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**COSC2196**

**Introduction to Information Technology**

**Assessment 2: Team Project**

**Team 24**

**Prepared by:**

**Motiana Tusa, Joanna Jane, Mason Brown, Simon Mckindley, Roshan Khadka and Amer Muhammad**

**Team 24 Profile**

About us Our Team

Motiana Tusa   
S3873180  
<https://github.com/MotianaTusa/Motiana.github.io>

Motiana grew up in the pacific island of Western Samoa. Beautiful Polynesian country where family is the core of all values and traditions. Motiana migrated to New Zealand before eventually settling down in Australia. Motiana is bilingual and has undertaken various courses as part of her professional development in New Zealand and Australia. After having pursued a successful career in Disability services she is now aiming to go further by studying IT. Her interests in IT developed overtime as she saw the remarkable pace at which IT Technologies have grown and have had a positive impact on all facets of life. Through her work experience she also saw a need to have basic IT education which can compliment any chosen career. Her IT experiences so far have been from user’s perspective, but she is aiming to expand her skills as she progresses in her IT degree and apply those to further her career.

Joanna Jane

S387374

<https://github.com/s3873742/My-I.T-Profile>

Jo was born in Australia to English parents who settled here in the 70s. Artistic in nature, Jo also loves performance vehicles and owns a WRX. Her interest in IT stems from a strong desire to understand how technology works. This began about 7 years ago when she started working on the helpdesk of a software company. Jo came to enjoy the troubleshooting aspect of it and would often test things in her downtime to fill gaps in her knowledge. She also really enjoyed writing technical guides and documentation on how to perform certain processes, and found it quite rewarding to not only solve problems for clients but teach them new or better ways of doing something using technology. Her experience is somewhat limited in that work was more-so related to the software itself rather than the computer or programs running on it, but by proxy she also learned a range of skills such as the process of troubleshooting by elimination (which largely comes down to knowing the right questions to ask), the software testing process, knowledge of client-server systems, and the basic concepts of database maintenance and repair.

Mason Brown

S3876704

<https://github.com/s3876704/Intro-to-IT->

Mason if from North Queensland and has fond memories of playing video games on pcs and PS4. This led to his fascination with IT technologies and their potential applications in tackling issues such as coping with deteriorating weather patterns and unpredictable storm surges due to global warming. Mason is passionate about building an application which integrates data available in public domain such Bureau Of Meteorology and uses Raspberry Pi to create physical indicators which alert users before they leave the premises, of possible stormy weather.

Roshan Khadka

S3876349

https://github.com/rk121/rk121.github.io

Roshan was born in Nepal and came to Australia at a very young age and loves to showcase his cultural heritage by celebrating Nepalese festivals. He plays soccer and loves FC Barcelona. Roshan had a keen interest in IT and even though has pursued another career, his main interest remained with IT and he is doing a bachelor’s degree. His main interests are programming and web development. He would like to develop an application which integrates front-end and back-end development with practical application in hospitality industry. This idea is particularly useful in the context of social distancing and responsible practices promoted within hospitality industry in the wake of COVID pandemic.

Simon Mckindley

S9406133

<https://s9406133.github.io/IntroToITAssigment1/>

Simon grew up in Heywood, a small town in country Victoria, and moved to Melbourne after finishing high school. A family man with a successful career at Australia Post, he also likes to play guitar. Simon is hoping to develop an app for teaching beginner guitar playing, one which will incorporate many unique features currently missing from available apps. Simon’s interest in developed at an early age when he got his first PC to do his homework. He also pursued a degree in IT early on but decided on an alternative career. He possesses programming skills in C++ and is also a Microsoft Certified Systems Administrator.

Amer Muhammad

S3728065

<https://s3728065.github.io/My-Profile/>

Amer was born and brought up in a rural town in Pakistan. Passionate about cricket and football, avid reader of history and politics, and is passionate about cooking, specialises in Indian and Pakistani delicacies. After migrating to Australia, chose to study Business Management and has held various jobs ranging from Administration to middle management. Interest in IT only grew after starting an investment and trading proprietary. Would like to study cloud computing and cybersecurity further to enhance the outreach of current technologies available in the financial sector.

Ideal Jobs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Ideal Job** | **Job titles**  **ratings** | **General skills** | **General skills in demand ratings** | **Core IT skills** | **IT skills in demand ratings** |
| Motiana | Scrum Master | 18 | * Communication skills * Team Building * Project management | 1  18  19 | * Project management * Business management * Scrum master | 5 7 23 |
| Joanna | Test Analyst | 10 | * Communication skills * Interpersonal skills * Quality Assurance and Control | 1  5  14 | * JavaScript, MSSQL), * C#/Python * HTML/CSS, JIRA, * Browser Stack, * CI/CD tools, Selenium, Agile development, Git, | 1  12  17 |
| Roshan | Senior Full Stack Developer | 17 | * Communication * Problem solving * Teamwork | 1  2  5 | * SQL, WCF, WPF * JavaScript, React, * C# * .NET, NET MVC, | 1  2  12 |
| Simon | Software Design Engineer | 11 | * Communication * Problem solving * Detail oriented | 1  2  8 | * Java * C# * Software engineering | 3  12  15 |
| Mason | Geek2U Field Technician | 18 | * Communication skills * Problem solving * Troubleshooting | 1  2  6 | * Microsoft Windows * Technical Support * Microsoft office | 4  11  18 |
| Amer | Cyber Security Consultant | 1 | * Communications skills * Time management * Multi-tasking | 1  12  20 | * Business analysis * Technical support * Microsoft Windows | 9  11  12 |

**Ratings Source: Labour Insight Jobs (Burning Glass Technologies)**

Ideal jobs for group members are as diverse as group itself. Mason has chosen a self-employment option where he works as IT vendor who comes to you for your basic IT needs, most customers in this line of work are going to be households with limited knowledge of products and services they use, providing technical support for Microsoft operating systems and Office products is ranked very highly among core IT skills most in demand at present.

Maotiana has chosen to work as scrum master where she will be managing small teams and actively engaged in project managements delivering tangible benefits for her employers. Her core IT skills required for this kind of work are listed among top five in desired IT skills in demand.

Roshan and Simon have opted for a high-end software development and engineering roles, respectively. This career path requires competencies in high end programming languages and web development applications, which are listed among top 3 most desirable IT skills in the industry.

Joanna has chosen to be a test analyst. Her work experience closely matches her chosen career path and competencies required to perform this role include knowledge of JavaScript, SQL, and Python. These core skills are among top 3 most desirable skills for IT professionals.

Amer has chosen to work as a cybersecurity consultant. Work will involve engaging clients in determining their business needs, analysing existing IT infrastructure, and delivering client-oriented cybersecurity solutions. This role will involve combining generic business management skills and technical knowledge of latest industry trends available in the market.

Notwithstanding obvious differences in chosen career pathways by group members, almost all job selections have general and core competencies listed in the top ten most desirable for IT professionals. These include, communication skills, problem solving, teamwork, SQL, Java, operating software and packaged software such as Microsoft Office.

**Industry Data - PENDING**

**IT Work – Interview with IT professional**

**Contributor profile**

Parneet was born and brought up in Northern India. She had a passion for all things technical and pursued a degree in Computer Engineering. Her desire to be the best in her chosen field took her across the country to Southern Indian city of Hyderabad, which is known around the world as “Cyberabad”. This city is the Indian version of Silicon Valley where venture capitalists support local tech starts ups and some of the biggest tech companies are also based here. Through her exposure to this vibrant environment, Parneet developed expertise in Cloud Computing and Cybersecurity and started working for Deloitte India. After migrating to Melbourne, she transitioned into a similar role for Deloitte Australia where she is working as a senior consultant.

1. **Please tell us about the industry you work in.**

I work in the Cyber Risk domain which comes under the wider umbrella of the Risk Advisory services that my organisation offers to their clients. Risk Advisory Services are meant to help their clients which can be a business, or an organization understand the risks it faces and minimize such risks. The risks that an organisation faces can be of any of the below types:

* **Operational Risk** refers to risks associated with employee conduct, business processes, and overall operational structure
* **Regulatory Risk** refers to risks associated with meeting and adhering to government regulations
* **Strategic Risk** refers to risks undertaken by the organisation related to the implementation of its business strategies
* **Cyber Risk** refers to risks associated with cyber-related threats

1. **Please tell us about your IT work. What exactly do you do?**

After pursuing my bachelor’s in computer science, I started working in one of the Big 4 consulting firms as a Business Technology Analyst. I work in the Cyber Risk department as a Senior Consultant. Cyber Risk focuses on the technological aspect of the risks the client’s business might face i.e. their applications, systems, servers, etc. This area of services further comprises of the below technology services for client:

* 1. Identity and Access Management
  2. Application Security
  3. Governance Risk and Compliance
  4. Data Privacy and Protection

I specialise in the Application Security space with an expertise in security strategy and design, architecture, and implementation of security in client’s applications.

1. **What other kinds of work do you have to do?**

Apart for providing general consulting services to clients, depending on the projects – I assist in the project management, resourcing and writing statement of work for various clients

1. **Who are all the different people you interact with in your work? Please tell us about them.**

The people I interact with as a part of my job are the client counterparts, who are usually IT professionals. These client professionals provide insights into the client’s business and the define requirements for the work to be undertaken by our team.

We interact with people and teams from diverse range of industries, for example – Consumer and Industrial products, Public Sector, Financial Services, TMT – Technology, Media & Telecommunications, etc which gives us an opportunity to understand how these businesses work, their products and services, goals and also their problems and vulnerabilities.

1. **Please tell us about your interactions with other IT professionals.**

Being a senior consultant, I act as an intermediary between the organisation’s leadership and the operational staff. My interactions with the leaderships mainly comprise of discussions on expanding the cyber risk practice, design trainings for staff, acquiring new skills to keep the professionals up to date with the emerging trends and contributing to business proposals

With the operational staff, my interactions focus majorly on coaching the staff around various upskill trainings and help them make aware about different career pathways in the Cyber world

1. What about your interactions with clients or investors? – Same as No. 4-
2. **What aspects of your work do you spend most time on? Please tell us about these.**

Most of my time at work is spent on conducting workshops with the clients to understand the requirements of the work. As a part of my work, I also train the junior staff and university graduates to bring them up to the speed and make them aware about the new trends in the industries

1. **Which aspects of your work do you find most challenging?**

Honestly, every day is a new challenge when working in a dynamic consulting environment solving real-time problems of the clients. Due to the current situation, the most challenging aspect of my job is virtually connecting with the clients’ stakeholders and my team. For a person like me, who values and thrives on human interaction, it was quite challenging to adjust and adapt to the remote working scenario initially.

But to overcome this, I always encourage my team to switch on their videos, frequently organise team building and networking events and have virtual drinks/ coffee catchups with other professionals in the organisation.

1. **Finally, can you share an example of the work you do that best captures the essence of the IT industry?**

My role requires me to wear different hats to manage and sometimes lead the projects. To capture the essence of the consulting world, below are a few examples of the various tasks I perform as a part of my routine:

* Design, manage, lead, and evaluate projects
* Lead and develop team members on projects
* Manage project resourcing
* Manage clients and key stakeholders
* Be able to facilitate and hold workshops
* Be proficient in assessing where a business is at and how to move them forward with  
  greater financial viability.
* Write proposals and reports competently and succinctly

\*Please provide your consent to use your first name and job title for the purpose of this assessment only.

I agree to provide my consent to use my first name and job title for the purpose of this assessment:

**Parneet M  
Senior Consultant, Cyber Risk Services  
Deloitte Australia**

**IT Technologies**

1. **Clouds, Services and Servers**

“Cloud computing is the practice of using a network of remote servers hosted on the

Internet to store, manage, and process data, rather than a local server or a personal

computer.” (Nick Hastreiter, 2017)

The concept of cloud computing was developed in the 1960’s, in 2006 Amazon Web

Services introduced its Elastic Compute Cloud (EC2). In the 2010’s development and

releases of services like Microsoft Azure, IBM SmartCloud, and Google Compute Engine

occurred. (Cloud computing, 2020)

Cloud computing is named as such because the information being accessed is found

remotely in the “cloud” or a virtual space. Companies that provide cloud services enable

users to store files and applications on remote servers and then access all the data via

the Internet. This means the user is not required to be in a specific place to gain access

to it, allowing the user to work remotely. In fact, the use of cloud services is becoming

more and more prevalent amongst both individual users, as well as businesses. The

growing number of cloud network services support this, some examples of cloud

networks and providers include: MS OneDrive, CertainSafe, Google Drive, Dropbox,

IDrive, Apple iCloud Drive just to name a few of the growing number of networks and

providers. (Muchmore, 2020)

**The advantages, benefits and efficiencies provided to users of a cloud service**

**include the following:**

**Cost effective -** Cloud computing eliminates the need for physical data centres and

server rooms on location, so cost is reduced on hardware, software, IT services and the

overheads involved for maintaining a functioning data centre such as electricity and

cooling. Over time the cost saving can be quite substantial when using a cloud service

over the conventional data centre. For individuals this allows them access to the cloud

services without the cost involved with the running of conventional data centres and

expenditure on expensive data storage hardware while allowing for access to the cloud

service.

**Speed -** cloud computing services generally provide self service and on demand, where

computing resources can be accessed for use in a matter of minutes, typically with just a

few mouse clicks, giving individuals and businesses a lot of flexibility in accessing large

amounts of data in a timelier manner - especially with deadlines looming.

Global scale - cloud computing services include the ability to scale elastically. Which

means delivering the right amount of IT resources - for example, computing

power, storage, bandwidth - as required and from the right geographic location, allowing

for effective service and troubleshooting for both businesses and individuals.

**Productivity -** on-site data centres typically require a lot of “racking and stacking” -

hardware setup, software patching, and other time-consuming IT management chores.

Cloud computing removes the need for many of these tasks, so IT teams can spend time

on achieving more important business goals. For individuals this allows them access to

the cloud services without the cost involved with the running of conventional data

centres, allowing for the focus to be on productivity.

**Performance -** the biggest cloud computing services run on a worldwide network of

secure data centres, which are regularly upgraded to the latest generation of fast and

efficient computing hardware. This offers several benefits over a single corporate data

centre, including reduced network latency for applications and greater economies of

scale. Individuals are also able to access this to take advantage of the performance

offered by a cloud service.

Reliability - with the movement away from physical storage such as server rooms and

storage devices such as hard drives; mobile phones; USB drives etc. Data is more

readily accessible with the improved ability for data backup, disaster recovery, and

business continuity through a cloud network. Dramatically reducing the likelihood of any

data loss.

**Security -** many cloud providers offer a broad set of policies, technologies, and controls

that strengthen your security posture overall, helping protect your data, apps, and

infrastructure from potential threats. This benefit both individuals as well as business

organisations. (What Is Cloud Computing? A Beginner’s Guide | Microsoft Azure, 2020)

**Disadvantages of this technology include the following:**

With all the speed, efficiencies, and innovations that come with cloud computing, there

are, naturally, risks.

Security has always been a big concern with the cloud especially when it comes to

sensitive medical records and financial information. While regulations force cloud

computing services to shore up their security and compliance measures, it remains an

ongoing issue. Encryption protects vital information, but if that encryption key is lost, the

data disappears.

Servers maintained by cloud computing companies may fall victim to natural disasters,

internal bugs, and power outages, too. The geographical reach of cloud computing cuts

both ways: A blackout in California could paralyse users in New York, and a firm in Texas

could lose its data if something causes its Maine-based provider to crash.

As with any technology, there is a learning curve for both employees and managers. But

with many individuals accessing and manipulating information through a single portal,

inadvertent mistakes can transfer across an entire system.

**There are 4 types of cloud services: IaaS, PaaS, Serverless, and SaaS**

Knowing what they are and how they are different makes it easier to accomplish business

and individual goals. Each service is stackable and progresses from the most basic IaaS

to a completely virtual service (SaaS). Regardless of the kind of service, cloud computing

services provide users with a series of functions including email, storage, backup, and

data retrieval; creating and testing apps; analysing data; audio and video streaming.

delivering software on demand.

**Infrastructure as a service (IaaS)**

The most basic category of cloud computing services. With IaaS, you rent IT

infrastructure—servers and virtual machines (VMs), storage, networks, operating systems

**Platform as a service (PaaS)**

Platform as a service refers to cloud computing services that supply an on-demand

environment for developing, testing, delivering, and managing software applications.

PaaS is designed to make it easier for developers to quickly create web or mobile apps,

without worrying about setting up or managing the underlying infrastructure of servers,

storage, network, and databases needed for development.

**Serverless computing**

Overlapping with PaaS, serverless computing focuses on building app functionality

without spending time continually managing the servers and infrastructure required to do

so. The cloud provider handles the setup, capacity planning, and server management for

you. Serverless architectures are highly scalable and event-driven, only using resources

when a specific function or trigger occurs.

**Software as a service (SaaS)**

Software as a service is a method for delivering software applications over the Internet,

on demand and typically on a subscription basis. With SaaS, cloud providers host and

manage the software application and underlying infrastructure, and handle any

maintenance, like software upgrades and security patching. Users connect to the

application over the Internet, usually with a web browser on their phone, tablet, or PC.

(What Is Cloud Computing? A Beginner’s Guide | Microsoft Azure, 2020)

The consensus amongst IT professionals, CIO’s, and CEO’s of the use of cloud

computing and its future, is the adopting of hybrid IT solutions – the utilisation of public

cloud and private cloud networks, with the gradual phasing out of physical on premises IT

infrastructure.

“Traditional data centres and the traditional model of delivering IT services will become

extinct. The days of building your own data centre, owning your own equipment and

installing/updating hardware will leave us rapidly. There will be some on premise

solutions, but that will diminish dramatically.” (Source: David Hartley, Virtual CIO & Principal,

Technology Advisory Services for UHY LLP, (Nick Hastreiter, 2017)

As has already been outlined, the development of cloud technology has changed the

technological landscape of Information Technology.

Mike Smith (Founder of AeroComInc.com) foresees the following changes and

developments in the industry:

“In the next 15 years, the biggest change we’ll see is 50% of small companies (with 1-500

employees), doing away with buying computer towers and servers and instead, adopting

Desktop as a Service (DaaS), as the method for deploying workstations to employees.

Companies will simply buy a monitor, keyboard, mouse, and a thin client (which basically

controls the keyboard, mouse & monitor), for each workstation. All the desktop

appearance, applications, and compute functionality will be handled by a 3rd party cloud

provider.

This will allow employees to essentially have the exact same computer appearance,

regardless of the device or their location. It will also allow companies to more easily

manage the deployment and security of computers and applications, across all devices

and locations.

Furthermore, companies will never have to worry about having the latest version of any

major productivity software, such as Office, Adobe, etc.” (Nick Hastreiter, 2017)

The most notable change will be the movement away from on-site physical servers and

data centres and even the possible reduction in storage space and memory in personal

devices – with data storage readily accessible via an internet connection.

Budding developers and application creation (and hosting) will become more prevalent, in

particular with SaaS. With self-service and access to computing resources at your

fingerprints, the engaging of IT service providers will decrease over time. Likewise, for the

reliance on technical support with the need for IT field technicians becoming redundant

with 3rd party cloud service providers footing the bill for service and maintenance for their

data centres.

In my daily life, this will enable me to access any data, photos, documents etc. that I have

stored on a cloud service (e.g. Google Drive). In terms of IT itself, I will be looking more at

the development side that the cloud service provides (SaaS) for applications – with the

potential to create an app that will benefit others and share it. As a student I currently

have access to a Canvas, which allows students to access course content and

announcements, submit assignments, and receive grades and feedback (Canvas is a

rapidly growing, cloud-based service that helps improve student and faculty collaboration

by integrating Web services such as Google Drive, Calendar, SMS, social media, and RSS

(Buss, 2020)

At this stage I will adopt the use of cloud services more and more over time, there will be

less of a need to buy hardware and storage/memory devices, with only the basic

hardware with an internet connection allowing access to a cloud with a near unlimited

amount of virtual memory (at a cost). The use of clouds for collaboration, sharing and

accessing of various media will be more and more relied upon because of its

convenience, both personally and by businesses and organizations (potential employers).

For both family and friends, once they realise the benefits (if they are not already utilizing a

cloud service) will adopt the use of a cloud service to share, access media, store data

and conduct business with the advantages it presents. I am currently aware of a family

member currently using O365 (which uses the Azure Cloud) for work purposes to access

the full suite of MS Office products and in particular SharePoint. The use of cloud

computing is the future of IT for all users, with the innovation it brings far outweighing the

disadvantages with developments in the areas it currently lacks to improve it.

1. **Autonomous Vehicles**

**What are they?**

Autonomous vehicles, automated vehicles, self-driving cars and driverless cars are the names used to describe vehicles which have technology that allows them to move through their given environment with little, or no input by humans (Self-driving car, 2020). Although there is debate about what the different names describe, to the public they all mean the same thing; a car or truck which can drive itself. The SAE (Society of Automotive Engineers) has defined five different levels of vehicle automation.

Driver assistance for a specific function. e.g. Cruise control, auto parking.

Partial automation. The vehicle is fully controlled by the technology, but a human driver must be ready and watching to take control immediately.

Conditional Automation. The vehicle is fully controlled by the technology, and the human driver does not need to monitor the performance. The vehicle will notify the human driver if it needs assistance.

High Automation. There is no need for driver assistance at all, however the vehicle will only operate within a defined area.

Full Automation. There is no need for driver assistance at all and the vehicle can operate anywhere in the world that a human driver could. (En.wikipedia.org. *Self-Driving Car.* 2020.)

Anything from level 3 and above is considered an autonomous vehicle.

Currently nearly every major technology or automotive company in the world is developing autonomous vehicles, either as part of a collaboration or individually. It is difficult to get an exact number, but collectively hundreds of billions of dollars has been invested to develop this technology. All the companies involved see this technology as the future of the automotive industry and do not want to get left behind (CB Insights Research. *Autonomous Vehicles & Car Companies L CB Insights.* 2020.)

There are currently trials of automated taxi services in major cities around the world, including Shanghai in China, San Francisco, Las Vegas, and Phoenix in the USA (Korosec, 2020). They all allow the customer to book and pay for a trip like they would any other ride sharing service, and a trained person, known as a “safety driver”, is present in the drivers’ seat of the vehicle. (CB Insights Research. *Autonomous Vehicles & Car Companies L CB Insights.* 2020.) However just recently the Google subsidiary, Waymo, began services in Phoenix where no safety driver is present. All the vehicles are still monitored remotely by Waymo staff, but this is the first “next step” for this industry. (The Washington Post. *Waymo To Launch Fully Driverless Service To The Public — A First Just In Time For The Pandemic*. 2020.)

These ride sharing services are likely to expand to most major cities around the world in the near future. Because the cars are prohibitively expensive for an individual person to buy and are heavily regulated, self-driving vehicles will continue to be only used for ride sharing services. Although, like any technology, this cost over time is likely to decrease allowing other uses to be implemented. Options such as companies or governments purchasing as fleet cars may become possible.

This current implementation of the technology is still only level 4 on the SAE’s classifications. All the vehicles operate in a well-defined area which is fully mapped and scanned before the vehicles can operate there. To reach level 5 vehicles need to be able to operate on any road that they need to get to their destination. A lot of work and research is going into this area, particularly in the field long distance trucking, which requires the vehicles to operate across large areas. A major area of research for automated trucking systems is what is termed as “platooning”, which is where automated systems virtually tether vehicles close together on long fast-moving roads such as freeways and motorways. While this can be achieved without full automation and is yet to be implemented beyond testing, it is considered to be the first step towards a fully autonomous trucking industry. (En.wikipedia.org. *Platoon (Automobile)*. 2020.)

The main reason there has been such a fast development of this technology over the last five to ten years is that data processing capabilities have reached a level where systems are able to process data from multiple sources and make complex decisions on that data within a fraction of a second. Without this processing speed, fully autonomous vehicles would not be possible. To accompany this there has been a lot of time and money spent to develop the monitoring devices that give the processors the data they need. These include vehicle mounted Radar, Lidar, cameras, and motion sensors. Even with the development of these advanced systems vehicles still also rely on external inputs such as GPS and virtual topographical maps. (Waymo. *Technology – Waymo*. 2020.)

**What are the likely impacts?**

This technology once fully implemented will have a major impact on the way everybody lives, works, and moves around. Our communities, particularly our cities and suburbs, have been designed and shaped around our use of cars and trucks. The majority of transport infrastructure built in Australia in the last 60 years has been for roads and private transportation. As a result of this people who are not car owners tend to be disadvantaged in the community.

The use of autonomous vehicles will be a major shift for the way Australians think about transport. Presently most people own their transport. It has been estimated that cars spend 95% of their time parked, so when all the costs associated with car ownership are added in, people who own cars are paying a high cost per trip. However, people are happy to pay for the convenience that this gives them. If people take up the on-demand self-driving services when they become available to them, they will be getting a similar amount of convenience at a much-reduced cost per trip (Parliament of Victoria, *Automated Vehicles*, 2017). This will push people away from private vehicle ownership.

Once autonomous vehicles are in widespread use there will to be several positive impacts to the economy and society.

A reduction in the number of road accidents. Estimates say that 94% of traffic accidents can be attributed to human error.

A reduction in congestion. The vehicles will drive more safely and will communicate with each other to increase traffic flow and efficiency.

Increased road capacity. Because the vehicles drive more efficiently there will be a greater capacity on the current roads.

Space saving. The vehicles will have less need to park for long periods space will be freed up for other purposes.

Personal cost savings. Private car ownership will no longer be necessary so this will free up money normally used for this.

Increased productivity. Because of reduced transport times and the removal of the necessity to drive, people will have time freed for other purposes.

Reduced product costs. Because of the reduced cost and increased efficiency of the transport of goods, the cost of these goods should also reduce. (Parliament of Victoria, *Automated Vehicles*, 2017)

These changes will have the biggest negative impact on people who work as vehicle drivers. It is estimated that there are more than 200,000 people who work as taxi, bus or truck drivers in Australia and this technology will completely wipe out their jobs (Parliament of Victoria, *Automated Vehicles*, 2017). However, it is expected that the changes will be implemented gradually so that any major disruption to the job market is diminished.

**How will they affect me?**

I find it hard to imagine my life where I do not own a car or know how to drive. But for children today it may be an unusual situation and even a luxury to own your own car that you drive yourself. My children are currently 4 and 2 years old and it may be the case that they will never get to drive a car.

Like other people it is most likely to be economic considerations that will change how I use transport in the future. If it is cheaper me to use the on-demand autonomous vehicles than to own a car that may become very expensive to buy, it is a good incentive to change. I imagine that I would continue to use mass/public transport for the same reasons and occasions I do now, but for trips to locations not easily reached by public transport it would be necessary for to me to use the autonomous vehicle option.

I know a number of people who work as drivers and in the transport industry and I can see that this technology will have a big impact on their jobs. Hopefully, they are able to transition to other work without too much disruption to their lives.

1. Natural Language Processing & Chatbots

**What are they?**

Chatbots are software programs designed to interact with humans in lieu of interactions with other humans. They are mostly used by companies to supplement online customer service capabilities and direct people to dedicated customer service agents, and as assistance apps on mobile phones and computers (e.g. Siri, Cortana, Google Assistant). Natural Language Processing (NLP) is the name used for software processes which are designed to interpret human communication. Different chatbots will use different types of NLP depending on the environment they are implemented in and the level of technology available to the organisation which created the chatbot. (En.wikipedia.org. *Natural Language Processing*. 2020.)

Because chatbots rely on NLP to communicate with humans, the development of both has gone hand in hand. The first chatbot developed was call ELIZA and was developed primarily to evaluate the Turing Test. This test devised by Alan Turing was to assess a machines intelligence from a person’s ability to determine if they are communicating with another person or a machine. The NLP used in these early model chatbots was basically a database of phrases that were manually matched up to the input from the human. (En.wikipedia.org. *Turing Test*. 2020.)

Since then there have been two major shifts in NLP implementation. The first of these began early in the 1990’s when the increase in computational power made it possible for algorithms to be written which allowed software to “learn” by studying written text. The algorithms then used statistical models to infer further information about the language that they were processing and to formulate responses base on probabilities. This is called Statistical NLP. (En.wikipedia.org. *Natural Language Processing*. 2020.)

Skipping forward to current technology, NLP has progressed to understanding human speech, which is much harder for a computer to do than understanding written text. Peoples speech is very variable, for instance not only are there many different languages spoken, people speak different dialects and with different accents. Speech is also not as structured as text as people can mumble, slur, use slang and can use terms from other languages. (Sas.com. *What Is Natural Language Processing?*. 2020.)

This progress has been made possible by the second shift in NLP implementation, which has also been made possible because of the further increase in computation power. This latest implementation is termed as Neural NLP and is a subset of Artificial Intelligence research. Neural NLP uses Artificial Neural Networks (ANN) to “learn” in a more efficient way. ANN’s are, simply put, a collection of computational segments designed to mimic the structure of animal brains. There are “neurons” interconnected with “synapses” and the individual synapses are strengthened the more they are used (En.wikipedia.org. *Artificial Neural Network*. 2020.). The main processes the ANN’s use to learn are known as Deep Learning and Data Mining. Deep Learning is a process where the ANN’s repeatedly perform set tasks on different sets of data and alter their responses and methods according to the results they receive. This technique has been made possible by the massive amount of data available with the current ubiquitous use of the internet (Marr, B., *What Is Deep Learning AI? A Simple Guide With 8 Practical Examples*. 2020.). Data Mining is the method of analysing large amounts of data using statistical algorithms to extract predictions about other events and processes. This is like what was used with Statistical NLP, but with much larger amounts of data available and more efficient ANN’s to process it. (Sas.com. *What Is Data Mining?*. 2020)

Current chatbot technology is widely used in customer service situations. While they are very efficient at simple tasks, they are generally programmed to transfer the customer to a human agent when more complex situations arise. It is also generally made obvious to the customer by the companies that use the chatbots that they are communicating with a bot (Chi, C., *7 Of The Best AI Chatbots For 2020*. 2020). Although, at the moment there is a rapid increase in the level of Artificial Intelligence being implemented in public fields and Natural Language Processing is a part of this. It is quite feasible that in the near future all our phone and text interactions with companies will exclusively be with chatbots and we may not be able to tell the difference between them and a real person. Also, as technology becomes more complicated tech companies will need to find better user interfaces for their products and chatbots are the best option for this. If you can interact with your device the same way you would another person, it would be the easiest option for the user.

**What are the likely impacts?**

The biggest impact that chatbots will have in society is the improvement in the general public’s access to services and technology. The use of technology such as accessing the internet and mobile phone use has become an essential part of life, and people who are not IT literate are in danger of being left behind. Chatbots can give people easier access to technology by allowing them to simply talk to an interface that can assist them to use a device or navigate websites. They can communicate with the chatbot just like they were talking to another person, so they would not need to learn anything new. People can also get greater access to essential services such as legal help, medical advice, education, news, and community information (Zilkha, G., *What Chatbots Are Doing For Social Good.* 2020). Many of these services are under resourced or expensive so people can wait long periods of time for access or not be able to get access at all. Chatbots are a very cost-effective solution to this problem, because for instance if a person is employed as a customer service assistant to answer phone calls, they can only answer one call at a time. Whereas the chatbot can answer as many calls as there are phone connections. When implemented online the chatbot can also communicate and assist an almost unlimited number of people simultaneously.

Like any technology there are also possible negative impacts of chatbots and NLP as well. For example, chatbots could be used to conduct phishing scams on a large scale. Chatbots could be programmed to communicate with people online through social media platforms, pretending that they are real people. They could then use this interaction to elicit personal details (bank account details, date of birth etc.) from their targets. There is also the impact to employment. Currently most chatbots can only help with basic enquiries, so there has not been a great impact on customer service jobs. However, as NLP improves chatbots will be able to engage in more and more complex interactions with people, so online and phone customer service roles will begin to be supplanted by this technology.

**How will they affect me?**

Currently when I come across a chatbot online I tend to avoid them, because my past interactions have been that the chatbot was not much more useful than a search bar. Simply directing you to another webpage or regurgitating information that is from the website. As chatbots become more sophisticated I am sure they will become the main way that we interact with customer service departments and even our devices, so I will have no choice but to interact with them more and more. Especially if digital assistants become the main way we interact with our devices, everybody will quickly get used to talking and giving instructions verbally to their phone, fridge, oven, media player, TV, etc.

The main negative impacts to my family would be diminished job prospects. Chatbots are most likely to replace entry-level remote customer service roles. These roles are often a way young people can enter the job market and gain experience as they are beginning their career. Without jobs like this available it makes it even harder for young people to enter the job market, and gain experience to move on to other roles.

1. **Raspberry Pis, Arduinos, Makey Makeys and other small computing devices**

**What does it do?**

The raspberry pi has bought into the IT world a small low cost per unit computer that can plug into a keyboard or mouse or be accessed over the internet through the use of a SSH tunnel. This low cost and the Pi’s ability to interact with the world around it is what provides the state-of-the-art technological abilities to the pi (What is a Raspberry Pi? 2020). When the Pi launched it was the cheapest and smallest computer in the world, it had a 700Mhz processor and 256mb of ram. This low cost and computing abilities brought accessible computing to the population for the first time. From low cost computing for rapid prototyping through to IT accessibility to people in the third and developing worlds who many have not herd of a computer. These abilities won the Pi a T3 award for innovation in 2012 and many more since (Parsons, 2020).

Currently there are many areas that the raspberry pi is used in the following are three key areas that are developing and show where the pi will go in the future. Firstly, the PI is being used as a computer and controller in the IOT sphere. The Pi can be used to control home automation from controlling the thermostat, door locks, appliances, lighting, and security. https://www.ijcsmc.com/docs/papers/May2015/V4I5201599a70.pdf With an ever-aging population the development in this sector has the potential to have a large impact upon many people’s lives (Ageing, 2020).

Secondly the Pi is also being used as a low-cost controller for the automation or buildings, power stations, radio repeaters and factories. It can be used as a telemetry module, server, router, and controller for many different types of machinery. With these abilities the Pi is currently being used in solutions for energy management, vehicle monitoring, medical systems, smart card reader, IT monitoring and telemetry, smart buildings and IOT integration (ModBerry - Industrial IoT Computer based on Compute Module 3, 2020).

Lastly the Pi provided as fast low-cost solution to problems, this can been illustrated in the way the Pi has been used to help fight COVID-19. The Pi has been used to rapidly test and design new low-cost ventilators in countries facing a shortage of ventilators. The PI has also been used to control 3D printers to print out personal protective equipment (PPE) to address shortages due to COVID-19 such as face shields. This ability to not only rapidly prototype but also control the equipment that can build or print the machines or products lie key to the pi’s future success and importance. In the future it is not inconceivable that PI’s and 3D-printers could be shipped to any location in the world and after rapid prototyping be ramped up to a large distributed scale that could be used to address any new pandemics or problems anyone in the world may face (Hughes, 2020).

One of the most exciting areas of development of the raspberry PI is in the area of artificial intelligence and machine learning. The PI’s small size combined with its abilities in processing and power consumption position it as an ideal choice for powering smart robotics. This is an area that is still developing limited by software and how to leverage it to control and teach computers to learn. In 2018 google combined with the Raspberry Pi Foundation to make its TensorFlow artificial intelligence framework compatible with the PI. This self-learning ability and low cost can be illustrated when you compare the following, you can build a raspberry pi based self-driving car for about a tenth of the cost of NASA’s Mars rover (Tung, 2018).

**What is the likely impact?**

The raspberry pi’s impact will be significant it will be able to help improve quality of life to millions of people, reduce government costs in healthcare, IT, and many other areas. It has the ability to help people reduce their carbon footprint, it will also be able to bring education to people in areas that may not normally be able to access it. The Internet of Things developments are expected to bring in the area of 4.5 trillion USD in revenue and cost saving opportunities worldwide in the next two years (IoT Opportunities and Impacts | Internet of Things, 2020).

This rapid change from one connected device per person to a future where we could see 10 connected devices per person will create a lot of new jobs and opportunities in the area of IOT this will counteract the majority of job losses from the upgrade and create many more. However, with all this monitoring of people in their data come growing risks of breaches of privacy and security breaches. For example, a smart meter that measures energy usage through the measurement of people’s movement in a house to then shut down unused devices. Could be used by nefarious people to record the homeowner’s movements and plane when to rob the house. There will be a need for the regulatory bodies in each country and possibly in international law to define the guidelines and polices that this data can be used, how it will be stored and who has access to it. As long term such intrusive monitoring of people could lead to many unwanted social implication such as change in people behavioural patterns and socialization due to their concerns about their privacy and who was viewing or had access to their information (Impact of Internet of Things (IOT) on IT and Iyengar, 2020).

**How will this affect me?**

The raspberry pi can help me in my daily life because it would be every useful to stop ads on you-tube. The raspberry pi could be set up as a storage cloud for me and my family so whenever we are doing any documents it saves them to the cloud so we can access them, the raspberry pi can also change your IP address using a VPN server so you can watch movies that are in different countries or to make it look like you’re in a different country. The raspberry pi will make our life greater because you would not be getting as much virus, malware, and cookies from websites you visit. The raspberry pi can help everyone that I know who browse on the internet, it would help my family members and friends. The raspberry would also make a wonderful small desktop for my family members if we were sharing files with each other that we didn’t want to store in the online storage’s like google cloud etc, or just to have a desktop that is not only cheap but can hold work document and access the internet like a desktop would do so you can take it anywhere you go. The raspberry pi will make my life different because of all it features it can do like blocking ads, but it would be very handy to have one just to play around with and test new things and see what it can do like voice recognitions, this would change me a little bit but that little change would be amazing to have, because of what the raspberry can do for other people and myself.

**Project Idea**

**Overview**

The project is a production grade web application that will power a backend and a front end involving both restaurateurs and patrons. The application will be linked to a restaurant website, where customers can sit at the table and place orders and pay via their phone without needing to order at the counter. Customers can scan QR codes or visit the main website to place an order, once the order has been placed the order is then sent to the restaurant’s dashboard which will be linked to the docket printer. This system’s backend will also integrate to the restaurants’ POS(Point of Sale) system. When orders are ready and passed out of the kitchen, the staff will have the ability to send a push/sms notification to the customers allowing them to collect the food from the serving area. The customer will also be able to leave real time feedback about the quality of food and services received right on the platform allowing business to strengthen their weakness. Since this platform is a web application built with mobile first approach, the user experience will be very intuitive. This project aims to provide exceptional service to both customers and the business by reducing human errors that may otherwise occur in taking orders.

**Motivation**

The motivation behind the project is to help the family business in the technological side. I look for ideas to improve the shop and find ways to fix problems. Recently we have been struggling at busy times with some customers taking too long to order. As customers take longer the wait time increases for others and there are lines of customers while one staff is busy just taking orders and not able to help others.

There are apps out there, but all comes at a premium fee, and they lack certain features. There are also multiple online food delivery companies, but they all charge hefty fees which forces restaurants to increase food prices to be able to profit from their sales.

**Description**

The project will be a web app linked to the restaurant's main website. Customers can place an order for takeaway from anywhere through the web app but can only order dine-in if they are seated at a table. Ordering from the app helps restaurants a great deal as it will reduce the amount of staff needed to take orders instead, they can use that extra force in the kitchen, this will be especially helpful in busy times. The reduced customer interaction means the restaurant can focus more on the quality of food.

There is a seat reservation function where customers must sign in to book a table, and the booked table will be displayed as Reserved before a certain time from reserved time. When the table is Reserved customers will not be able to place an order from that table unless the person that booked orders from their account.

In the app each table's QR code will be linked to a table in the POS System. Once a customer enters the shop, they will take a seat at the table of their choosing. To view the menu customers will need to scan the QR code at the table or visit the restaurant website then go to order.

Ordering from the table, the customer has access to the full menu and what is being served, can place each item to cart and to place the order they must pay. Once payment is received, the order is then sent to the kitchen printer. Then after the order is ready the chef can send notification to customers that placed the order via Admin App to let them know that their food is ready and they should pick it up from the counter.

Review System - customers can give feedback and rating on their food once they are done, they can choose to leave review as anonymous, this review will go directly to the restaurant which will help them improve. This will help in keeping a good track record of satisfied customers which will work in favour of the restaurant. This will ensure that the restaurant's food and service is always excellent quality.

Loyalty System - customers can place orders as guests or register an account which will track how many visits they have had and will be given loyal customer offers(could be monthly specials or discounts after certain amount of orders etc.). Owners can set up loyalty offers via the admin panel, they can run monthly offers or run offers based on orders where after customers have placed orders a certain amount of times on different occasions they will receive a reward.

The admin/owner features will let them access the admin panel where they can make a variety of changes to the menu - they can add new items, remove items, take an item off for the day, add daily specials. They can also view all orders in detail, they can see the customers details which includes name, number, table number they are seated at, and their order.

**Tools and Technologies**

Firstly, as the project is large scale, it will have few people collaborating. Github is a great program to start with for seamless collaboration and Trello is a great way to assign tasks. For technical skills, knowledge and ideas on different programming languages is required. Knowledge of visual language such as HTML, CSS, Javascript is needed. To make the app work and connect to the server it will require knowledge of server sided languages such as Php, Ruby, Python etc. For database, will need to use MySQL To use the service, the customers will need a smartphone that can access the internet. The shop will need a wifi printer, POS System, and a device that can access the web application admin panel for order management.

**Skills Required**

There are various skills necessary for the project including design, management, coding, testing and problem solving skills, these are the soft skills needed. Will need to learn how to use Github and Trello for collaboration with others working in the project. Github to share codes and merge all the codes and Trello to assign tasks and keep organised. For technical skills, The project will require general knowledge on Front-end technologies and how to code HTML, CSS, Javascript, Jquery, Ajax, Bootstrap. This is required to make the front-end of the web app and make it visually appealing. Knowledge of server sided scripts such as Php, python, Ruby on Rails to connect the app with the shop and send data from customers device to restaurant. Will also require knowledge of MySQL for database management and inputting all the restaurant data in.

**Outcome**

Mobile phones have become an integral part of our daily life. With seamless internet connectivity, these devices have become a utility with immense possibility. Among several applications users engage in their daily life, with this web application, we aim to provide a very comfortable, secure and reliable way for people to experience dining in at a restaurant. Not only that, this application will also allow restaurants to manage their menu online, collect orders and feedback from customers in real time. This project aims to provide exceptional service to both customers and the business by reducing human errors that may otherwise occur in taking orders.

**Group Reflection In progress**

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