INTRODUCTION TO IT ASSIGNMENT 2

TEAM REPORT

GROUP 13

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Team profile

Our team “Group 13” comprises the following members:

- Ben Tomlinson - s3390149
- Grant Dawson - s3812606
- Michael Reyland - s3293934

The Group 13 team profile can be found at https://grantsdawson.github.io/IIT_A2/ and contains the following information:

- Personal information for each team member
- Individual personality test results and commentary on how the information may be helpful to the team
- Comparison of ideal jobs
- Link to individual Assignment 1 websites

Group Assignment Tools

Various online tools were used to administer this group assignment. GitHub was used for the team profile website version control and a link to the repository is https://github.com/grantsdawson/IIT_A2.

RMIT Canvas and Microsoft Teams were both used for communication between team members, however once set up, Microsoft Teams became the prime mode of communication. Both Canvas and Microsoft Teams retain all the chat history, providing an audit trail of group formation, discussions and decisions made along the way. Our Microsoft Teams site "Intro to IT Group 13" can be found here for review (you will need to request access first via the link).

Version control for this report and its contributing artefacts was also managed via Microsoft Teams. We broke the assignment specification into its individual parts in a spreadsheet so each team member could assign themselves to each section. As each section was completed the spreadsheet was updated with status and comments. As SharePoint is the document repository behind Microsoft Teams, there is a full audit trail detailing the history of each document.

Overall, the combination of tools used provide a detailed audit trail of Group 13's work to complete Assignment 2. One point to consider for future group assignments is around the use of multiple channels in Microsoft Teams. This helps by breaking up the file folders in SharePoint and making the document repository neater, however it also distributes the chat history across multiple channels which makes the audit trail for our communication harder to follow than using a single channel.

Industry Data

We reviewed the Burning Glass IT Industry Data and used it to answer the following questions on the group's ideal jobs.

Job Titles

The job titles for our group members are listed below, ranked in descending order of employer demand:

1. C# Programmer and Unity Developer – Ben Tomlinson
2. Service Owner Telecommunications – Grant Dawson
3. General Manager Renewable Energy – Michael Reyland

Skills required

GROUP'S REQUIRED SKILL SET

The skills required for our ideal jobs are collated below, ranked in descending order of employer demand:

1. IT-specific skills:
    a. C# programming
    b. Networking certification
    c. Unity programming
    d. Application version control
    e. ITIL certification
    f. Cloud hosting
    g. Virtual Reality
    h. Cybersecurity
2. General:
    a. Communication
    b. Written English
    c. Problem solving and root cause analysis
    d. People Leadership
    e. Building relationships
    f. Project Management
    g. Vendor Management
    h. Finance, Commercial and Contract Management

The three highest ranked IT-specific skills not listed in our required skill set are SQL, JavaScript and Java.

The three highest ranked general skills not listed in our required skill set are Organisational Skills, Team Work/Collaboration and Troubleshooting.

Commentary on Ideal Job

The below sections are provided in answer to the question "Having looked at the Burning Glass data, has your opinion of your ideal job changed? Why or why not?"

MICHAEL REYLAND

The opinion of my ideal job has not changed after reviewing the burning glass data. Communication skills are identified as the number one generic skill and that is an area where I believe I already possess strong skills, that are getting further developed by the roles that I would need to experience prior to a GM position.

As well as communication skills, I would also develop a number of other valuable generic skills on my pathway to the ideal job such as problem solving, organisation and team work.

GRANT DAWSON

My ideal job hasn't changed reviewing the data, primarily because the data shows demand for the soft skills and technical skills that I will build throughout my degree and career development to attain my ideal job.

Seeing the skills I already possess, or those I am aiming to attain, shown as desirable in the data provides me with confidence to continue on my chosen career and educational path.

BEN TOMLINSON

Looking at the burning glass data my ideal job has not changed as VR/AR technologies will only further improve including in demand. Software development/engineering is also expected to increase with the rise of A.I. which is everywhere including in games, if I cannot obtain my ideal job there are other avenues I can take.

IT Work

Group 13 chose the option to interview an IT professional for this section of the assignment. The interview was held in person in Perth with Shilpa Evans, Manager Business Applications Operations for BHP. Shilpa is 25 years into her career in the IT industry, encompassing various technical and managerial roles.

A Cisco Webex session was used for group members to join the interview in addition to enabling an audio recording of the interview. Express permission was obtained from Shilpa to record the interview.

WHAT KIND OF WORK IS DONE BY THE IT PROFESSIONAL?

Shilpa manages a team of approximately 100 people (including BHP employees and Contractors) that support 2500 business applications used by BHP teams globally across Iron Ore, Coal, Petroleum, Copper and Potash mining assets. This support includes resolving incidents and problems, implementing changes and fulfilling service requests.

Shilpa also manages the opex budget funding the support of the applications, including labour costs, enhancements, small projects and vendor services such as application licencing, support and maintenance.

Other activities Shilpa is involved in from time to time include working groups on corporate culture and gender diversity, mentoring, coaching and training. Assistance with recruitment plays a part in role also, being asked periodically to join interview panels for roles in other teams.

WHAT KINDS OF PEOPLE DOES THE IT PROFESSIONAL INTERACT WITH? ARE THEY OTHER IT PROFESSIONALS? CLIENTS? INVESTORS? THE GENERAL PUBLIC?

Shilpa interacts with:

- Other staff from various teams across the global IT department (i.e. end user computing, infrastructure, networks, strategy and innovation, enterprise improvement)
- Application Vendors
- Consulting firms
- Other IT professionals outside of BHP – ad hoc catch ups with other women in IT around furthering diversity in the IT profession plus previous colleagues
- Business Partners (the IT department interface to BHP end users)
- The business – mine site teams and office teams.

WHERE DOES THE IT PROFESSIONAL SPEND MOST OF THEIR TIME?

Shilpa spends most of her work time:

- Planning the execution of work
- Managing escalations
- Supporting her team
- Managing vendors
- Producing performance reporting
- Managing Finances

WHAT ASPECT OF THEIR POSITION IS MOST CHALLENGING?

Work management is Shilpa's most challenging activity, balancing workloads with competing priorities and finite resources/budget.

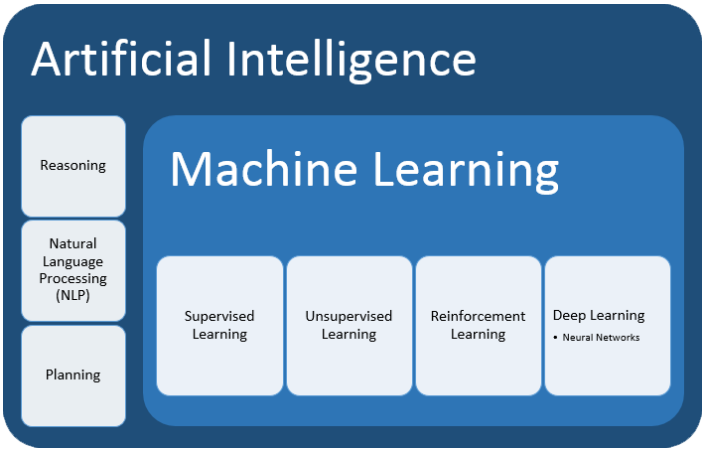
IT Technologies

We have explored four areas of the IT world – Machine Learning, Robots, Small Computing Devices and Cryptocurrencies, specifically addressing what each does, the likely impact and how it will affect us as individuals.

MACHINE LEARNING

Machine learning is a form of AI, term associations are similarly interchangeable but differ. (Hurwitz and Kirsch, 2019) Machine Learning, comprised of engineered algorithms capable of learning through non self-aware procedural data diffusion (Hurwitz and Kirsch, 2019). These conceptual algorithms capable of learning from data, iteratively processed, outputs models derived from the results of data sets (Hurwitz and Kirsch, 2019). Patterns in data are recognised by machine learning models which generate detailed analytics to assist in actionable objectives based on predictable outcomes (Hurwitz and Kirsch, 2019). Metrical structures from data analysis can be adapted if the model is deployed online to facilitate improvement, accuracy and adaptability. This enables greater flexibility and capability to enhance the model's ability to predict and monitor outcomes from existing data. Context of data sets pertains to unique business objectives, thus determining appropriate methodologies. Machine learning facilitated through these methodologies: supervised learning, unsupervised learning, reinforcement learning and deep learning.

Analytics in machine learning may be substantiated through supervised learning from an existing dataset. This method typically comprises of labelled data with representational orientation to assist training the algorithm and user inference. Techniques used in supervised learning are, regression, and classification (Hurwitz and Kirsch, 2019). Supervised learning; classification is from limited data values and regression is a continuous label, regression analytics is commonly implemented in weather forecasting by contrasting preceding and current data (Hurwitz and Kirsch, 2019). However, caution is advisable as *overfitting* occurs when the model is specifically aligned to a range of data, this results in undetected patterns in large sets of data (Hurwitz and Kirsch, 2019). Prevention of this abnormality *overfitting* can be avoided with unpredictable or unlabelled data (Hurwitz and Kirsch, 2019).



(Hurwitz and Kirsch, 2019)

Un-supervised machine learning is often implemented in business fraud, solutions, risk aversion and analytics to speech recognition (Hurwitz and Kirsch, 2019). The second method of training machine learning algorithms is unsupervised learning, this is associated with unlabelled unclassified data (Hurwitz and Kirsch, 2019). As with supervised learning, an algorithm observes and analyses data for patterns except without understanding the data (Hurwitz and Kirsch, 2019). This technology is often used in conjunction with email spam detection and social media through clustering data and associations with illegitimate or valid data (Hurwitz and Kirsch, 2019). Unsupervised learning is an approach to label data which can then be passed onto the supervised learning process (Hurwitz and Kirsch, 2019).

The third method of machine learning is a behavioural reinforcement model in which data analysis reviews determine the route to the best result (Hurwitz and Kirsch, 2019). The process of learning is similarly iterated but through trial methodology in which successful computations are *Reinforced*. If the algorithm fails data is iteratively modified until it's successfully, sequentially calibrated to fulfil the objective (Hurwitz and Kirsch, 2019). The learning paradigm is utilised in various purposes ranging from automated technologies such as self-driving cars to robotics.

The final machine learning conceptual model is deep learning, comprising of a layered neural network containing numerous nodes imitating a functioning brain (Hurwitz and Kirsch, 2019). Layers of the network consist of an input layer, abstracted layers which modify data based on specifications to link to the output layer (Hurwitz and Kirsch, 2019). Iteration like other machine learning methods is used to analyse for patterns in unlabelled data (Hurwitz and Kirsch, 2019). This is classed as a sub-model from supervised and unsupervised learning and will vary according the complexity of unstructured and unlabelled data. Industries this technology is applicable to; image recognition, visual and audio applications, internet of things and automation (Hurwitz and Kirsch, 2019).

Already machine learning is an integral part of existing and future technologies therefore every industry has connected in one way or another. Machine learning is not a new technology as it was invented in

1960 with an unprecedented evolution rate in innumerable industry contexts. The future of the technology is vast, developments in machine learning may include; integration with cloud services (MLaaS – Machine learning as a service), enhanced AI connectivity with maturing data processing capabilities (O'Keeffe, 2019). To enable these capabilities abetting hardware evolution to meet the demands innovations will impose on CPU and graphics hardware (O'Keeffe, 2019, Kour, 2019).

The impact machine learning and AI will impose is unquantifiable, as these technologies evolve new innovations will eventuate the resulting effect is not superficial in the context of industry and externally but deep-seated and far-reaching. Advancements in autonomous systems and AI with corresponding driven technologies are increasingly becoming integrated (Manyika and Sneader, 2019). Significant figures of job growth are likely, offsetting the loss of jobs, there prodigious variance which corresponds to estimated technological adoption rates (Manyika and Sneader, 2019). As the development of machine learning and AI existing occupations will change as workers adjust to new activities as others transition to automation. To adjust globally, skills and education alterations are critical for requisites transpiring from technological progression (Manyika and Sneader, 2019). As technology evolves, skills necessary to maintain, implement and integrate are becoming more integral resulting in an increased demand for tech professionals.

Information technology is the most obvious recipient of machine learning development as jobs are likely to merge, increase in complexity or become redundant. Database administrators are shifting towards common core skills needed for implemented AI and machine learning systems (O'Keeffe, 2019). The core skills that organisations require are data analytics and DevOps, as governance in data and integration with technologies are crucial as database administrators are at the forefront of data (O'Keeffe, 2019). Cybersecurity sector is also adopting AI and machine learning are forming critical layers in networks (Hinkley, 2019). Ironically however, hackers are adopting and embracing the technologies creating new issues in security as solutions emerge (Hinkley, 2019). Cybersecurity jobs are likely to become more complex as security professionals and data scientists monitor and analyse the performance and reliability (Hinkley, 2019). However, machine learning and AI technologies are immature and often unreliable, continuous management is necessary to avert failure. Software engineering, development and data science are coequal to cultivate these technologies.

As AI and machine learning become more prominent, interactive and non-interactive technologies are abstracted with processes. AI and machine learning are integral in internet technologies such as social media for marketing, security and data analytics. Emails with Gmail are filtered using an AI to categorise and classify emails including which emails are prioritised or legitimate (Manifest, 2019). LinkedIn with AI statistically analyse applications and predict outcomes of applications, Pinterest uses AI to analyse images for recognisable objects for similarity and enable marketing for vendors (Manifest, 2019). Chat-bots, another form of AI technology interaction to process input commonly from consumer inquiries and return appropriate actions (Manifest, 2019). Googles search engine uses AI to provide optimal responses to users with provided results prioritised based on criteria (Manifest, 2019). Products

purchased through Amazon are recorded, systematically analysed to use the collated synthesised information to produce specialised marketing (Manifest, 2019). Google maps utilises AI technology to determine optimal routes and traffic conditions in addition to integrated services such as specific locations (Manifest, 2019). Cybersecurity including a financial context, employ AI to detect fraud and provide enhanced security by analysing patterns of transactions unless it's verified by the account holder (Manifest, 2019). AI is used for airlines to automate flights where pilots typically fly manually for 7 minutes (Manifest, 2019).

The effect of machine learning and AI is already established, nescience of its existence is common unless individuals are well versed in the technologies used with AI. In daily life exposure is common, depending on the purpose and context AI enhances aspects connected to it, this ranges from shopping, listening to music, researching, communications and navigation. *Everyone's* life is influenced directly or indirectly though AI and it will only continue as it evolves not only work orientated but expansive and functionally widespread for individual purpose.

ROBOTS

Whilst robot technology is continuing to evolve at an increasing rate, it could not be considered a new technology, as evidence suggests that robots in various forms have been around for over 2000 years (Newton 2018). According to Newton 2018, it was in the 1920's that the field of robotics separated into two distinct fields. The two distinct types of robots were Industrial Robots and Humanoid Robots. Industrial Robots were primarily developed to complete tasks that humans were either incapable of performing, or could not perform as efficiently or cost effectively. Humanoid or 'Android' type robots were designed to look and in some cases act like humans.

At present, robots are becoming more prevalent as individuals and organisations seek to reduce costs, improve processes and reduce effort. Robots in their now many forms, are part of our lives every day. Some common examples from the perspective of an individual or household include dishwashers, vacuum / mopping robots, pool cleaners and in some less common cases, humanoid robots that are being designed to provide companionship for a range of demographics in society. From the point of view of organisations, robots are currently heavily utilised to perform repetitive tasks across nearly all industries such as automotive, healthcare, manufacturing and logistics.

With ever improving engineering and production capabilities, robots are very rapidly evolving in the complexity of the tasks they can complete. In the short to medium term it is likely that robots may start displacing jobs that were only a few years ago considered immune to significant impact (Pew Research Centre, 2014). Some examples include the construction industry where jobs such as bricklayers and carpenters that may have previously seemed like jobs that required human skills, are now threatened as a result of robotic improvements. One Australian company has already developed an automated bricklaying robot that has successfully constructed a three-bedroom home in less than three days

(Palmer-Derrien, 2018). The Healthcare industry already has a number of robots that perform tasks ranging from assistance in surgical operations, through to ultra UV cleaning of hospital rooms. This industry is likely to see continued focus on robotics to replace humans, as some analysis concludes that up to a third of all hospital deaths could be attributed to some form of human error (Pew Research Centre, 2014). Companion robots are also likely to evolve significantly in the short to medium-term as organisations seek to capitalise on a market that is expanding as a result of changes in social norms.

The key advancements in supporting fields that may enable further evolution of robotic technologies are in the field of engineering, machine learning, programming improvements and connectivity. Engineering improvements are enabling robots to perform more and more tasks that historically required human hands to complete. According to QUT (2019) there have already been some improvements to robotic grasping and manipulation capabilities, however the next step from an engineering perspective is to move into meaningful vision-guided manipulation. Machine learning has also played a major role in advancing robot capabilities through various forms such as Computer Vision, Imitation Learning and Self-Supervised Learning techniques (Faggella, 2019).

The potential impacts of further development in the field of robotics range from significantly positive through to significantly negative, specifically related to the impact on jobs and the wider economy. The potential impacts are widely debated with strong views on both sides of the argument. In fact, in 2014 the Pew Research Centre undertook a detailed survey of experts across a vast array of industry fields (Pew Research Centre, 2104). Over 1,800 experts responded to the survey question seeking opinions on whether by 2025, robotic advances and AI would displace more jobs than they create (Pew Research Centre, 2014). The views were so divided that 48% they believed there would be a negative net effect as a result of the advancements, whilst 52% said they believed the advancements would have a positive net effect on future jobs (Pew Research Centre, 2014).

The people most likely to be affected by further integration of robotics into our daily lives are likely to be blue-collar workers whose roles consist of relatively routine tasks that do not require creativity or humanity are expected to disappear (Schwab, 2016). This has been the case over recent times, whereby millions of jobs have been lost through robots / automation, however many experts predict that the service sector is not immune, and half of all service jobs in the American service sector are in danger of disappearing (Johannessen, 2018).

If some of the predicted advancements do come to fruition, then there would likely be profound impacts to my daily life from the perspective of both work and home. The tasks that currently occupy time in my home life such as cleaning and outdoor maintenance may be completed by various robots automatically. This would give me much more leisure time to spend with my family and friends. Professionally I am already starting to see the effects of automation and robotics and as it continues I wold expect to see more significant role changes initially for blue-collar roles. This would affect me as I believe it will see further need to manage large numbers of employees that are emotionally affected

by the loss of identity, that comes with watching a machine complete a task that they used to feel a sense of pride when completing.

The impacts are going to be much more significant for our children than they may be for my generation. The latter parts of the industrial era have seen an increase in size of the middle class, however there are a number of predications from various experts that believe the middle class is likely to shrink as more roles are automated and performed by robots (Pew Research Centre, 2014). This being the case if we want to see our children succeed we will need to invest in their education to ensure that their fields of learning will give them the best opportunity of securing employment in roles that have a long term future and are more difficult to substitute with a robot. One thing area that was very widely agreed upon by the industry experts surveyed was that our existing educational system is doing a very poor job of preparing workers for the significantly different employment landscape of the future (Pew Research Centre, 2014).

In summary it is still too early to predict what advancements are going to take place in the field of robotics and even more difficult to predict whether they are going to have a positive or negative effect on the human race. One thing that we can be relatively sure about is that the impacts are likely to be significant, and the way we work and live will be very different in the not-to-distant future.
Source: Jeff Clune

SMALL COMPUTING DEVICES

Devices such as Raspberry Pi and Arduino are classified broadly as small computing devices, however more specifically a Raspberry Pi is described as a single-board computer, while an Arduino is a single-board microcontroller. Both devices feature various hardware elements built on a single circuit board, enabling them to function as a fully self-contained computer/controller, namely:

- Microprocessor (Arduino) or combined Central Processing Unit/Graphics Processing Unit (CPU/GPU - Raspberry Pi)
- Stored Program Memory
- Random-Access Memory (RAM)
- Input/output (I/O) connections
- Other Integrated Circuits providing supporting features, such as wired or wireless communications

These devices are intended to be used directly “out of the box”, allowing software developers to start using code without having to spend time developing hardware. Generally seen as low-cost devices, they have found a large user base in both educational and hobbyist circles.

RASPBERRY PI MODEL 4B (WIKIPEDIA 2019)

ARDUINO MEGA (WIKIPEDIA 2019)

In my mind, the state-of-the-art device in this small computing device category is the Raspberry Pi 4. Released in 2019, this device is powerful enough to take the place of a basic desktop PC. A summary of the hardware specifications is:

- Quad core ARM CPU/GPU
- Up to 4 GB RAM
- Wi-Fi
- Gigabit Ethernet
- Bluetooth
- Multiple USB 2.0 and 3.0 ports
- USB C Power port

Small computing devices are currently used in many educational, DIY and commercial applications. In education, these devices provide the perfect low-cost platform to support students in learning to code. In commercial applications these devices again find favour with their low cost and enable the expense of development to be reduced, even finding themselves embedded as part of final production run products. Home automation applications include controlling IoT devices and monitoring resources such as power and water. For the hobbyist, there are a multitude of kits and accessories available.

The mobility of these devices is likely to expand over the next three years with advancements in battery technology and low power use components. Batteries constructed using different chemical compositions or physical properties (crystals rather than liquid for example) are under development, along with different physical designs such as nanobatteries. Once a breakthrough in battery technology is reached, it will enable the use of small computing devices and associated sensors outside in areas without mains power, expanding their reach. CPU Processing power is ever increasing and will unlock further use cases, particularly in low cost personal computing, where the Raspberry Pi already performs as a desktop PC, or in areas such as video analytics which are particularly CPU intensive applications.

The greatest likely impact of small computing devices in the short to medium term is in automation and the Internet of Things. As it becomes more cost effective to connect and control devices in the home or across industry, business cases will tip in favour of automating equipment and processes

rather than relying on manual labour. Those most affected will of course be the individuals performing the manual labour or performing tasks in a process. While automating equipment and processes will make those particular jobs redundant, it will create many more different jobs. The physical maintenance alone will be immense, but obviously that too will become automated in time. Humanity's trust in automation will take time to bed in, so I foresee many quality assurance and governance roles being required, checking that the automated systems are performing as they should.

In my daily life I expect many changes with the increased prevalence of small computing devices. As the use cases increase and cost decreases, I will be able to implement more small computing devices at home. Rather than my family of five sharing one computer we will be able to afford multiple desktop PCs. I will be able to control and monitor my power and water usage, or better control my garden, lights or air-conditioning. My employment in the future may change where work that I have been performing gets replaced by automation and myself, family and friends may have to retrain to attain new skills after having their jobs made redundant.

BLOCKCHAIN AND CRYPTOCURRENCIES

Blockchain technology is the key enabler of cryptocurrencies. Blockchain essentially allows direct transfers or transactions between participants without intermediaries as a distributed public ledger (Hughes et al. 2019). Blockchain and Cryptocurrencies have been in use since 2009 when arguably the most famous cryptocurrency 'Bitcoin' was introduced to the world (Campbell-Verduyn, 2017). The technology was initially only limited to technology enthusiasts until in 2013 due to a number of global events it received a huge increase in attention and as result went through a significant period of volatility (Campbell-Verduyn, 2017). This volatility was a key reason why there still continues to be apprehension by more cautious investors and organisations about the technology's applications.

Bitcoin was the original cryptocurrency, however once the underlying Blockchain technology was established and proven, the number of different cryptocurrencies has expanded rapidly. Due to the volatile nature of the early cryptocurrencies where the value of each digital token could fluctuate so dramatically, the use of the currencies become not just a method of transaction, but also a speculative asset for some investors (Campbell-Verduyn, 2017).

Whilst Blockchain technology was originally developed to support financial transaction, such as Bitcoin, due to its vast security benefits, the future applications of Blockchains is likely to be much more widespread than just financial transactions (Makhdoom et al. 2019). Blockchain benefits are likely to extend across many transactional boundaries in the long term, however there are already market leaders that are investigating possible benefits that they technology may have on their own field. One area that experts believe would benefit greatly from improved security, traceability and transparency is the supply chain (Azzi, Chamoun & Sokhn, 2019).

The improved security of Blockchain technology may also in the medium to long term be an enabler in other rapidly developing technologies such as Unmanned Aerial Vehicles (UAV's) and Autonomous vehicles (Makhdoom 2019). One of the main issues both these technologies face is related to security concerns if people wanted to maliciously sabotage the systems. By combining swarm robotics and decentralized Blockchain technology, the increased level of security afforded to the systems may be the difference in achieving the necessary safety and regulatory standards to become more mainstream (Makhdoom 2019).

Ultimately the key technological advancement that has made Blockchain possible is the improved global connectedness through network / internet enabled devices. It is estimated that by the year 2020, over 30 billion devices globally will be able to connect to the internet (Makhdoom, 2019). The processing power and speed of the connections to these devices has also further assisted in facilitating this technological. The introduction of 5G and continued expansion of network coverage across the globe may lead to further adoption of Blockchain and cryptocurrencies.

The likely impact of Blockchain technology when used to support cryptocurrencies is that they gradually replace traditional cash-based currencies around the world. To do this though, there will need to be more clarity on what value cryptocurrencies actually have, as there is still widespread debate as to whether they are actually money, or inherently valueless (Campbell-Verduyn, 2017). If cryptocurrencies supported by Blockchains were to become mainstream, the implications would be felt by at every level of the economy from governments, organisations and individuals.

Arguably everyone in society would be affected in terms of the way they transact and connect, however those directly involved with either central or commercial banking would likely be most affected, especially as Bitcoin in particular was developed initially with the clear intent of disrupting the present banking system (Campbell-Verduyn, 2017).

There is already some evidence of major financial institutions reducing roles as a result of improved technology such as automation, and if cryptocurrencies became mainstream, these reductions would be significant to this sector. In Australia, the four major banks alone employ over 150,000 people, with many more employed in roles the directly support this sector (Ziffer, 2019). It is unclear though whether the impacts of the technology would reduce the number of the roles or change the responsibilities. Given that the new cryptocurrency is still viewed with a high degree of apprehension, there could be a situation where current financial institutions create and manage their own cryptocurrencies. The major banks are already creating new roles with the mandate to investigate new technologies and how they will integrate into the current system (Ziffer, 2019).

The impacts of Blockchain technology disrupting many industries through enabling advancements in other technologies could be much more widespread than cryptocurrencies alone. The effects on supply

chains alone would impact most individuals and organisations given that nearly all businesses have some interaction with supply chains.

The adoption of cryptocurrencies supported by Blockchain on myself I feel would not be significant unless they still had similar levels of volatility that they currently exhibit. If that was the case, then purchasing power could fluctuate wildly in either positive or negative directions. It would be difficult to plan financial is there was uncertainty over the value your currency would hold at the specific time that you needed to use it.

The impacts of Blockchain technology is probably more likely to affect myself and my family if it does indeed become an enabler in advancements to other fields of technology such as UAV's and autonomous vehicles as predicted. Autonomous vehicles alone if supported by Blockchain would change the way we work and live in a number of ways such as shared vehicle ownership, less congestion on roads and people could live further from major cities as time in vehicles could be used productively.

In summary, there is a good chance that cryptocurrencies that are supported by Blockchain technology will become more integrated into future financial markets as a result of the traceability and improved security that they present. Blockchain technology may also support significant advancements in many other fields that could impact many individuals, organisations and governments as we become more connected.

Project Idea

FOOD SHORTAGE AND SUSTAINABLE RESOURCE MANAGEMENT

Food shortages in developing countries are a major global issue that is expected to increase in line with the world's population, resulting in malnutrition. It is a significant issue which would benefit from rectification through sustainable methods, practices and innovation.

Solving global food shortages has been a constant issue with 815 million people who are left to starve and an additional 1.185 billion are expected to follow (Goal 2: Zero Hunger - United Nations Sustainable Development, 2019). In addition, as food shortages continue, critical resources are dwindling, contributed to by global warming, climate change and an ever-increasing populace. Countering this issue, sustainable methods of agriculture are required to efficiently manage water resources which are increasingly at risk. Implementing a strategy to facilitate sustainable agriculture using technology will minimise human effort and associated error.

Group 13 plan to assist individuals in both developing countries and the western world to sustainably grow their own food and optimise their water usage through building a prototype for a low cost, open source DIY irrigation system. This system will allow irrigation control based on the open-source Arduino micro-controller commonly used for interactive real-world projects. The device will be housed in a protective cover with connected expansion boards, relays, a display, test buttons and can be fitted with a WIFI adaptor or 4G modem for network connectivity (Dawson, 2019). For connectivity in rural areas the system could be connected to a satellite internet receiver. Separate rain, temperature and soil moisture sensors will be located separately from the unit, powered by rechargeable batteries while maintaining communication with the controller via BLE (Bluetooth low energy) (Dawson, 2019). The controller, coupled with a mobile phone software application, can be automatically or manually adjusted to seasonal weather conditions based on climate data. This device will be marketed as a DIY kit (Dawson, 2019) or sold as a complete unit. It will have user friendly features as default while the open source architecture will allow for custom functionality. As the controller will need to receive data to accurately adjust watering frequencies, the cloud application can relate to the mobile device or the micro-controller itself.

In a residential application, the system will allow savings on:

- water bills by managing water use as to not over or under water
- saving on money as a result by preventing plants from rotting or wilting from over watering or underwatering

The device will enable connectivity through the cloud and network as the device will be capable of communicating to the cloud and mobile devices. In addition, adjustments to the micro-controller and notifications can be facilitated through the cloud application as a result, which is convenient as control can be maintained from the opposite side of the globe.

In commercial applications, the device implementation will be more sophisticated and elaborate but will impart the same results. As management of water will be passed to the device allowing more control of water resources saving millions of litres and maintaining yield. The other benefit the device will have will be error and time, as the adjustments can be automatic reducing the capacity for error and the time spent calculating watering frequencies daily.

The device promotes water resource management through sustainable practices including soil moisture, evaporation and weather data. Therefore, this device has an application for residential and commercial purposes and can have a global impact on water resource management. Resource management is imperative as the global population is increasing, thus growing food on minimal resources is critical to reduce usage and increase food volumes.

Along with developing the prototype hardware kit, an instruction manual will be drafted and preliminary costings and suppliers detailed. The DIY kit will be compared in cost and features against some commercially available units to assess viability for future marketing of the DIY kit.

Group Reflection

GROUP COMMENTS

There are many facets to this group assignment that worked well. We had one team member take the role of team leader, breaking up the assignment into discrete tasks and setting up the collaboration tools we utilised for version control and communication. Our assignment tasks were tracked in a spreadsheet so we could visualise progress throughout the assignment period. We largely self-assigned tasks, allowing team members to select elements of interest or aptitude. The task load for each team member was fairly equal and the quality of work produced has been good. Our collaboration tools allowed for chat via desktop or mobile application, enabling the team to communicate even while one member was overseas during the assignment period.

Some ideas could be implemented to improve the group performance, such as scheduling a weekly conference call. This would be an improvement on the “chat only” communication model we used in Assignment 2, but would also serve as a status update on individual progress against assignment tasks. Forming groups in a single time zone would also assist in faster communication, as the three-hour time difference between Perth and Melbourne along with work commitments meant the chat response time was sometimes up to 24 hours. Setting staggered due dates for various assignment tasks before the assignment due date is perhaps the most important idea that we could implement, especially where completing some tasks is dependent on others being completed first. In this assignment we planned for all content to be collated two days prior to the due date, but this left us with a hump of work as a couple of team members pulled out of the course right near the deadline without contributing anything to the assignment.

One surprising observation from the assignment was how easily everyone agreed on decisions regarding the assignment content and structure. Usually you find competing opinions in a group and at least two individuals who really push for their point to be the winner. In this group we reached a consensus easily and there were no conflicting opinions.

We have learned a few things about groups through this assignment. Groups need a leader, both to set direction and coordinate effort. In that regard it’s clear that groups benefit from different personality types, not everyone can be the leader. Groups also need to be flexible, in this case certain members had to pick up the slack when other members left the group unexpectedly.

MICHAEL REYLAND

The group has worked well and I believe put together a good assignment. Grant did a great job of providing the direction. It was a great idea to set up a spreadsheet at the start allow each person to try and self-assign tasks. There was some really good communication from most of the group, however it was unfortunate a couple of the team members had some personal issues that resulted in them pulling out in the final week.

Overall though it has been a good group to work with and Grant and Ben were both proactive in getting things done. The content that has been provided is of a good quality which is great.

Grant also has some really good presentation skills and has done a great job in pulling it all together and collating / developing the website. In reflection I will make sure I try take on more in the next assignment to ease the load on Grant and Ben where I can.

GRANT DAWSON

Unfortunately I had a 10 day vacation booked in the middle of this assignment period. The team was very understanding and I was able to take on the administrative tasks and the profile website, meaning I could load up my contribution to the beginning and end of the assignment.

Time zones and varying work commitments meant we found it hard to tee up specific times to discuss the assignment, but we made great use of Canvas and Teams chat functions to overcome this, with both tools allowing access to chat on desktop PC and mobile phone apps.

Having three of the original group pull out without providing any input to the assignment was frustrating, especially the two at the end of the assignment period where we had planned on their contribution. In a work situation there would be other resources we could turn to when faced with unexpected absences to meet a hard deadline, unfortunately in this case we had to make up the shortfall between the three remaining team members. One thing I have learned about group assignments is to allow for unexpected absences or low performing team members.

BEN TOMLINSON

Over-all I think the group worked well to complete the second assignment, communication as expected for online distance education can vary with the length of time as it did. However, the group adjusted to this and made sure to reply when they could. The way the group communicated with respect showed the maturity of everyone. As to completing the assignment content, everyone who had been communicating took the initiative of taking on tasks set in the assignment brief. Grant Dawson has

been the leader of the group with exceptional organisational skills including setting out documentation and the interview for the group.

Personally, I have worked well with the group to communicate; what I could do to help and what tasks I was willing to do. I have strived to do the best work I could possibly do with the skills and knowledge I do and do not have.

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