final mark for the project.

Shaun Hains - s3801693

From the onset we have formed a friendly group that is more than willing to contribute in their designated areas, and to put their hand up to help if the issue were to arise. Each member of our group has taken their task and done their part without any issues which is a rarity, and all need to be thanked for making this an easier experience than expected. Even though we experienced some hiccups throughout out Assignment each member put their hand up and helped where it counted and took on extra roles when required.

We have had excellent group management skills from Andrea where she was able to organize all aspects of our weekly meeting and what each member is expected to contribute. Chris who has done an amazing job compiling the data that we needed and organizing of the Burning

glass data. Tyson who has also helped in an amazing way with the management and has also done an excellent job with his work on Cloud computing and structuring the team from behind the scene also. Britt did an Excellent job compiling previous assignments together for this and has helped all involved when needed.

Christopher Stephen - s3172455

From the outset, Peak Performance has worked well as a team. Everyone has put in the time to complete this project and get their submissions in with minimal fuss. Tyson has done a great job creating the Website with myself providing the GitHub repository. The design is clean and simplistic which suits our needs. Tyson has also done a great job helping proof the final document, preparing it for submission. Britt has done a great job with his submissions to the main document and has been excellent with his communications to the group, his work on the team profiles and autonomous vehicles has been fantastic. Andrea naturally took to the role of group organiser, giving the team a solid framework to work from. Andreas content submissions in the form of the Raspberry Pi section has also been great. Shaun has been a great asset to the team, contributing well during our team meetings and submitting his work promptly to be collated into the main document. Shaun's work on Machine Learning has been fantastic.

In summary, I'm happy with the way our team has performed. There has been minimal fuss and spirit of cooperation from the outset. I look forward to working with them further as this unit progresses.

APPENDIX A - Bibliography

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