

Introduction to Information Technology

Assessment 3: Our IT Project

Tech Instinct

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Kylie Copeland, Maleeha Yasir Mian, Ngo Khanh Tung

RMIT University

“Tech Instinct is committed to working as a team towards a common goal. Our highly professional team is comprised of six Information Technology students with extensive experience in a range of industries and technology applications.”

TOOLS

The following tools were used to collaborate and best meet the requirements of this team project:

Microsoft Teams.

The primary purpose of using this tool was to record the formal progress team meetings. These scheduled meetings were conducted twice a week via video conference. MS Teams was also used to centralize all messaging between team members and all meeting communications. This tool was used to facilitate the production and maintenance of the group artifacts that were collaboratively constructed. This included formatted data, reports, images, links, and any word documents. Word documents that were shared via MS Teams, were created, and allowed each team member to contribute their input towards the main content. The written content was then formatted into a website and PDF documents for the final submission. To see the MS Teams information, [click this link.](#)

GitHub.

GitHub repository was set up with the intended purpose of using a Git to facilitate the production and maintenance of the Tech Instinct website. The Git repository audit trail is not an accurate reflection of the work contributed by the team members. This is due to the fact that GitHub was only used during the final stages of completion of the group assessment. The primary use of this tool was to collaborate on the website construction and all other aspects of this assignment, including majority of the written content

contributions are not recorded in the GitHub audit log as the group members found the use of MS Teams, Microsoft Word, and Notepad to be more efficient for completing those tasks. To see the Tech Instinct GitHub repository [click this link](#)

[TechInstinct Project Website](#)

THE TEAM

Abdul-Halim Ramadhan Vlahos.

Hi. My name is Abdul-Halim, and I'll be turning 17 at the end of the year. I was born in Adelaide, South Australia, but by descent, I am half-Greek and half-Indonesian. I currently live in Western Australia, and am home-schooled. As far as past education goes, I haven't yet finished high-school, but through OUA, I have completed some undergraduate courses, namely, the fundamentals of; mathematics, physics, English, 3D modelling, and programming. In order to be eligible for a Bachelor of IT, I am currently taking an RMIT course called "Introduction to Information Technology" (...which is what this website happens to be an assignment for, but you already knew that). My hobbies include football (⚽) and basketball. I've been interested in technology, particularly the concept of programming, for a long time. Since I was around 7, I used to make games in PowerPoint. Later on (since around 11), I made games in Scratch, a block coding website. More recently (last few years) I learnt Python and made some things there. I also learnt some Java, and, quite recently indeed, I learnt the basics of HTML and CSS.

S3893744

Jarrold Murphy.

My name is Jarrold Murphy, I'm 29 years old and am working currently as a level 3 teacher's aide where I work with the technology and workshop faculty's helping in fields of IT and workshop duties. I completed my certificate III in digital media and information technology this year and this is when I started my new job. My education in IT has stemmed from a lifelong interest in Computers and technology. I've started my studies in the field of IT because I think it's an ever growing and important industry that won't be going away in the future. I like to play poker, mountain bike, go to the gym, online game. I came to RMIT because I have a

full-time job and the convenience of being able to study single subjects online was ideal for me to try and slowly but surely get through all the subjects to hopefully finish and get a degree so I can earn more money in the long run. I expect to get a well-rounded knowledge of all aspects of the subject and find a specific field in the industry that may interest me more than others to pursue. Skills I would like to learn more about in this course would be an extensive knowledge of HTML, CSS, Microsoft Windows, Business Analysis, Python, Git and the ability to technically support with a high understanding in a security sense.

S3928474

John Norberg.

My name is John Norberg, and I am a 21-year-old student currently living in Sweden but am trying to move back to Australia where my mum currently lives. The reason for me living in Sweden is because I hold dual citizenship (Swedish and Australian) and have moved several times between the two countries. I have always loved playing video games and some of my earliest memories are from when I was playing Mario on my Gameboy in the early 2000s. However, my interest in IT really started at my university in Sweden where I studied robotics, however; the program was split into roughly equal parts programming and electronics. So, while through studying the program I realized my interest in programming and the software aspect of IT, I also realized my lack of talent and general interest in electronics, so I decided to drop out of the program and peruse programming in Australia. Most of my experience in IT also stems from the 2 years I spent studying robotics.

S3925832

Kylie Copeland.

I'm Kylie Copeland. I'm an Online Administrator currently studying Information Technology at RMIT University. I have a certificate IV in Information Technology Networking and have just completed the course Introduction to Computer Systems at RMIT earlier this year. Besides working towards my academic goals and achievements, I love to crochet in my spare time. I'm fascinated by Moore's law and the exponential growth of technology. I grew up in an exciting era for technology innovation and have obsessed with computers since childhood. I wanted to be a part of making exciting changes to the future using technology. Solving technical

problems is an important aspect of computer science and is something I find incredibly satisfying. Computer Programming, Computer Systems Analysis and Software development are areas I have a particular interest in, and I am eager work towards a career in these IT sectors

S3882854

Maleeha Yasir

S3928103

My name is Maleeha Yasir, I've recently turned 17. I am a dual national Pakistani/Australian, located in Melbourne Roxburgh Park, currently living in Pakistan due to Covid-19. I completed my High School through UK British studies O/A levels on June 3rd 2021. Talking about my hobbies, I love reading and bullet journaling in my free time, one of my advanced professions is in watercolor painting; it is said to be one of the most difficult types of paintings but I find it really enjoyable as high skill is required. The reason I chose IT was because of my interest that had been built over the past years, speaking of which, information security analyst is my main cause of attraction in IT, seeing how IT has grown to be the main backend for almost everything. Though I don't have any such experience in Information Technology I look forward on learning through RMIT.

Ngo Khanh Tung.

S3794510

My name is Ngo Khanh Tung. The given name was used for registration, my full name is Ngô Khánh Tùng to be exact and the name 'Ngô' is my surname as a common Vietnamese naming culture. I am going to become a personal trainer and a software developer. I tend to keep a low profile and I normally stay quiet as I enjoy silence but not being too silent. I am 22 by the way. I decided and started learning IT 2 years ago. I have had my interest in computers long since I was a child. I was intrigued by how the games and the software are constructed, what made them so lively and unique, so distinct from the real world.

GROUP PROCESSES

The team worked well together, especially towards the end of the assignment. We each fell into specific roles naturally and never officially discussed who would take what role in the team, which in hindsight, is something we probably should have done. A good example of this is how Abdul fell into the role of team leader, however; he himself did not want this role. So, this is something I believe we should take away for future group assignments, that it could be a good idea to officially give people roles, such as group leader, to the person who is most fitted and, most importantly, interested in the role. One thing we need to work on within this group is better communication and division of labour since some people did do more work than others, however; this was never forced, and these people volunteered to do more. While it was good that it worked out this was that everybody got to do the work they most wanted, a more formal and equal division of labour should be something we focus on more moving on to assignment 3.

One thing that was surprising with working within this group was, as mentioned above, how people got to do the work they volunteered for and showed passion for. The surprising thing about this was especially how everybody did this work on time with nobody missing a deadline for the work that they themselves set. This is surprising as a lot of the complaints you hear from people frequently working in groups is that group members tend to have lax deadlines despite what was officially discussed within the group. With this being the stereotype, I think everybody in the group was surprised to find out that that was not the case in this group. This was also a valuable lesson about working in groups, people in the group are just that, people; so, going into group assignments with these stereotypes is not a good idea as they will, more likely than not, prove to be false.

CAREER PLANS

The group members ideal jobs and career plans are quite different, though everybody does want to work within IT, which sector and IT, the reasoning behind it, interest etc are vastly different from one another. Maleeha and Abdul do share a common way of thinking, which is that they both state that as of right now they cannot give a concrete answer as to their dream job as they lack experience in the field. Though they are the only ones who have stated this in assignments 1 and 2, all group members (besides Jarrod) can relate to this quite strongly and it has affected our individual ideal job and career plan. Another thing that ties our ideal jobs and career plans together is education, specifically that we all would need a bare minimum of a bachelor's degree within IT (such as computer science, information technology etc), although after this is where our career paths take different turns.

Getting certificates within IT is a common trait for both Jarrod and Maleeha, though the actual certificates differ as per their writing, there is still a high chance that they may need to end up getting the same certificate since they both are interested in cyber security. Tung's dream job involved working with cloud service and networking, he mentions the same thing as Maleeha and Jarrod that cyber security knowledge is a necessity for this job, meaning that Tung will most likely also get the same/similar certificate(s) as Jarrod and Maleeha. John and Kyli's dream job are the same, though Kylie specifically mentioned working at a big tech company, they both wish to pursue a career as a software engineer. Their reasoning for this does vary, they share a common goal and will most likely choose a similar path to achieve this dream job.

PROJECT PLAN

OVERVIEW

TOPIC

Failing to provide timely lifesaving treatment to an injured person can be the leading cause of a road accident fatality. There is a clear need for a tool to help effectively call for assistance and to alert local emergency services while providing them with the precise location of the accident. This can be done by automating a request for help when the motion of a crash has been detected.

The purpose of the following report is to document the production of a service that can address the need of a computerised technology that improves the response time of emergency services and their arrival to the scene of an accident. This product is a possible solution or improvement to the delayed arrival of emergency services, by providing the emergency dispatch with prompt, and precise details of the road accident.

MOTIVATION

According to the Australian Institute of Health and Welfare, nearly two-thirds of all hospitalised injuries are accounted for by on road vehicle traffic crashes.¹

“Road traffic injuries kill more than 1.25 million people every year and are the number one cause of death among 15–29 year olds. Over 50 million people are also injured in non-fatal crashes every year, causing an enormous burden of disability.” (World Health Organisation)²

Esurance reported that 77% of drivers have been involved in at least one road accident and out of the 10 million road accidents that occur every year, 3 of every thousand are fatalities.³

The process of requesting immediate assistance after being involved in a serious accident, has proven to be difficult. Currently, there are mobile applications that promise to assist the user to request for help from emergency services. However, there is a need for a simple, user-friendly smartphone application that can automate the processes involved with requesting for help and also provide quick and accurate details of the precise location an accident may have occurred. Using the in-built technology of a smartphone, it is possible to detect that a crash has happened and trigger these processes automatically. It is possible that those involved in an accident are unable to move or are unconscious and therefore, unable to call for help. By using a straightforward approach, this product development is a possible solution to this problem and can allow for the user to increase their chance of survival and decrease the severity of an injuries.

LANDSCAPE

The premise of the WreckWatch is somewhat similar to the BlackBox design in planes. A BlackBox record flight information such as speed, position, and audio and can be salvages in a crash to find what happened, and what went wrong. WreckWatch is implemented in cars, and will record the travel data to ensure that there isn't an accident or crash. When the WreckWatch detects a

crash, it alerts the emergency response units to the location with information, ideally ensuring faster response time and higher survival chances. Another product with a similar purpose function is Google's new phone, Google Pixel, with its Personal Safety feature which detects a crash and contacts the emergency response systems. Hopefully, WreckWatch can provide safety, at a price a thousand times cheaper than the \$999 of the Pixel.

DETAILED DESCRIPTION

AIM

According to the Australian Institute of Health and Welfare, nearly two-thirds of all hospitalised injuries are accounted for by on road vehicle traffic crashes.[2]

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Tech Instinct is in the development stage of a new product, WreckWatch. WreckWatch is a mobile phone application that assists road users to alert emergency services and contacts in the unfortunate event of a road accident. This automated service will use GPS to provide an accurate location and the in-built sensors/accelerometer in a smartphone to detect a crash. The intent of this product development is assist the user to promptly and accurately request for immediate assistance.

By allowing smartphones to detect dangerous situations involving vehicles, and sending correct relevant information to the appropriate authorities, we hope to make the roads much safer than they are now.

PLANS AND PROGRESS

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WreckWatch is a project we're going to develop that will not only save lives but will also have a big impact on the people of this country. The lives of people are our number one priority, the fact that this project will not only save lives but will also reduce accidents. Sensors will be

used which will individually be connected to each car outside and inside, these sensors will play the role of notifying any unusual encounter, for this, multiple types of sensors will be used;

pressure sensors which will be used to detect the pressure of a car in collision, The pressure of an automobile in a collision is detected using a pressure sensor. This component also collects continuous pressure data and raises an accident alert when the pressure surpasses a 350-pound-per-square-inch threshold. The pressure sensor is utilized to improve the system's accuracy and lower the likelihood of incorrect accident detection and reporting. Smartphone Accelerometer sensor: If an accident occurs, the impact sensor generates signals that cause a flag bit in the micrometer to be set, alerting the microcontroller to the fact that an accident has occurred. The accelerometer sensors ADXL 335 from analogue devices were employed to detect the impact. It is a comprehensive 3 axis 3g accelerometer that is tiny, thin, and low power. It can detect gravity's static acceleration as well as dynamic acceleration caused by motion, shock, or vibration in tilt sensing applications. On-Board Sensors: It can accurately detect road accidents using an OBU that consists of an accelerometer and a gyroscope, as well as identify an accident event using the Global Positioning System (GPS). It has the ability to collect photographs from inside a car using a high-definition camera module, and then attach the recorded images/data to the other information transmitted to the destination. Using a vehicular ad hoc network, the entire message is forwarded to the edge node. Edge Gateway: These are the entities in the control room who are located in all of the regions. It is in charge of receiving an accident notice and subsequently processing the data gathered. Another duty of Edge Gateway is to use face detection methods to determine the number of victims and the individual involved in the accidents. It also analyses the data received from the network's nodes before informing the hospital so that the ambulance may be dispatched as soon as possible. It also has the capability of temporarily storing data until it is safely received by the cloud server.

The overall contribution of the proposed system is divided into two main procedures:

1. The first procedure deals with the automatic accident detection mechanism that also provides a module to record the necessary information. Additionally, the system based on the implemented Testbed deals with the following three novel aspects:

- (a) The detection of an accident with the help of sensed information through appropriate sensors where an algorithm has been developed to gather and monitor the required information. Based on the sensed information, it performs the logical computation to detect the accident. Once it is detected, it generates an alert message. This article includes the details of data processing of the accident detection module in a practical manner. Additionally, the contribution is presented through a flow chart of the proposed system to detect an accident correctly and in a timely manner.

- (b) The second module is used to identify the location of the accident and medical service nearby. It then notifies the hospital not only about the condition of the person but also about the severity of the event based on the damage. Moreover, it stores useful information about the incident for future use.

(c) The third part deals with the hospital module, which not only sends the ambulance to the incident location on emergency alert, but also gathers the passenger's status like injuries, deaths along with medical proof of alcohol and personal details like name, age, and the Electronics 2019, 8, 896 5 of 28 number of passengers, etc. This information is then sent back to another module for future use.

For this we'll put together an Android and IOS app where all the information will have input and output, the app will require a full login with each and every detail from name to blood group. This app will automatically be connected to every hospital in the area, Hospitals will also be made to implement this software where it will have direct communication with our app. The outcome so far; we have all our algorithms laid out and planned as well as the flowcharts as needed. The negative sides have also been listed out alongside some positive aspects; we came across some risks which have also been noted down and taken care of. Testing part is also cleared nonetheless the roles have all been assigned to each individual with tools and technologies. For more detailed information, view Timeframes, you'll get a better idea of our format and outcomes so far.

The following points may prove invaluable in reducing the number of casualties and injuries drastically, caused by road accidents:

- Providing medical help to victims of road accidents in a timely manner.
- Notification about the precise situation to the first responders.
- Lack of a permanent database, holding all appropriate documents and records, which can be examined as and when necessary

Section 1. Keeping false positives at bay to assess if an accident has happened, vehicle-based accident detection systems monitor a network of sensors linked to the vehicle. An instance of strong acceleration/deceleration owing to a big change in vehicle velocity over a short period of time is one major signal of a collision. These acceleration occurrences are difficult to achieve if a vehicle is not actively being driven, as an unattended automobile is unlikely to just roll away from a parked spot. However, because cellphones are portable, it's feasible that the phone will experience acceleration events that the user would not. A phone, for example, may fall from a height of 6 feet. It's critical to identify and reduce false positives in a smartphone-based accident detection software since it notifies emergency services and may deploy police/rescue teams. Because of smartphone mobility, it's difficult to programmatically distinguish between a real automobile accident and a dropped pocketbook or a fall on a hard surface. The failure to effectively recognize and reject false positives, on the other hand, might render smartphone-based accident detection apps ineffective by spending emergency response resources on fake event reports. Section?? discusses how we use devi to overcome this problem. However, the inability to effectively recognize and reject false positives might render smartphone-based accident detection apps ineffective by spending emergency responder resources on event reports that aren't really accidents. Section?? outlines how we solve this problem by filtering out probable false positives using device usage context (such as speed).

Solution approach

This section presents a "WreckWatch" prototype smartphone-based client/server application we created to solve the issues raised in Section 1. WreckWatch works in a similar way as an accident/event data recorder in that it records the route, speed, and acceleration forces on a vehicle prior to and during an accident. It may also deliver preset text and/or audio messages to emergency contacts, aggregate photographs and video supplied by onlookers at the scene of an accident, and inform emergency personnel of accidents.

The WreckWatch Architecture

WreckWatch is separated into two main components—the WreckWatch server and the WreckWatch client. The WreckWatch client was developed using Google Android. It acts as a mobile sensor, relays accident information to the server via standard HTTP post operations, and provides an interface that allows third-party observers to contribute accident report data

The Android client for WreckWatch is going to be built in Java and based on Android 1.5 with Google APIs. It is made up of many Androids app Activities¹ for mapping, testing, and image uploading. Background services monitor smart-phone sensors like the GPS receiver and accelerometers for accidents. The polling rate can be changed at compile time to fit the demands of the user and to ensure that the appropriate power consumption characteristics are achieved. To identify emergency contacts, the WreckWatch client can acquire data from phone databases (such as an address book). The Android client communicates with the server using conventional HTTP post operations.

The Spring Framework and Java/MySQL were used to create the WreckWatch server. It gives emergency responders, family, and friends with data aggregation and a communication channel. It also allows customers to provide accident characteristics (such as acceleration, route, and speed) and provides numerous interfaces for viewing this information, including a Google Map and XML/JSON web services.

The WreckWatch server updates a Google Map with location, route, and severity information as it becomes available, to assist emergency responders and other cars attempting to navigate the roadways around the accident. This map is produced with AJAX and HTML and is accessible through HTTP with a typical web browser. The rest of this section describes WreckWatch's formal accident detection model and strategy to reducing false positives, as well as elements of the WreckWatch client/server programmer that assist first responder situational awareness.

The period between an accident and its detection can be cut in half. In-vehicle accident detection and notification systems, such as OnStar, are effective in reducing the time it takes for first responders to get on the site. However, these technologies are costly and not accessible in every car. Smartphones may be used to detect accidents indirectly through their inbuilt sensors, such as accelerometers, to help boost the use of automatic accident detection and notification systems. However, there are a number of obstacles to overcome, including the possibility of false positives due to lost phones. Because of the enormous number of "phantom" (accidental) calls to 911, it's critical to lower the false positive rate of smartphone accident detection. Accident detection systems that are resistant to false positives can be constructed using a combination of context data, such as when a user is inside a vehicle, sensor data, such as accelerometer and auditory information, and

intelligent sensor data filtering. Air bag deployment, for example, is only activated when acceleration exceeds 60 G's. We gained the following lessons while building and testing WreckWatch, a prototype accident detection and notification system.

- Accidents cause extraordinary forces to be applied to a phone that are unlikely to occur when it is dropped. The forces produced during an automobile accident are enormous, and they are extremely unlikely to occur in any other situation save a high-speed collision. As a result, these events are easier to recognize and describe. Furthermore, false positives are less common when the accident detection technique is combined with contextual information to establish when the user is in a car.
- Smartphones have the potential to provide new situational awareness capabilities. Uninjured spectators and motorists can act as citizen scientists by providing several streams of speech and imagery data from the accident scene. This information can help first responders determine the severity of the event, the number of victims, and the need for medical attention. Smartphones can also offer information about the victims' identities and automatically notify emergency contacts, such as family members.
- App stores on smartphones significantly reduce the cost and complexity of software maintenance. On a smartphone, the built-in application upgrading methods and communication channels allow you to distribute updates to hundreds of millions of customers and roll back if the installation fails. This functionality has shown to be very useful in maintaining and improving software in accident detection and notification systems.
- It's probable that smartphones won't be able to detect all incidents. Because of the filters used to prevent false positives, it's possible that a low-speed "fender-bender" will be unnoticed by the app. To accommodate these types of collisions, further work needs to be done to improve the filtering systems. WreckWatch's filtering algorithm, in particular, could be improved to discern whether the user is in a car or not using historical data. Users may take similar routes to work, for example, and WreckWatch may learn where stops or speed restrictions are typical by analyzing trends (For example, if a person normally goes through an area at 40 mph but periodically comes to a halt, signaling a possible traffic jam). Similarly, WreckWatch might use recognized intersections to identify and forecast possible pauses or download traffic data to estimate the location of traffic jams caused by long-duration speed reductions.
- Acoustic data alone is insufficient for detecting traffic collisions. Our empirical findings reveal that signal clipping occurs above 140dBs in various smartphone microphones and signal processing infrastructure. This clipping makes it difficult to distinguish noises like shouting from air bag deployment. This constraint may be overcome, but it will necessitate considerable effort.

ROLES

- Project manager: Abdul-Halim Ramadhan Vlahos
- Business Analyst: Kylie Copeland
- Database Administrator: Maleeha Yasir Mian
- Software Architect: Ngo Khanh Tung
- Tester: Jarrod Murphy
- Cybersecurity Manager: John-Climent Norberg

SCOPE AND LIMITS

In Scope

- Create an *Emergency Contact* database – the creation of a data structure that facilitates the input and organisation of emergency contact data according to specific criteria.
- Create *Emergency Message* – this function takes current location data retrieved from GPS based location tracking information and inserts it into an emergency message.

- Send *Emergency Message* to *Emergency Contacts* – a feature that simplifies the process of sending *Emergency Message* to multiple recipients at one time, using the contact information retrieved from the *Emergency Contact* database.

Out of Scope

- Any deliverables, activities, core functionality, or rounds of revisions beyond what is outlined in the *In Scope* section above.
- Training documentation – only basic demonstration will be provided.
- Support and maintenance of the implemented system once the project has been finalised.
- The data entry – adding the actual data to the *Emergency Contact* database.
- Creation of a developer account, or any registration to application store/s services.
- Creation of link or any association to services that provide public with access to downloading a copy of the finalised project.

TOOLS AND TECHNOLOGIES

The key technology of this project is Arduino. This IOT gadget acts as a bridge to operate and connect every key component together. Familiarity with developing Arduino and electrical safety are strictly required.

Environment data including the vehicle's motion, speed and location, these data can be collected by using accelerometer and GPS module.

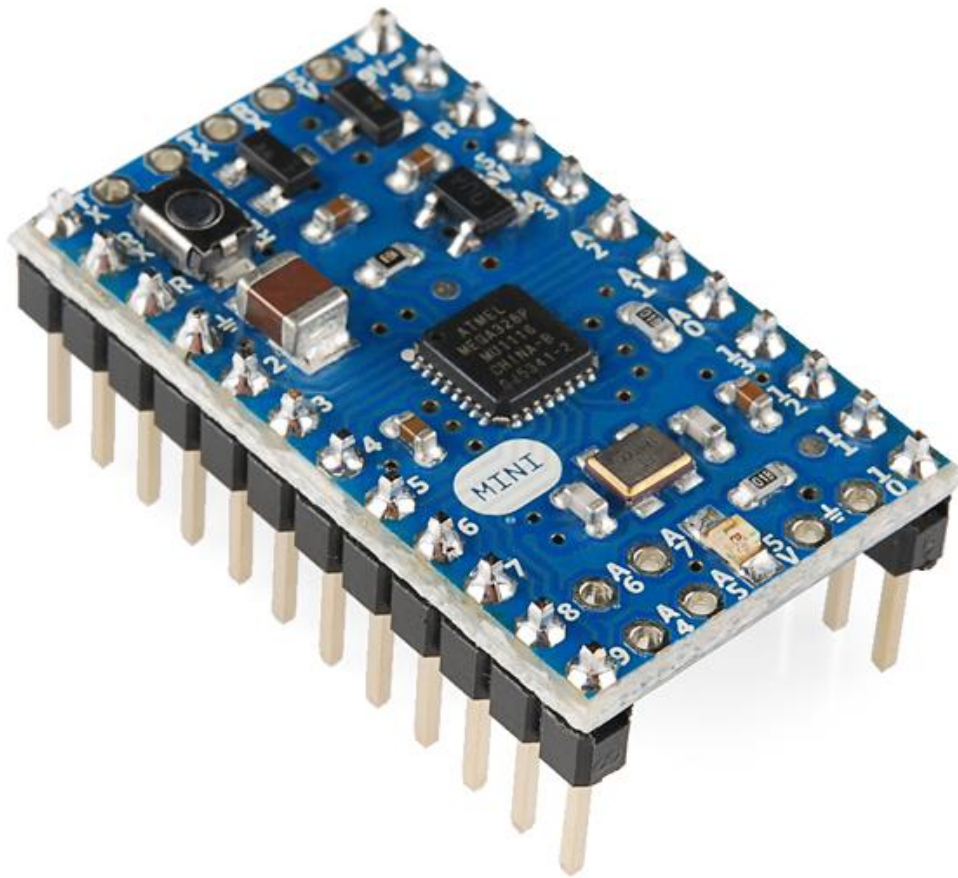
GY-251 module has a built-in MPU-6050 which is use for measuring velocity, orientation and gravitational forces.

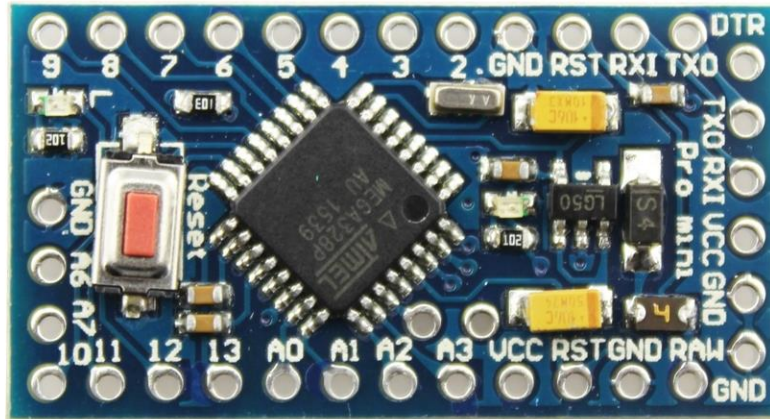
GPS module: GY-251.

The project will be developed on most common smartphones OS: Android and IOS

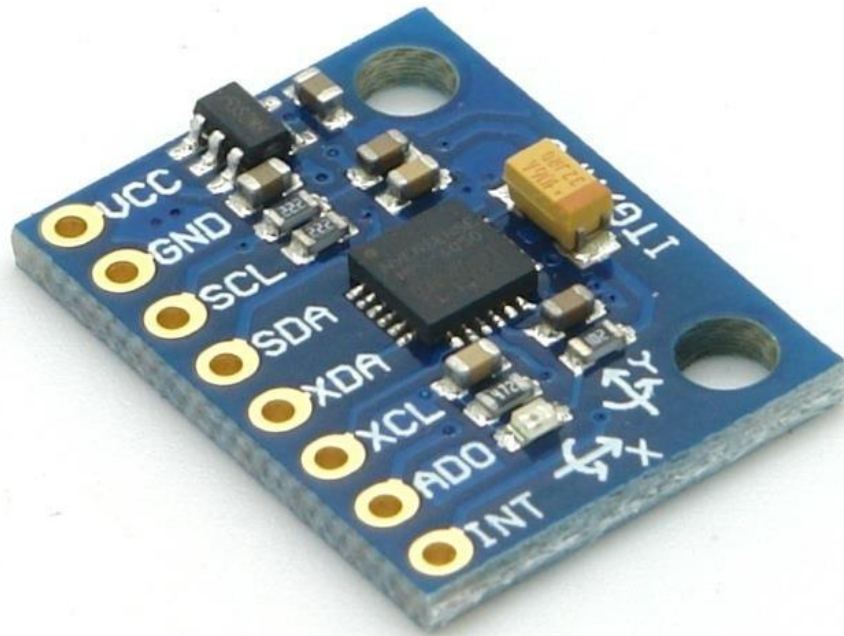
1. Physical and hardware components:

- Arduino Mini: a compact version of Arduino, a microcontroller that is able to have computation power and interact with other electronic devices. In this project, this IOT gadget is the key component which acts as a bridge to operate and connect every key component together. Familiarity with developing Arduino and electrical safety are strictly required.

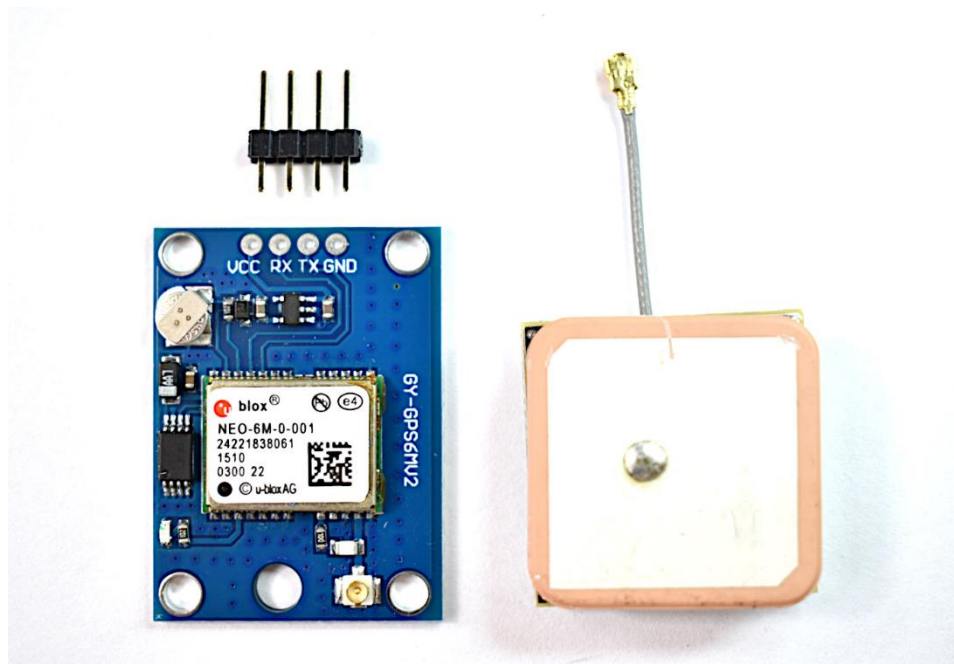




- Accelerometer and Gyroscope Sensor: GY-251. GY-251 module has a built-in MPU-6050 which is use for measuring velocity, orientation and gravitational forces. This component is used for detecting sudden changes in the vehicle's movement to identify likely car crashes.



- GPS module: NEO-6M. A module built for performing GPS (global positioning system) activities. This component is capable of communicating with GPS satellites and locating. This component is used to collect the positions of vehicles that happen to be in an accident.



This project is built and based on the current smartphones running on Android and IOS operating systems, which are the most common OS in the smartphone industry.

2. Cloud Services:

Amazon Web Services (AWS) provides a wide range of cloud services which can be utilised for many business models. AWS services are highly scalable and available across nations worldwide. In this project, the following services will be used:

- o Amazon Aurora: a distributed relational database service with high availability. With storage auto-scaling and automatic replication, Aurora gains high fault-tolerance. Aurora is compatible with MySQL, which will be used as the main database for this project.
- o Elastic Beanstalk: a deployment environment for web applications. This service is a combination of other AWS services which assists the users on configuration and scaling. Elastic Beanstalk is serverless since users only need to deploy and the service will handle most of configuration and allocation for healthy web applications. This service is utilised for maintaining the website for the project.
- o Lambda: a serverless computing service. It acts as functions that execute the code and automatically manage resources for computing. This service is used for executing algorithms, managing requests between components and the web, and sending requests for email and SMS notifications.
- o Simple Notification Service (SNS), Simple Email Service (SES): web services for sending emails and SMS messages. These two services are used as a notification system of the project.

3. Skill required:

Management skills:

- Project coordination
- Leadership
- Scrum
- Team working
- Tasks management
- Risks management
- Documentation

Technical skills:

- IoT devices development: Arduino and Arduino component.

- Programming language: C and C++
- Web development.
- Web programming languages: Java, NodeJS, HTML/CSS
- Framework knowledges: Spring Boot, React
- Mobile Application development
- Mobile Framework knowledges: Mobile Angular UI
- Database management: MySQL
- Cybersecurity: web and mobile applications
- Cloud services and cloud architecture knowledges: AWS

TESTING

At Wreckwatch our goals are to make a technology that helps provide emergency services and people a more direct way to inform the required services needed to help in a very distressing situation, this cannot be done without testing our product to ensure this can be delivered. One question that needs to be answered or tested by WreckWatch is which part of the globe this product will be most effective in. By using statistics on car accidents and where most injuries and deaths occur in the world would provide a good indicator of where WreckWatch would be most suitable to implement the product and where it would have the greatest impact to help emergency services and in effect help save lives that may be in danger from these accidents. Social media would be used to take in surveys from users to see if this is a product that the public would use, this could also be useful to find out the best areas of people who would be most interested in using the product. The most crucial part of this product working is to figure out if using an OBDII sensor with an application or iOS device in a crash scenario will be effective at relaying the response via SMS to emergency services. This can be done by setting up a standard crash test scenario with dummies and the use of the WreckWatch system installed into the vehicle to make sure that everything works accordingly without any bugs as to not have false positives and being counterproductive in what WreckWatch is trying to achieve.

TIMEFRAME

Weeks	Maleeha	John	Jarrod	Kylie	Tung	Abdul
7th	Overviewed the assignment, planned & laid out drafts on the intro.	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2
8th	Planned and laid out drafts for the overall Project.	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2
9th	Finalized, revised, added images and edited.	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2	Worked on other parts of assignment 2
10th	-----	-----	-----	-----	-----	-----
11th	Worked on other parts of assignment 3.	Rerevised the whole project making changes as per suited, using the feedback.	Worked on other parts of assignment 3.	Worked on other parts of assignment 3.	Worked on tools and technologies.	Worked on other parts of assignment 3.

12th	Worked on Timeframes.	Worked on roles + Scope and Limits.	Worked on Testing.	Worked on other parts of assignment 2.	Worked on tools and technologies.	Worked on Group processes and communications.
13th	Look into Tools and technologies and further understand them.	Look into Tools and technologies and further understand them.	Look into Tools and technologies and further understand them.	Look into Tools and technologies and further understand them.	Look into Tools and technologies and further understand them.	Look into Tools and technologies and further understand them.
14th	The Proposed architecture layout will be prepared	Algorithm for accident detection	All the components needed for Accident Detection (hardware and software) will be organized	The design for the app will be drafted.	The connections needed, the AC, noise and speed will be taken care of.	Accident detection and reporting algorithm chart will be prepared.
15th	Put together the generic architecture, The architecture of ADRS & the working of ADRS	The algorithm will be rerevised for any errors.	Components needed for Accident Detection (hardware and software) will be tested and made sure everything is functioning correctly.	The design for the app will be finalized with any changes to make.	Overview of the proposed system	Flow diagram of the proposed system
16th	The databases needed from the hospitals and	Algorithm for notifications will be laid out.	The front end developing for the first 3 pages	The front end developing for the rest of the 3 pages.	The notification part will be fully organized and ready to function.	Abdul will partner up with Tung for the notification part.

	cars will be gathered.					
17th	The backend for the inputs required for the app sign in, username & password	The backend for the inputs required for the app sign up, Email, name, blood group, emergency no & password	The backend for the inputs required for the app to start tracking, G-force, speed, pressure & sound.	The backend for the inputs required for the app to stop tracking, G-force, speed, pressure & sound	The backend for the inputs required for the app when accident detected, G-force, speed, pressure & sound	The backend for the inputs required for the app to cancel alarm, 6 seconds delay notification, accident detected bar pop up.
18th	The backend part will be taken care of for notifications.	Jhon will partner up with Maleeha for the backend part.	Accident and reporting system.	Accident details	Location of the accident,	Threshold evaluation
19th	Notification phase implementation	Testing the G-force value while dropping a smartphone,	Accuracy percentage of experiments	False reporting of experiments	Parameter based comparison	Abdul will partner with Jhon.
20th	Case 1: where we will compare the speed value with the sensor which Cannot detect speed less then 30km/h estimated	Jhon will help Maleeha with the first case.	Case 2: where we will have 2 situations in this case with 2 sensors	Kylie will help Jarrod with case 2	Case 3: In this case we will multiply the sensors and will use the accelerometer, speed, noise and pressure sensors.	Abdul will help Tung with case 3.

21st	Evaluating the possibility for false positive acceleration values	Jhon will partner up with Jarrod	Evaluating accident reconstruction capabilities	Kylie will partner up with Maleeha	Evaluating the possibility of acoustic false positives.	Abdul will partner up with Tung
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RISKS

One of the biggest risks we are taking with this project is, ironically, taking on this project. Because all members of this group are new to IT, this project is a huge risk considering our lack of experience and proficiency. This is because we will not have a baseline for a timeframe or experience with planning, group work, proper testing, the tools involved, revering from a failed test etc. So, with such little experience and knowledge, taking a project this grand with such consequences is a big risk in in of itself.

Another big risk is the responsibility that this product would put on us. It is intended to save lives and/or reduce injuries in vehicle related accidents. If it were to fail to do so, that would way heavily on the mental health of us as a group. This is a huge psychological risk we would we be taking by making this project a reality, it must work since you do not get do overs in real life. If the product fails, the responsibility would be on us as the creators, which could be extremely detrimental to our health.

GROUP PROCESSES AND COMMUNICATION

Good communication is a vital component of a successful group project. Our group has communicated thus far using primarily Microsoft Teams, and, to a limited extent, email. The group has held two meetings per week on Microsoft Teams discussing the project report and its surrounding details. More information that is omitted in the meeting may be discussed by posts in the General channel of the Teams group, or member specific information can be exchanged via the Chat feature. Project failure is commonly

caused by group miscommunication, and to ensure that every member is aware to be present during information briefings, we established a set time and date for the two weekly meetings. If a group member happens to be unavailable for the meeting, they ideally let the group know beforehand, allowing the other members to consider rescheduling. We also decided to have a 10-minute delay in the beginning of meetings if waiting for an absent group member to attend the meeting, and to begin thereafter if the member had still not appeared. Members may also view the recording of the meeting later to brief themselves of any information or tasks.

SKILLS AND JOBS

At Tech Instinct, we work with a wide range of emerging technologies and are always striving to innovate exciting new tech related products. We are currently seeking motivated and skilled IT experts to join our team as we work towards the release of our debut mobile application.

Arduino Programmer

You will be responsible for:

Working as part of a team

Prototyping microcontrollers and embedded systems to develop a range of solutions using Arduino hardware and software such as Git repositories

Planning and designing new hardware systems

Developing algorithms to take inputs from hardware and perform proper data processing techniques to obtain desired outputs

Working with a range of hardware devices through communication mediums such as Bluetooth, infrared, and RFID/NFC

Requirements:

Bachelor's degree in robotics, computer science, programming languages, or a related field

Familiarity working with a range of Arduino firmware, components, and software libraries

Experience working with embedded systems and IoT devices to create new hardware solutions to problems

Proficiency with Arduino IDE and the Arduino programming language or similar programming languages, such as C/C++, Python, and JavaScript

Understanding of integrated systems and how hardware devices communicate with each other

Mobile App Developer

You will be responsible for:

Working as part of a team

Building a new Android application or iOS from scratch

Keeping up-to-date with concepts, terminologies, and global best practices for the coding of different mobile applications

Ensuring the application meets quality standards

Collaborating with the team to innovate app functionality and design

Documenting project plan and technical specifications

Requirements:

Bachelor's degree in robotics, computer science, programming languages, or a related field

Experience as a mobile app developer

Competence in Android, iOS, and Windows operating systems

Excellent communication and organisation skills

Problem-solving skills

Skills in mobile technology and building apps for Android, iOS, and Windows platform phones

UX/UI Designer

You will be responsible for:

Working as part of a team

Mock prototypes, site maps, user flows and wireframes

Developing UI assets

Conducting research and testing, including competitor analysis, user interviews, gathering insights from research reports, usability testing

Create style guides to ensure consistency while adhering to brand guidelines

Requirements:

Experience in a UX/UI design role

Ability to wireframe and turn into UI designs

Must have a high level of attention to detail and high level of creativity

Experience with building out design systems

Mobile app design and responsiveness across Android and iOS

Java Team Leader

You will be responsible for:

Developing features and technologies across various aspects of the Java stack, primarily focused on Spring Boot and Spring Cloud

Working with the team to build strategies for execution

Facilitating key decisions

Conduct design and code reviews

Project coordination and team management

Requirements:

Possess an understanding of cloud architectures

Experience in a similar role

Bachelor's Degree in Computer Science or equivalent work experience

Experience in building mission critical applications from scratch

Experience with a broad mix of technologies, including a strong subset of; Core Java, Spring Boot, Spring Cloud, Angular JS, SQL, AWS

GROUP REFLECTION

John Norberg:

The experience I have had working in this group has been mostly positive. It has been a fun experience seeing everybody agree to do x amount of work on y thing, then checking the document/website by the set due date and everybody has done exactly what they have said. Watching the website being built and documents filled out by others while I am off doing my own part of the project is really fun and motivating. A big part of why I have enjoyed the group work has been that our group is really easy going, as in everybody listens to each other's ideas and gives everybody a chance to say their piece, as long as you have the courage to speak your mind the group will definitely listen and either agree and give constructive feedback as to why they don't. The biggest problem our group has had however is definitely our organizational skills, scheduling meetings has proven difficult. Though that is most likely due to our lack of experience working in groups online with people from many different time-zones.

Maleeha Yasir:

Considering everything, every member of the team played their role evenly. The group overall knew what we had to do, how to compromise in a team, everything fell into place smoothly even after facing a few obstacles towards the end.

I personally believe the thing that could improve is our daily sitting on Microsoft teams, to contribute to a team you need to always have set times where anyone is free to discuss anything with you regarding any part of the assignment.

The surprising thing that I encountered was that everyone knew how to contribute in the team, they all knew how to manage things, whereas I thought everyone will take things a bit confusing at the beginning and struggle.

I have learned that working in groups isn't all that easy, nor too complicated. If you want to do teamwork you need to have top-notch communication skills, you have to be upfront, and most importantly you need to be able to collaborate.

At first most of the team members struggles with GitHub, but after getting the hang of it, GitHub allows you to go back to the previous code and update it with any changes, you can commit those changes as a new branch, or directly to the main branch.

Kylie Copeland

This team was successful in achieving our objective which makes it difficult for me to pinpoint any improvements regarding performance. This has been a rewarding, challenging and enjoyable experience for me, personally. I thoroughly enjoyed most aspects of working as a group and collaborating with my team to work in these assignments. I don't feel that the outcome would have differed by much had we scheduled our meetings differently. Meeting remotely via video conference is something that is new me and probably to most of us, however, I was amazed that we were all able to meet as a group as often as we did. I was really impressed by that. I felt that our system of deciding who would be Chairperson and who would be Secretary (taking minutes/writing agenda) was very effective. Something that I would probably do differently, if I were to work collaboratively on a team project, is changing the procedures involved in the use of an agenda for each meeting. This may have improved the structure of our meetings and we may have used that time more efficiently.

Abdul-Halim

I think a good decision the group made was to have set meeting days each week; that helped ensure everyone was aware when to turn up for their next briefing. During the later stages, the group began to broke down what needed to be done, which was very helpful. Overall, I am grateful to have had this group of students to work with, as they were kind and supportive, which lightened my struggle with anxiety as much as possible.

I've been thinking about the reason why we've ended up being quite so late, and I've arrived at the conclusion that it is probably my fault. I stepped away from leading and stayed more silent, and didn't really take on extra or more complex tasks. I guess I was burnt-out from pushing myself through the first Group Assignment. The group probably had a harder time without the direction and organizing they expected, and that may be why we're later than anticipated? I expected from the start I would be bad at group work and was worried about letting the group down. So I am disappointed in myself and apologetic.

Despite the stress it brought, I can be thankful for the experience I've gained from group work, it seems to have reduced my social anxiety, even in public (unless I am just beginning to grow out of it, perhaps?).

Ngo Khanh Tung

As a second-year student at RMIT, working as a group member is not too unfamiliar while dealing with school assignments. Despite that, there are still far more things that I have learnt after spending time with Team 9, 'Tech Instinct'.

One of that is trust. For the first time I have the feeling of workload management, we share a same big assignment, a same project and yet everyone has their own jobs, and the work was done quite well eventually.

Participating and managing meetings ever week is also an achievement when we could in turn be the chair and doing the documentation instead of one or two persons doing all the work.

As time pasts, we gradually could not only be more casual and open to each other but also keep our professionalism. I am still a shy, introverted member but I finally saw some progresses and found my place inside a team.

I am truly grateful to work with Team 9 and hope to meet our team members and work with each other again in the future.

Jarrold Murphy:

My experience working with this group has been mostly positive, everyone has tried their best to get the work done and handed in as promptly as possible. Doing group assessment work over the internet can be quite challenging and I think it's important to have the ability to overcome that challenge to continue down this style of learning. This was why I was surprised that we did so well in our first assessment as a group, this gave me confidence going into the final assessment as a group because of everyone's hard work in the previous assessment. Organisation in meetings has been the biggest issue with us in my opinion but that's just part of the challenges that come with doing this work online especially when there's different time zones and daily life with work etc. I think everyone is at the same stage in which we are competent with computers and this area of study which has been a little challenging in some areas of our project idea in figuring out exactly how we will achieve our goals of completing the assessment but I'm confident in our team at getting it done.

Summary

The experience each individual group member has had during these 3 assignments has been mostly positive throughout, as seen in the individual group reflections. Planning meetings with members who are in different time-zones has both been easy and difficult at the same time, once a plan for a meeting had been set everybody attended without a problem, as long as work or life in general got in the way. The group saw the benefits of having meetings via teams, a big part of that however was because the actual members. Each individual reflection stated at least once how their expectations for the group were exceeded and praised each other. The a few group members stated that as time went on, they felt more comfortable with working in this group, which shows that the group had a good environment for people to work in. Keeping a professional and non-toxic work environment is a key aspect to group work, which means that this group was successful at achieving on the most important things for working in a group.

One of the biggest things that everybody in the group agrees on is that scheduling our meetings is something that needs to be improved. While the circumstances for this course made scheduling much more difficult than regular school group works, having it be more difficult also highlighted even more our own shortcomings as well as the importance of overcoming them. Because almost everybody is in a different time-zone, with vastly different life circumstances, scheduling meetings was difficult. Towards the end of the course, we did decide on a specific date and time which worked consistently for everybody; however, for the other weekly meeting, the planning was far more spontaneous meaning some members were left out. The side effect of this however was that members saw the appeal of having online meetings as they could be recorded, meaning that group members who missed a meeting could easily catch up.

Another improvement the group members should consider in the future is something Abdul wrote. He states how we was the acting group leader but kind of fell out of that position later. However, the position was in a little forced onto him in. In the future the group members should consider formally announcing a group member as a leader instead of leaving the position open until someone reluctantly takes on this role.

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Tables

Table 1

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Column Head	Column Head	Column Head	Column Head	Column Head
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