JUNE 19, 2022

ASSESSMENT 1 - IIT

MY PROFILE

MEG MARONI

GITHUB REPOSITORY: HTTPS://GITHUB.COM/MEGLM/A1.GIT

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Personal Information

Student Details

Name: Meg Maroni
Student number: s3967486
Student email address: s3967486@student.rmit.edu.au

Background Information

Hello and welcome to my profile. My name is Meg, and I would like to share a bit about myself.

I was born in Albany, Western Australia, and have remained here most of my life. It's a small city, population 38,370, that has deep roots within the ANZAC history and is surrounded by beautiful coastal destinations, tourist attractions, and hiking trails which I enjoy taking advantage of in my free time. My education was also completed in Albany, including my K-12 years, then my TAFE studies in Information Technology up to a Certificate IV, attained in 2020.

During my TAFE studies, I was fortunate enough to be awarded the Apex Club of Albany's Great Southern vocational student of the year 2020 and shared the honour of being awarded Southern Regional TAFE's student of the year across the 12 campuses in my region. In recognition of my academic efforts, I was encouraged to take part in the 2021 WA Training Awards and was awarded as a finalist in the Vocational Education and Training category.

One of my main hobbies is growing and cultivating plant life, specifically carnivorous plant species. The way they have evolved to get their nutrients through food instead of soil, and the intelligence they seem to have developed when it comes to catching their prey is both spine-tingling and fascinating. An example that's particularly interesting to me is the Venus flytrap's ability to 'count', noting how many times its fine hairs have been stroked to determine if what's been caught is worth digesting. Currently, I only have pitcher plants and cape dew for pesky fruit flies, but one day hope to grow a plant as magnificent and terrifying as the Pod in Jumanji (Johnston, 1995)[1].

Interest in IT

What is your interest in IT?

I remember growing up and having the TV blaring first-thing every morning watching RAGE[2], Rugrats[3], or the family recordings on VHS, and I just couldn't take my eyes from it. I wanted to understand how it was possible to show me these pictures using the red, green, and blue 'squares' that I would intently watch flicker from 1cm away. This curiosity led me to rummage through our tapes and rip them apart, holding the film up to the light and studying each frame with wonder before getting into severe trouble for ruining them, teaching me the valuable lesson of re-winding tapes in the process. As I have grown, this curiosity has never settled and further molded itself into a desperate want to work with technologies and understand more about each aspect, including diving back into the origins of technology progression to understand where we are today. My passion helped guide me towards my studies at TAFE and to my current profession as a Technical Support Officer for a few schools in my region. The position has helped me gain a vast knowledge of managing, maintaining, and repairing a medium-sized business's networking and physical technical infrastructure, but I still seek to gain more knowledge of all other fields pertaining to the IT industry.

Why did you choose to come to RMIT?

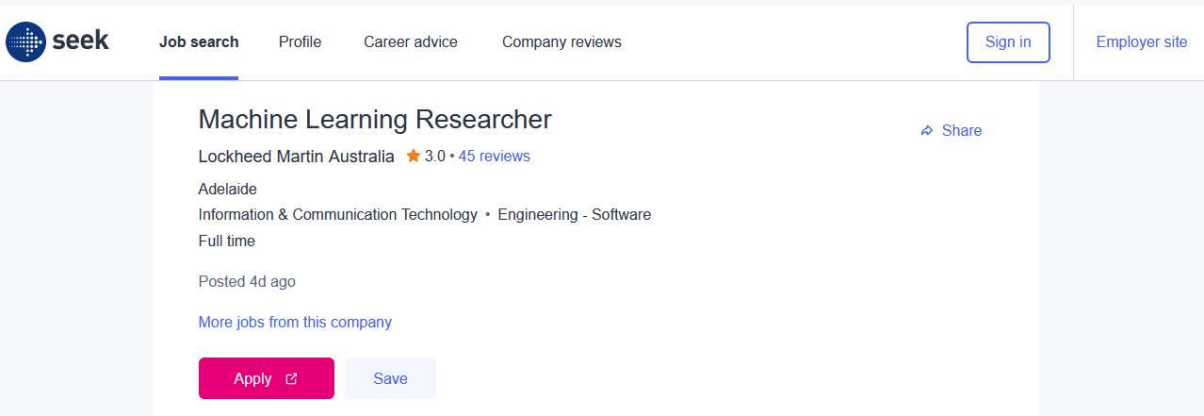
I always wanted to further my studies in IT as my excitement to know more has frequently been nagging at me since I finished my TAFE certification, but I didn't want to have to leave Albany, with education facilities and study options limited in this region. I began researching possible careers I could progress to with the experience of my current position and level of education but promptly discovered certain university degrees were preferable or a certain amount of experience within the specified industry. If I was going to study for a degree, it needed to have a wide scope involving many information technology and computer science concepts as I wish to gain knowledge of all its compositions before settling on a specialized position. This led to the search for online course options that related to the positions found whilst job-seeking and discovered the RMIT online courses, specifically the Bachelor of IT.

What do you expect to learn during your studies?

During my studies at RMIT for the Bachelor of IT, I anticipate gaining a deeper understanding of all IT sector terminologies and subjects, including advancing my ability in programming, networking, communications, and more. My technical, mechanical, and critical thinking skills are also expected to increase as a result of these studies and they will not only be skills used for the advancement of a career, but they will also be lifelong skills to develop me as a well-rounded, educated person and improve the quality of my life. Finally, whilst continuing through these studies I hope to gain a better understanding of or 'home in on' a specific subject that I would like to specialize in for my future career path.

Ideal Job

Position Description



Seek - Machine Learning Researcher[4]

The position I have found for what my idea of my ideal job would be is a Machine Learning Researcher with Lockheed Martin Australia[5]. This position describes a focus on the research and development of Machine Learning technologies to advance Australia's understanding and proficiency in computer science, image processing, analytics, and more while working in conjunction with the Australian Institute of Machine Learning[6] (AIML). This position focuses on the core elements of what I want to achieve, which is the betterment of technologies for our society, not only in Australia but across the board, and to be able to research and conduct studies by exploring the unknown and discovering new concepts to improve our current technologies.

Position Skills and Qualifications

This role necessitates a wide range of professional expertise as well as a high degree of education. The following are specifications of this in brief detail:

- Having earned a Ph.D. in a field relating to the responsibilities of the position. They provide specifics including computer science, machine learning, and image processing. This degree must have been earned from an institute of recognizable standards.
- Project experience in research and development is also important, and the project experience must be connected to the core topics this role outlines.
- Experience in a research team that combined multiple professional specializations.
- Excellent communication and reporting abilities for presenting study findings to key stakeholders within the research.

The position also states a section outlining key points of desirability for applicants to meet. The following is a short summary of the beneficial experience outlined:

- Expertise or experience in machine learning technologies
- Experience with communication, processing, and engineering of systems, specifically space-based systems, or radar electronic warfare systems.
- Experience in sensor fusion, plus managing the errors that can be present in collected data
- Previous usage of signal and imaging processing practices or techniques

Current Skills and Qualifications

Certificate IV in Information Technology

My Cert IV in Information Technology provided me with basic skills and knowledge in the following fields and technologies:

- Development and maintenance of software and databases: Interpreting specifications to create software applications through the process of designing, modelling, developing, testing, and production of technical documentation.
- Programming: Building and testing of applications with basic object-orientated language skills.
- Web development: Design and development of website layouts with functional interactive components.
- Systems administration support: Producing schedules and procedures for maintenance and providing live and written support to clients.
- Small to medium-sized businesses' physical and network infrastructure understanding and support.

Technical Support Officer

My role as a technical support officer has supplied me with a great understanding of the following technologies and skills in Department of Education (DOE)[7] schools (medium-sized businesses):

- Network management and administration through web filtering, policies and profiles, and user-based activity such as access, privileges, and password maintenance.
- Managing legal obligations and regulations regarding licensing, copyright, and third-party software data usage.
- Executing risk management and contingency planning strategies for data security.
- Strong communication skills to instruct employees in applications, digital technologies, and other topics.
- Purchase management of technological infrastructure or digital technologies required and provide accurate budget expenditures for future years.
- Analyse and resolve IT problems as they arise, as well as and developing and implementing solutions.

Progression Plan

My current skills and qualifications related to this position I would say are at the start of possibly a 10–20-year journey of professional education, development, and experience. The current road I can envision to obtain what is required of me can be broken down into four main components:

1. Complete the RMIT Bachelor of IT degree to the best of my capability, with the goal of a distinction.
2. Complete an Honours year at the end of the bachelor's degree or go for a master's degree in a specialization of IT
3. Work in the industry as a graduate software engineer to gain industry experience and continue to work in this position, or similar, for multiple years.
4. Complete a Ph.D. whilst I am working in a relevant field.

Once I've completed all of these, I believe I'll be able to meet the **minimum** requirements to apply for a position as a Machine Learning Researcher with Lockheed Martin Australia or with another cooperation that will inevitably emerge by the time I am ready for this, as meeting the highest degree of attractiveness for the desirable knowledge aspects will require enormous amounts of work experience.

Profile

Myers Briggs Type Indicator Test[8]

Personality: Turbulent Advocate (INFJ-T) (16 Personalities, 2022)
My Role: Diplomat
My Strategy: Constant Improvement

This assessment helped me to better understand my own personality, and how it is reflected both positively and negatively, as well as gain insight into my personality type through the reports and community of others who were placed on the same scale. It also gives me a sense of self-assurance in self that my personality type is similar to that of previous great leaders the world has seen, and that some of my internal thoughts about myself are represented as a personality attribute rather than a flaw or issue.

Learning Style Online Assessment[9]

Result: Visual Learner

Understanding my learning style has always been helpful in maximising my learning capacity in every setting and this online assessment confirmed my understanding of my distinct learning approaches, but it was also a good reminder of what I should focus on throughout my RMIT studies. Being a visual learner combined with online learning will have both benefits and drawbacks. While visual content is constantly shared to keep lectures and discussions engaging and informative, and any steps performed on a computer can be easily shared, visualizing the human element will become more difficult in the future as topics shift from theory to practice.

IQ Online Test[10]

Result: 138

Taking this assessment revealed where my IQ stood in comparison to the human average, and it was encouraging to see my problem-solving skills were strong, increasing my self-esteem and morale. But, knowing my score, I won't take it too personally because I don't want to stifle my will to overcome obstacles, pursue new possibilities, or improve myself. I do see, though, that having better problem-solving skills is beneficial to the IT industry since it is constantly evolving and expanding, with new challenges to solve around every corner, thus the assessment has provided me with more confidence in my pursuit of a career within IT.

How do you think these results may influence your behaviour in a team?

Based on my findings, I believe I can contribute some valuable traits to a team. My attitude or behaviours will not alter significantly as a result of hearing these results, but I will be more conscious of my abilities. I'll try to emphasize those qualities that will benefit the team and project the most, such as being able to use my diplomatic skills to help the group harmonize individual ideas and create a cooperative, supportive, and productive environment in which each person can thrive, or using my strong problem-solving skills to help the team overcome any obstacles.

How should you take this into account when forming a team?

These findings serve as more of a guide than a rulebook in influencing my decision to join a team, whilst they may be partially accurate, they cannot specifically validate or capture who I am as complete, intelligent being because they are based on a broad average and each person has their own unique characteristics that come into play. They do however give me an idea of what traits I might have and allow me to openly debate those attributes with others before forming a team. Before building a team, it is vital to be able to openly share our learning styles, personality types, and other test findings, as diversity fosters creativity.

Project: PhotosyntherSeeker

Overview

The project I've chosen to create is an indoor planter shelf with an IoT (Internet of Things) application that can rotate in a 180° horizontal position from a wall to in front of a window by revolving around a pole axis positioned on the window frame. This is a long-term solution for indoor plant aficionados who want to use natural light instead of artificial light. It's especially suited for individuals who don't have access to accessible sunlight floorspace in their house and can't afford the luxury of terra gardens, indoor propagation stations or hydroponic tents. In addition, the PhotosyntherSeeker serves for aesthetic purposes by adding colour and liveliness to a room by having plants scattered nicely about it for exhibition. A water soil monitor will be provided as an optional attachment to increase plant monitoring and may be effortlessly integrated into the infrastructure.

Motivation

My motivation for this project was to extend the innovation outlaid by Etsy home décor woodwork creator DMDesign Works[11] in the development of a rotatable shelf[12]. As the rise of plant enthusiasts spurred by the Covid 19 epidemic continues to develop, I can envision their design being integrated into the IoT in any wireless household with a passion for botany, as many live in small houses or apartments where this enthusiasm may be stalled by floor space availability. Another important motivator stems from personal experience living in a home with inadequate natural interior illumination and primary living area windows and doors face the incorrect position in accordance with the sun's rotation.

Description

PhotosyntherSeeker is a smart, attractive, and completely wireless solution for plant lovers who wish to make the most of their home's natural light resources. This rotatable shelf has a number of functions that will benefit both users and their plants.

180° Rotation

The PhotosyntherSeeker 180* rotation allows a user to have their plants on full show in the sun during the day, then move them against the wall at night with the push of a button, so they may have both privacy in the house with shutters or curtains while still seeing their lovely plant display.

Shelving Options

The shelves will be 3D printed out of recycles materials, providing a sustainable and lightweight design and may be installed in any home, with a variety of lengths and heights to fit most conventional window sizes. The regular shelf package comes with two standard shelves in a choice of colours, as well as the option to add more for taller windows (4 maximum).

Remote Controllable

The PhotosyntherSeeker will be controlled remotely using a free mobile phone or tablet application for Android and iOS devices. This involves manually controlling rotation with a button tap, as well as arranging rotation using the application for a specific time of day or length of time. It can also be schedulable for the shelf to rotate out and back in response to the sun's output, with the utilization of UV sensors.

Application and Diagnostic Data

The application has a simple and user-friendly interface that allows users to control and set timers for the shelf, as well as generate reports based on the data acquired by the UV sensors. This includes daily UV exposure, key exposure peaks during the day, and longer statistical analyses such as monthly and seasonal exposure habits to improve the health and quality of the indoor plants and guarantee their demands are satisfied.

Additional Features

An additional expansion to the shelf is a moisture detector to supplement the plant's monitoring systems with PhotosyntherSeeker, which can help users understand if their plants are getting enough water to satisfy their needs. It will be simply set in the soil of the planter pot, connected to the Arduino, and the PhotosyntherSeeker

application will identify it and monitor the soil water levels periodically with user-friendly reports and notifications through the application, as well as the ability to specify the plants' variety type in relation to each water sensor, to correctly monitor the plant's individual needs.

Tools and Technologies

The following tools and technologies listed are elements that will be required in each stage of development for the PhotosyntherSeeker and viable options that can be used for that component.

Designing and Planning

- 3D Printing Design Platform (parts and structure creation): TinkerCAD[13], Blender[14]
- Application design platform (wireframes): Figma[15], Diagrams.net[16]
- Database design (table creation, data dictionary and entity relationship establishment): Excel[17], Diagrams.net, MySQL Workbench[18], MS Visio[19]
- Arduino technologies structural design: TinkerCAD

Creation

- Programming Arduino technologies and frameworks: Arduino IDE[20], C++,
- Developing application: NetBeans[21], JetBrains[22], MS Visual Studio[23]
- 3D Printer: Dremel DigiLab 3D45[24], Adventurer 4[25]
- Database creation: MS Visual Studio, MySQL Server[26]
- Framework types: Java, PHP, C#, SQL, .NET, JavaScript, Ajax, iPhone SDK, Android SDK
- Main Hardware components: Arduino Uno, nRF24L01+ Wireless Module, Servo Motor(s), UV Sensor, Water level sensor.

Testing and Debugging

- Alpha and Beta testing
- Database: MySQL Server & SQL relationship and functional testing
- Application load and function test: Akamai CloudTest[27], Digital.ai[28]
- Arduino Unit test: AUnit library[29]

Implementation

- Versioning Control: Git[30], Azure[31] (DevOps Server)
- Database hosting: MySQL Server, Azure (SQL Database)
- Application hosting: Windows Server IIS, Azure (App Service)

Skills Required

To be able to successfully create this project multiple skills are required. Firstly, to develop the working electronic shelf; a degree of mechanical thinking and an understanding of Arduino technologies is necessary. This involves basic understanding of electronics and circuitry, having experience with soldering, the ability to program in C++ and use of libraries to work with the various components used in the Arduino physical architecture, such as the Wi-Fi module. Secondly having the skills to program in multiple different frameworks is key to advancing this project to the next level and integrating with a household's IoT, by designing and building an attractive cross-platform mobile application to interact with the shelf wirelessly, while having a functional database to store data collected by the sensors and produce reports. Within my current capabilities I have a basic understanding in the skills required and have most of the physical components readily available, which is what partially inspired the project. If I were to fully commit myself to this project it would be a slow process full of learning, but I believe I could successfully execute it.

Outcome

On the successful development of this technology, it will open the door for many plant enthusiasts to enjoy their hobby seamlessly and sustainably, as well as invite more people into the hoppy because access to floorspace or shelving indoors will no longer be an obstacle. Indoor plant life provides scientifically proven benefits such as improving air quality, boosting mental wellbeing, aiding in allergy relief, and moistening the air.

These advantages should be available to everyone, and PhotosyntherSeeker idea strives to provide this opportunity.

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