Project Plan & Software Design Document

Group-34 (Visualization of Urban Mobility Related Wheelchair Data)

SWE40001 Software Engineering Project A

5/28/19

INDEX

Executive Summary

Visualization of Urban Mobility Related to Wheelchair Data is a project that aims to help a team of researchers. The aim is to assist in developing a smart wheelchair that will help to derive meaningful information from the sensors attached to wheelchairs. The derived information will in turn help wheelchair users as well as town planners to improve the urban accessibility.

Our clients have collected data related to angular velocity, translational acceleration and GPS coordinates corresponding to timestamps using different sensors. This in turn created a problem, which is information overload (infobesity, i.e. too much information). The information collected had to be filtered and processed or visualized to make it easily recognizable.

We proposed a web application to present this data into meaningful visualization figures. The parameters of the visualization will include the speed of the wheelchair, surface roughness, zero-activity, and fatigue calculation. Our proposed solution would have key indicators for it. The parameters will then be superimposed on the Map as a color-coded path and figure lines corresponding to the GPS coordinates.

The system will be developed in three stages; 1) Requirement Analysis, Data gathering and Prototype Development, 2) Product Development and 3)Testing procedures. The product will have applications to go further into real-time scenarios in the future. The project will then be able to implement navigation system.

VISUALISATION OF URBAN MOBILITY RELATED WHEELCHAIR DATA

Project Plan

Team: SABAQ

List of your Names:

Name	Position	email	phone
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SWE40001, Software Engineering Project A, Semester 1, 28/05/2019

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1. INTRODUCTION

The given document is a project plan that details the methods and technologies that were used to build this project, the document lists out the members involved, processes used, deliverables and risks involved for project completion. The current project is an attempt to visualize data from wheelchair users to vaguely define datasets corresponding to path from wheelchair users experience. The purpose of this application is to visualize data on a map that will help to extract useful information from the data collected. The initial data set targeted will relay information about the path of the wheelchair, Fatigue of users, GPS locations and translational acceleration.

The project plan conveys specific methodologies and criteria responsible for the proper delivery of this project. It will help the team to understand any unclear portions within the project and helps to proceed forward without any obstruction in the future. Anyone who is involved in the project should read this project plan to understand the simulation of this project and implementation phases about it.

1.1. BACKGROUND

The client's research is based upon a framework which is an exploratory user-centered design which targets people who use wheelchairs, their families and therapists to identify priorities in wheelchair and seating system, barriers to participation in life situations. The project is broken down into proof-of-concept studies that aim to collect data from wheelchairs. The data will give us a clear objective measurement of daily activity which will help us understand the use and positioning and other parameters in everyday use of the person using a wheelchair.

Our project is aimed to build an interface that helps our client to input these wheelchair data and visualize the location points on the map easily. The interface will be able to generate a result based on the client's algorithm and visualize parameters which will help end users to increase understanding and interpretation of data collected by the wheelchair.

1.2. KEY PROJECT PERSONNEL

The key personnel involved in this project are as follows:

1.2.1. CLIENT

This project falls under a portion of research named as Smart Equipment Engineering and Wearable Technology Design. Our clients are a team of researchers who are partnered with Swinburne on this project to build a functioning futuristic wheelchair.

Professor Tino Fuss
Professor Tino Fuss is the core Program Director for the research Smart Equipment Engineering and Wearable Technology Design. He is also a professor of Health and Sports Technologies

Adin Ming Tan
Adin Ming Tan is a team member for the research.

Doctor Yehuda Weizman
Doctor Yehuda Weizman is also a team member of this research.

1.2.2. CO-CLIENT

Ahsan Morshed amorshed@swin.edu.au

1.2.3. PROJECT SUPERVISOR, TEAM LEADER, AND KEY PROJECT MEMBERS

The list of stakeholders other than the clients for this project are:

The key team members are:

Team Members		
Name	**Role**	**Email**
Binay Dhawa	Leader and Developer	101187399@student.swin.edu.au
Andres Alvarez	Developer	101742154@student.swin.edu.au
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The mentioned people above are the list of stakeholders in our project. We are not putting people using wheelchair in our scope as our product is only meant for researchers involved in this project. The stakeholders may expand at a later stage with people being added into the project but as the software is tailored to the use of the current client, we have listed our clients as our stakeholder.

2. TERMS OF REFERENCE

2.1. OBJECTIVES

Mobility is an essential factor for welfare, but urban spaces environments often do not respond to the needs of people with disabilities. The current research is intended to gauge how the environment the wheelchair is on, is adapted to the user's needs, related to the properties of the ground, accessibility of the transport.

Our project is to create a web application that visualizes different parameters of data on Google Maps using Google Maps API. the data will be supplied by our clients in their data collection for their research. Our final product will help researchers to analyze and understand data in an easier way.

2.1.1. GOALS AND OBJECTIVES

The goal of this project will serve to visualize GPS data on Google Maps, the path of the wheelchair, whereby the other parameters are color coded and superimposed on the path. List of parameters are:

- Wheelchair speed (GPS data and sensor data)
- Surface roughness
- Zero-activity (identifiable by the difference between the speed of GPS and accelerometer sensor)
- Stroke pattern and possibly fatigue (optional, dependent on data collection on client side)

The project's objective will impact the following outcomes for the client:

- **Increased reliability**: Because the visualizations of the data will help to make better and clearer decisions for your investigations.
- **Increased data integrity**: The data will go through a process, with rules that guarantee the validity and accuracy of a data set or all data contained in a database. Protecting the validity and accuracy of data also increases stability and performance while improving reusability and maintainability.
- **Increased efficiency**: Decision making through visualizations is much faster and more efficient than traditional ways of doing research. Also, the visualization of the data can reveal information that researchers can rapidly incorporate into their investigations.

2.2. SCOPE

2.2.1. SCOPE STATEMENT

To produce a web application that visualizes sensor data on Google Maps using Google Maps API.

2.2.2. SCOPE ITEMS

1. The project team will design and develop the web application customized for the clients.
2. The web application will be PC and mobile friendly.
3. The project team will design wireframes and prototypes for the web application.
4. The software will meet the goals and objectives defined above.

2.2.3. SCOPE CREEP

1. The use of machine learning algorithms.
2. Real-time data processing may be out of scope due to unavailability of hardware applications and time constraints
3. We cannot attend experiments for data collection through a wheelchair.
4. The knowledge about sensors and hardware concerning data collection may be out of scope for this project
5. The support for the software ends with the semester, the user will have to request for an instance in Nectar for new instance or extension of the current ones through a new proposal request.
6. Interfacing our software to wheelchair sensors is out of scope.

2.3. CRITICAL SUCCESS FACTORS

Critical Success Factors(CSFs) defines the successful expectation for the team during and after the project. Key Performance Indicator(KPI) defines the quantitative metric for each success criteria. The table below lists out the CSFs of this project

Table 1: *List of Critical Success Factors*

Phases	CSF	Factors	KPI
DURING DEVELOPMENT	**1. Time**	❑ The project can be delivered within the desired schedule. ❑ Proper functions are delivered within schedule. ❑ Deliverables are clearly defined	❑ Every team member will record his timely progress. ❑ Tasks will be ticked off from trello board according to schedule. ❑ Scrum meeting is organized weekly.
	2. Requirements	❑ Team has a proper direction for the product. ❑ Client deliverables are properly addressed.	❑ Project team members are getting requirements right by clarifying with clients during the meeting. ❑ Team meetings are held weekly ❑ Client issues are properly noted down. ❑ Clients are updated on any change or updates on the product. ❑ User stories are defined. ❑ Wireframes and productivity are properly created.
	3. Skill	❑ The project team has required technical knowledge. ❑ Address a common framework where all team members are involved.	❑ Ensure each team member has a general idea of the product before they begin working on it. ❑ Team members are expected to work on developing the required skills. ❑ Documents and code help is provided, if someone is stuck on an issue, code issue will be addressed on the slack chat.

	4. Risk	❑ Project risks are properly outlined ❑ Risk mitigation procedures are also properly defined	❑ Brainstorm risk of the project.
	5. Productivity	❑ A proper schedule is maintained and logged ❑ Project team members are communicating.	❑ Every member should achieve weekly tasks designated to them. ❑ Team meetings and log updates are carried out weekly and daily respectively
AFTER DEVELOPMENT	**1. Client Satisfaction**	❑ The client is highly satisfied with the end product. ❑ The project meets requirements defined ❑ Project is able to achieve the goal/ objective listed within the deliverables ❑ The project has a user-friendly interface.	❑ Client's satisfaction over 80 % ❑ Achieve over 90% of client request features. ❑ People with no expertise can visualize data and use the web application.
	2. Testing	❑ The project needs to be tested before deployment. ❑ User stories are created.	❑ The proper framework is defined and utilized. ❑ Test-oriented development is created accordingly for each function.

2.3.1. SWOT ANALYSIS

The critical success factors are key outlines that will help a project to define its definition of done, they mark milestones and needs for the project. The critical success factors are essential for project completion in a timely manner. We have done a SWOT analysis to define critical success factors in our sector. The CSF will define the current and the future designation of the success of the enterprise.

Table 2: *SWOT Analysis of Critical Success Factors*

Strength	**Weakness**
● Features of the map ● Accessibility and user-friendliness ● Team with related web application experience and knowledge.	● Integration error ● Cloud Access error ● Consistent involvement with the client
Objective	**Threat**
To produce software that will help to visualize data; Interpret data into facts and figures that help in data analysis 1. Distance calculated. 2. The roughness of the surface is calculated. 3. Speed is calculated. 4. Fatigueness is calculated (Stroke Pattern). 5. Visualize the speed of the wheelchair on the map. 6. Visualize the route of the wheelchair on the map. 7. Visualize the roughness of the road on the map. 8. Visualize zero-activity when the wheelchair is not moving on its own. 9. Visualize fatigue of the user with stoke pattern.	● Time constraint ● Change of user requirement ● The increase of project scope ● Server hardware down ● Framework and API errors

The SWOT analysis above helps us to recognize our project in a more detail manner and help us to minimize risks and identify key strengths and weaknesses.

The opportunity/objective we have is to develop an application that encompasses the given features. In doing so we encounter Threats such as Time constraints, Requirement, and Scope. More detail about the Threats can be seen in ***Section 6, Risks*** *of this project.*

The key Strengths of our project is that the features of the map, using google maps such as its user-friendliness and accessibility which makes the system environment better for interactivity and more accessible.

While producing this software we do have some weaknesses such as Framework and API, it is common to encounter API errors and integration in deployment, this might take more time to resolve bugs. More weakness for this application is its nature of using a cloud application, the unavailability

in cloud resource makes the application useless, data will not be accessible and the features of the system will not be functional.

2.4. ACCEPTANCE CRITERIA

Definition of Done

The definition of done for this project will be dependent upon the successful integration of Google Maps API with visualizing the data sets accumulating facts and figures that will visualize data corresponding to GPS data of the wheelchair, speed of the user, surface roughness, zero-activity, and users' stroke pattern. A comprehensive chart or figure that relays the information along with integration with maps will be the final product for this project.

- System user signs in with valid credentials.
- The maps created with the points of the dataset is displayed.
- Every coordinate is marked on the map.
- There is a button "Show Map" to open the map view.
- Interval of time option should display in the interface.
- Correlation graph should display once the user chooses a time interval.
- The main objectives of the project have been successfully achieved within the described scope.
- The final prototype responds all performance, non-function and functional criteria as described in the software requirements specification.
- The final functioning prototype; with usernames and passwords are delivered to the client.
- All technical and usability documentation produced is handed over to the client.

3. ESTABLISHMENT

3.1. PROCESSES, PROCEDURES, AND STANDARDS

The team has selected Scrum process to manage processes, procedures, and standards for the project. Scrum is an agile framework for managing development projects. It was selected due to the familiarity of scrum procedures in our team and its agile nature. Scrum was best fit for the project as most of the team members were familiar with it and the project standards or direction were constantly updated. The Scrum environment was better suited for this project mainly because of our goals were structured to be initialized on a number of phases and each phase was dependent on the other, ie the backlog had to be regularly updated and each of these phases was accustomed to sprint definitions.

Sprint backlog was created each week and a sprint review happened at the end of each week to discuss drawbacks, completed tasks and to create new backlog items

The Sprint planning happens at the end of each review where a set of tasks are finalized and a new set of product backlogs are created. Sprint retrospective happens on the end a sprint where the team realizes the tasks completed and a new set of tasks are defined, the sprint retrospective and Sprint planning usually go hand in hand.

For our Sprint we consider the client as the product owner.
ROLES:
The Sprint duration was set for 1 week keeping in mind the confusion during the first week. The ***Scrum master*** was our ***Team Leader***. The ***Product owner*** of this project were ***our clients***. The rest of the team were assigned as ***Team members.***

PROCESS:
Each sprint was designed to be carried out for four weeks with a mid-sprint happening on week 2. We avoided daily standups but kept ourselves updated regularly through messaging channel in slack. Each sprint is designed to be four weeks with a Sprint review happening each week to update on backlog tasks. A time frame for four sprints was created but the first one failed due to planning nature of the stage. We have however carried out sprint reviews and documented minutes of the meetings on the google drive. A Sprint Retrospective is yet to be carried out in the final weeks.

3.1.1. VERSION CONTROL

A distributed version control environment called ***Git*** was selected for ***version control*** for the project. The project repository was set up from the first day of a team meeting. A GitHub repository designated for the team was created and files were regularly updated to ensure project progression and unwanted deletion. It allows us to integrate on their work together and can be used to track changes in any file system. It gives the user the required data space, integrity, and non-linear workflows.

The link to our GitHub is: https://github.com/Bdhawa123/SEPAB-34

3.1.2. PROJECT ENVIRONMENT

The project is set up to be completed by a team of 5 final year computer science students while doing their own respective university studies. As each of us are enrolled in full-time study load in Swinburne University, the usual work environment is set to be in school using our own personal computing equipment and software which incur no monetary cost on the project. Also, the whole project development process is expected to be conducted for free with online resources and weekly on-site meeting with the project supervisor at Swinburne Atrium.

The project will require the implementation of Client-Server architecture. Therefore, the team has decided to deploy both the web server and database server on the *Nectar Cloud* for no monetary cost. *Nectar Cloud* is a platform that provides computing infrastructure to Australia's research community. Although the team has only been granted a year of access to Nectar Cloud which is only valid until April of 2020, the clients can extend the length past the valid date anytime by lodging a request with Nectar Cloud.

3.2. PROJECT TEAM SKILL DEVELOPMENT REQUIREMENTS

The project skill selection was based on the client requirements but as the client had not specified any necessary platform or skills, we made sure to work on the skill set that we had in common for this project. The team used a common framework such as ***Scrum*** for development ethics, languages which were known to everyone was taken into account to start working on the software.

We decided the software to be a web-based application considering the client's requirements and the common grounds of each developer. Also, we decided to work on standard HTML, JavaScript, CSS, PHP, D3 and Google Maps API for front-end. SQL, cloud server administration and PHP for the back-end. As only a few people in the team had prior knowledge of D3 and Google Maps API, it was made essential for everyone to master these frameworks for the project to succeed.

4. PROJECT DELIVERABLES, ACTIVITIES, AND CAPITAL RESOURCES

4.1. DELIVERABLES

The deliverables for our project will only consider software and research side with basic user interfaces that will utilize user design stories and mockups, wireframes to produce a viable product that will be able to achieve our list of definition of done and critical success factors. The project, however, will not deal with the business side as there is not enough data and information about the organization to fully comprehend how the project will help the business/organization goal. The Deliverables for the project is divided into two parts:

Project Management Deliverables:

1. Project Scope and Goals
2. SWOT Analysis
3. Risk Analysis and Assessment
4. Project Work Breakdown Structure
5. Estimation of budget
6. Gantt Chart and project schedule
7. Wireframes and a Prototype
8. Project reviews
9. Minutes of Meetings
10. Scrum Reports

Product Deliverables:

1. End-user Manual.
2. Technical Manual, Front-end, and Back-end.
3. Software Source Code for front-end and web server.
4. Final Report.

4.2.WORK BREAKDOWN STRUCTURE

List of works broken down into sub-work pieces

Table 3: *Work Breakdown Structure*

Level 1	***Level 2***	***Level 3***	***Dependencies***	***Hours***
Project Plan	*1.1 Research Project Background*	*1.1.1 Define User Background*	*None*	*2*
		1.1.2 Define requirement background	*None*	*7*
	1.2 Gather requirements	*1.2.1 Define user requirements*	*1.1.1, 1.1.2*	*6*
		1.2.2 Define content (help/ about page) requirements	*1.1.2, 1.1.1*	*2*
		1.2.3 Define system requirements	*1.1.2*	*2*
		1.2.4 Derive Scope (May be DOD)	*1.1.1*	*1*
	1.3 Develop Risk Management	*1.3.1 Perform risk identification*	*1.1.1, 1.1.2*	*10*
		1.3.2 Perform risk assessment	*1.2.3, 1.3.1, 1.5.1*	*6*
		1.3.3 Define risk matrix	*1.3.2, 1.3.1*	*4*
		1.3.4 Perform risk mitigation	*1.3.2*	*6*
	1.4 Document stakeholders	*1.4.1 Distribute roles for stakeholder*	*1.2.3, 1.2.1*	*1*
	1.5 Project Timeline	*1.5.1 Develop WBS*	*1.2.2, 1.2.3, 1.2.1*	*6*
		1.5.2 Develop project schedule with Gantt Chart	*1.5.1*	*8*
	1.6 Communication	*1.6.1 Planning communication management*	*1.4.1,1.5.1*	*2*
		1.6.2 Managing Communication	*1.6.1*	*12*

	1.7 Project environment	*1.7.1 Define front-end environment requirements*	*1.2.2, 1.2.1*	*3*
		1.7.2 Define back-end environment requirements	*1.1.2*	*12*
Design	*2.1 Wireframe*	*2.1.1 Design home page*	*1.7.1*	*7*
		2.1.2 Design Login Page	*1.7.1*	*3*
		2.1.3 Design admin page	*1.7.1, 1.7.1, 1.7.2*	*3*
		2.1.4 Design update csv page	*1.7.1, 2.1.1, 1.2.1*	*6*
		2.1.5 Design about page	*1.7.1*	*2*
		2.1.6 Design help page	*1.7.1*	*2*
Application Development	*3.1 Calculation*	*3.1.1 Calculate route distance.*	*1.2.2, 1.2.3, 1.5.1*	*8*
		3.1.2 Calculate roughness of the surface	*1.2.2, 1.2.4, 1.2.1*	*8*
		3.1.3 Calculate speed of the wheelchair	*1.2.2, 1.2.4, 1.2.1*	*8*
		3.1.4 Calculate zero-activity	*1.2.2, 1.2.4, 1.2.1*	*9*
		3.1.5 Calculate fatigueness (TBD)	*1.2.2, 1.2.4, 1.2.1*	*7*
	3.2 Web Pages	*3.2.1 Create home page*	*2.1.1*	*4*
		3.2.2 Create a login page	*2.1.2, 1.7.2,*	*4*
		3.2.3 Create admin page	*2.1.3, 1.7.2*	*2*
		3.2.4 Create update CSV page	*2.1.4*	*4*

		3.2.5 Create about page	*2.1.5*	*1*
		3.2.6 Create help page	*2.1.6*	*1*
		3.2.7 Import Google Maps API	*1.7.1, 1.7.2, 1.6.1*	*4*
	3.3 Features	*3.3.1 Visualize the speed of the wheelchair with saturation*	*3.1.1, 3.1.3*	*30*
		3.3.2 Visualize the route of the wheelchair with the path	*3.1.1, 3.1.4,*	*12*
		3.3.3 Visualize the roughness of the route with a curly line	*3.3.1, 3.1.1, 3.2.7, 3.1.2*	*35*
		3.3.4 Visualize zero-activity with hue	*3.3.1, 3.1.1, 3.2.7, 3.1.4*	*25*
		3.3.5 Visualize fatigueness of the user with stroke pattern (TBD)	*3.3.1, 3.1.1, 3.2.7, 3.1.5*	*48*
		3.3.6 Add speed filter	*1.7.1, 2.1.3, 3.3.1, 4.1.3*	*6*
		3.3.7 Add roughness filter	*3.3.1, 3.2.7*	*4*
		3.3.8 Add fatigueness filter	*3.1.5, 3.2.7*	*8*
		3.3.9 Add zero activity filter	*3.1.4, 3.2.7*	*6*
		3.3.10 Admin is able to sign in	*2.1.3, 1.7.1, 1.7.2 3.4.3, 3.4..1*	*12*
		3.3.11 Admin is able to upload CSV/ remove CSV	*2.1.4, 1.7.1, 1.7.2*	*18*
		3.3.12 Validation	*3.3.11*	*12*
		3.3.13 Admin is able to sign out	*3.3.10, 2.1.3, 1.7.1, 1.7.2*	*2*

	3.4 Backend	*3.4.1 Set up database to store CSV.*	*1.7.2, 3.3.12, 3.3.11,*	*4*
		3.4.2 Data Processing Server-side validation	*3.4.1,*	*16*
		3.4.3 Create RESTFUL APIs	*3.3.11,*	*6*
Application Testing	*4.1 Calculation*	*4.1.1 Test the distance calculation is correct*	*3.1.1, 3.4.1, 3.4.2, 3.2.7, 1.1.2*	*5*
		4.1.2 Test roughness calculation is correct	*3.1.2, 3.3.7, 3.4.2, 3.2.7, 1.1.2*	*6*
		4.1.3 Test speed calculation is correct	*3.1.3, 3.1.3, 3.4.2, 4.1.1*	*4*
		4.1.4 Test zero-activity calculation is correct	*3.1.4, 3.4.2, 3.4.1, 1.1.2, 4.1.1*	*2*
	4.2 User Interface	*4.2.1 Test usability*	*2.1*	*3*
Support	*5.1 Training*	*5.1.1 Demonstrate to the user*	*4.2.1*	*1*
	5.2 Improvement	*5.2.1 Fixing bugs*	*4.1, 3.4, 3.1*	*24*
	5.3 Documentation	*5.3.1 End user Manual* *5.3.2 Test Plans and Release* *5.3.3 Technical Manual for front end and back end* *5.3.4 Minutes of the meeting*	*4, 3, 2, 1*	*38*

4.3. ACTIVITIES

The project will take place in three phases. Each phase will implement a subset of the task that the client requires. The three phases will be completed in three sprints. The phases are divided according to the level of complexity within the project and the corresponding data given through the client. The phases can be shown as of below:

Phase 1:
Phase one is defining the requirement and a basic working prototype that will outline client requirements and a successful ***API*** that is able to display coordinates into the maps. Phase one will be producing an Interface that is able to successfully help users to navigate through different pages. This means the web application will be able to view a map interface that will log data into it. The data logged will be entered through a database which has parameters defined by the users. This means that Phase 1 will involve in creating a user interface; the interface will be defined by UCD design standards and will implement a restful ***API***. Phase 1 will also implement a database supported by nectar cloud.

Phase 2:
Phase two will be adding data analytics into the interface. The data parameters defined by the users will be run through a set of algorithms. The data set obtained in the result set will be visible to the end users in the form of a map and color-coded variations supported by the other data displayed. This includes acceleration, the roughness of the ground, etc. The parameters will be set by the client and will only be defined while implementing.

Phase 3:
Phase three will be implementing complex algorithmic procedures which may involve going through research work in creating a visual dynamics that displays fatigue of the users. This isn't defined yet and will only be implemented if Phase two is successful. The definition of phase three is not clear yet on both sides and will only be clear after the implementation of phase two.

4.4. RESOURCES

On the basis of client requirements, we have listed out the resources as follows:

SOFTWARE:
As the application is web app based on a restful API, we will be needing a server, to run our programs, we have decided to go along with ***Nectar cloud*** servers as a recommendation of our co-client. The web app will be using basic HTML script with JavaScript functions using Google Maps API functions as we will be using Google Maps API for this application. We also used the Bootstrap library and CSS to enhance the usability richness of the application.

COMMUNICATION:
As for the mode of communication, we used Slack as our channel for communication, we used google drive and docs to share resources and work on our project and a GitHub repo to work on the coding part of the project. The documentation was maintained by the team and worked upon remotely from laptops.

PHYSICAL:
aside the physical requirement for this project was a common ground for a meetup, we also needed a laptop and a physical internet connection running to share our resources across google drive.

5. ORGANISATION AND STRUCTURE

The team members are:

- Binay Dhawa(Team Leader) 101187399@student.swin.edu.au
- Andres Alvarez(Scope Manager) 101742154@student.swin.edu.au
- Alywin Sim (Front End) 100074144@student.swin.edu.au
- Sanee Salim (Risk Manager)101887181@student.swin.edu.au
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6. RISKS

6.1. PROJECT RISK MANAGEMENT

Risk is when a vulnerability is exposed to a threat. Every real-life project has a lot of risks associated with it. It is extremely necessary that these risks are dealt with as a team to avoid project failure.

For this project, a comprehensive risk analysis of the project was conducted by the project team based on the information available, we used the ***Delphi method*** to analyze the risks and mitigation methods were produced consecutively, each team member analyzed the project on their own with their area of expertise. We reviewed the risks and brainstormed upon the existing ones to classify them under a category. The risk identification was conducted during the project planning process after that Risk analysis was conducted and then a risk mitigation plan was developed to mitigate the impact of the risks on the project. All the risks identified were placed in the risk register present in the appendix.

The Risk Register includes:

- Serial No. of the risk
- Time of the identification of the risk
- The name of the Risk
- Description of the Risk
- Category of the Risk (defined in section ***Risk Categories)***

6.2. RISKS CATEGORIES

Scope

Scope related risks can be defined as situations where the workload increases beyond the limit of the team. These risks would also include any risks regarding limitations and deliverables of our project.

Technological

The risks related to technical failure and technological defects will come under this category. These risks include both software and hardware related technical issues. All the risks regarding computing would fall under this category.

Schedule

Schedule related risks are all the risks related to time management of the project. Any schedule creep due to any issue can cause the whole project longer than the time planned, this can also lead to incomplete deliverables by the deadline.

Resource

All the risks related to human, cost and other resources will fall under this category. This includes all the risks with the team members, supervisor, clients, and other important stakeholders. Although, the use of finance in this project is minimal but any financial risks would be considered under this category.

6.3. RISK IDENTIFICATION

The risk register was maintained, reviewed and edited every week from our first meeting, and it was decided that the risk register will be kept iterative document and we will keep making changes to our risk register. The risk register below has been sorted based on the time of identification of the risk.

Table 4: *List of Risks*

Risk No.	Name	Description	Category	Time of Identification
1	Personal Shortfall	As the project would require specific skills mostly related with data analysis and visualization, it is possible that not all the team members have similar skillset, one of the team members was very experienced and another had not dealt with data visualization. This might create room for personnel shortfalls.	Resource	06/03/2019
2	Language Barrier	None of the group members speak English as their first language but we still chose English as our mode of communication within the group, with the supervisor and with the client. This language barrier can lead to misinterpretation of key messages	Resource	07/03/2019
3	Wheelchair Failure	All the data collected that we have is collected through a wheelchair that has been built with hardware that emits signals and generates data. We are using that data to visualize it on the web. Failure of the wheelchair to generate data could be considered as a risk	Resource	25/03/2019
4	Gold Plating	The software although looks rather simple, the data set and the communication delays can lead to information that does not make sense or rather feature addition upon the given set of proposal, this can easily be a problem in this case scenario and thus help to put forward scope creep without the team knowledge and might possibly lead to project getting no direction at all.	Scope	28/03/2019

5	Team Member Unresponsiveness	The group is comprised of 4 team members. If one of the team members become unresponsive it can lead to project slippage and uncompleted tasks from individuals.	Resource	29/03/2019
6	Leader Unavailability	Binay Dhawa has been assigned as the leader of the group. He is responsible for Project Management and assigning tasks to individuals. Without the leader, the project can lose direction and might not be completed.	Resource	30/03/2019
7	Inappropriate Software Functions	The set of requirements for our project is not clear and thus we need better dataset and guidance, however, the lack of communication was seen in the project which might lead us to develop software functionality which is not required. Or extra functionality which might probably be redundant.	Scope	01/04/2019
8	Over Budget	The budget might possibly be another problem as the integration of a high-end software with great capabilities might lead to shortages in budgets and funding problems for the project. At this moment we have been avoiding any budget constraints for this project.	Resource	08/04/2019
9	Project Slippage	Our proposal has described us about requirements and to build a schedule based entirely on it seems to be misleading considering the gap of knowledge. There is a possibility that the schedule that we will be forming might become unrealistic	Schedule	10/04/2019
10	Client Unresponsive	Our clients for this project have been unresponsive and a communication gap between our client has established. This communication gap can make matters intense and the project might fail as a result.	Resource	11/04/2019

11	Unsatisfying User Interface	A lot of freedom has been provided by the client on the design of the user interface. Although, some specifications have been provided, there is a lot of grey area and we might not be able to meet the expectations of the client.	Scope	15/04/2019
12	Nectar Failure	The software might need some database. The creation of a database is unclear at this moment, but extensive research and effort could make it possible. Although, there is still a risk that nectar's database might fail to deliver the outcome it is expected for our project.	Technological	20/04/2019
13	Scope Creep	Considering the unclear objective of this project, it is quite possible that the requirements of this project will change, our requirement set has been changing from the start and we predict that there might be more requirement changes which will lead to the project underperforming or overperforming.	Scope	21/04/2019
14	Performance shortfalls	The project is being carried out by group members who are expected to meet deadlines. Their ability to meet deadlines is very difficult as they have commitments to other units, work, and other matters. These individual performance shortfalls can hinder the schedule of the project.	Schedule	22/04/2019
15	Loss of Data	The project Plan and other important documents have been stored in Google Docs, if any of these documents are being removed by mistake all the data will be lost and would be very difficult to recover.	Technological	23/04/2019

16	Lack of Communication	Communication within the team is very important to ensure the quality and completion of the project is attained. As team members, we only have one point of contact with each other.	Resource	24/04/2019
17	Database Security	The Security of Database is a major concern as any alteration in the database by unauthorized sources could lead to effects in our webpage that would affect the outcome of the project.	Technological	25/04/2019
18	Managing Bugs	As we will write our code we might face some bugs that might be a result of human error that could fail the execution of our project outcome. There is no time frame for managing bugs, it could take up to weeks to solve these which could delay project completion	Schedule	30/04/2019
19	Unawareness with Libraries	We have decided to use the D3 library in JavaScript to make visualizations, but our awareness about this library is limited and it might be difficult to implement such decisions.	Technological	26/04/2019
20	Unawareness with Software	We have decided to use Nectar, HTML, CSS, and JavaScript as the main software for our project. Unawareness with these pieces of software could affect the progress of the project	Technological	27/04/2019
21	Lack of time to implement feedback	We will be receiving feedback from our client and supervisor to enhance our project but considering the time shortage, we might not be able to implement the feedback that they would like us to	Schedule	28/04/2019
22	Incomplete Testing	There is a risk that we might fall short of time and won't be able to test the application completely. This would have a very low impact as our application would be just a prototype.	Technological	29/04/2019

23	Team Disagreements	Some of the decisions made as our project progress might not be supported by other team members which could lead to disagreements between team members.	Resource	30/04/2019

6.4.RISK ASSESSMENT

The risks identified through the risk register were assessed based on the impact and likelihood of those risks. Risk impact and Risk Likelihood was calculated on a scale from 1 to 5 where 1 was the lowest and 5 was the highest. The specific scale is shown in the table below:

Table 5: *Scale of Risks*

Impact	**Score**	**Likelihood**
Negligible	1	Rare
Minor	2	Unlikely
Moderate	3	Moderate
Major	4	Likely
Catastrophic	5	Certain

6.5. RISK MATRIX

The heatmap below has categorized the risk based on their impact and likelihood. Risks are annotated using R and their corresponding risk number according to identification table above. The Likelihood of happening is the vertical y-axis and where the higher the plot higher the likelihood and Impact of happening is based on x-axis where more the distance from the origin the greater the risk impacts the project.

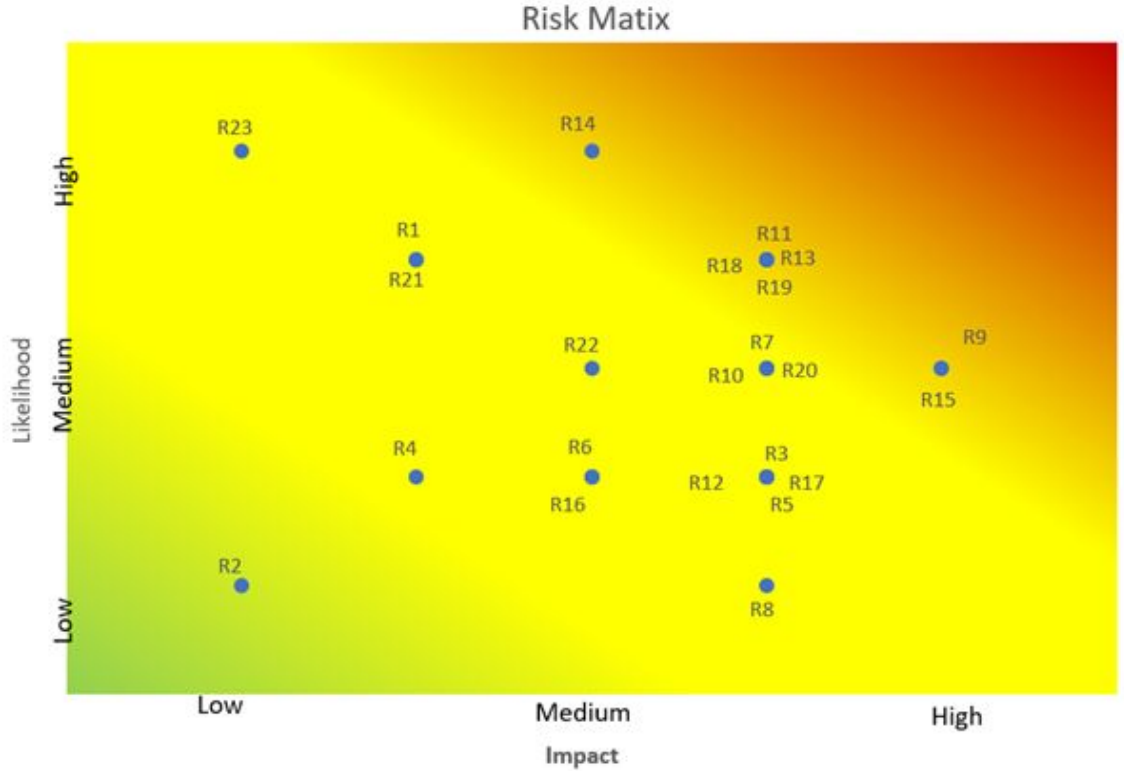

Figure 1: *Graph of Risk Matrix*

6.5.1. RISK RANKING

The risks in the table below are sorted based on the risk score. Where:

```
risk score = risk impact * risk likelihood.
```

Table 6: *Rank of Risks*

Rank	Name	Impact	Likelihood	Risk Score	Mitigation Strategy No.	Contingency
1	*Unsatisfying User Interface*	4	4	16	1	Try to satisfy the client by altering the interface in the time left
2	*Scope Creep*	4	4	16	2	Focus on the previous requirements before working on the new ones
3	*Managing Bugs*	4	4	16	3	Try best to make sure the code is executable.
4	*Unawareness with Libraries*	4	4	16	4	Refer to documentation and online tutorials to increase information
5	*Project Slippage*	5	3	15	5	Focus on completing deliverables and success criteria
6	*Performance shortfalls*	3	5	15	4	Reassign tasks and report to the Supervisor.
7	*Loss of Data*	5	3	15	6	Start working on the project again with the best potential to complete it again

8	*Inappropriate Software Functions*	4	3	12	1	Change software functions to match the client's requirements
9	*Client Unresponsive*	4	3	12	7	Continue the project based on assumptions
10	*Unawareness with Software*	4	3	12	4	Refer to documentation and online tutorials to increase information
11	*Incomplete Testing*	3	3	9	8	Being precautionary during execution to avoid exposing flaws
12	*Personal Shortfall*	2	4	8	4	Refer to documentation and online tutorials to increase information
13	*Wheelchair Failure*	4	2	8	9	Work with the remaining available data
14	*Team Member Unresponsiveness*	4	2	8	7	Reassign tasks and report to supervisor
15	*Nectar Failure*	4	2	8	10	Using file input output
16	*Database Security*	4	2	8	15	Delete data and input all data again

17	*Lack of time to implement feedback*	2	4	8	7,9	Assure that the feedback will be implemented in phase 2
18	*Leader Unavailability*	3	2	6	12	Co-leader to take charge
20	*Team Disagreements*	1	5	5	7	Consult the supervisor to solve disagreements
21	*Gold Plating*	2	2	4	11	Immediately stop gold plating and work on deliverables
22	*Over budget*	4	1	4	13	Ask for funds from the client/institute
23	*Language Barrier*	1	1	1	14	Use Google Translate and written conversations

6.5.2. RISK MITIGATION

The table below highlights the risk mitigation strategies to be implemented to prevent the above-mentioned risks.

Table 7: *Lists of Risk Mitigation*

Number	Description
1	To ensure that the user interface is accepted and agreeable to the client, wireframes and mockups will be created and shown to the client frequently in meetings for approval
2	Scope change management process would be created to ensure that any change in scope initiated by the client is assessed before approval.
3	Best practices will be used when writing code and extra time would be given to code writing as it could take a while to sort out bugs
4	The work will be divided amongst the group members based on their skills and ability to ensure that the knowledge gap is restricted and personal shortfall can be avoided. Constant checking and re-assigning of tasks would be carried out.
5	A project Schedule Management Plan (Gantt Chart) would be created and followed throughout the duration of the project to ensure that deadlines are met.
6	All the project plans will be edited and compiled on the cloud, but the local backup will be carried out by the group leader to ensure that all the lost data can be regained.
7	Weekly supervisor meeting will be conducted to assess the progress of the project, communication with the client and communication within the team. Necessary feedback will be collected and implemented as well.
8	Aylwin was assigned as the Quality Manager within the group to ensure that the quality of the product is maintained at each step.

9	The client will be contacted and an effort to obtain all the necessary information will be made to avoid an impact on the project. Necessary feedback would be collected and implemented as well.
10	Extensive research will be carried out to ensure that nectar's functionality is carried out to the full potential on our side.
11	Andres was assigned as the Scope Manager to ensure that any new addition to scope is assessed under scope management process and out of scope deliverables are avoided.
12	Quan was assigned as the Co-Leader of the group and was expected to take charge
13	Sanee was assigned as the Risk Manager to ensure that all the risks are assessed and dealt without incurring any costs as no funding for the project has been provided.
14	The meeting was conducted to ensure that everyone is English proficient, and communication can be successfully carried out within the group.
15	The database will be secured and will not be accessible until a username and password are written that verifies the identity.

7. SCHEDULE

7.1. PROJECT TIMELINE

The project timeline was constructed using the scrum methodology which means that all the tasks that are linked to the next task will be done together. For Eg: All the web pages will be designed first and then developed. The scrum methodology focuses on one part of the task at a time.

The project timeline is based on the Work Breakdown Structure in Section 4.2, this timeline was created based on the scrum approach described earlier in the plan.

The ***Gantt chart*** below is the brief description of the tasks that will be completed for this project. A detailed schedule with specific tasks can be found in the appendix.

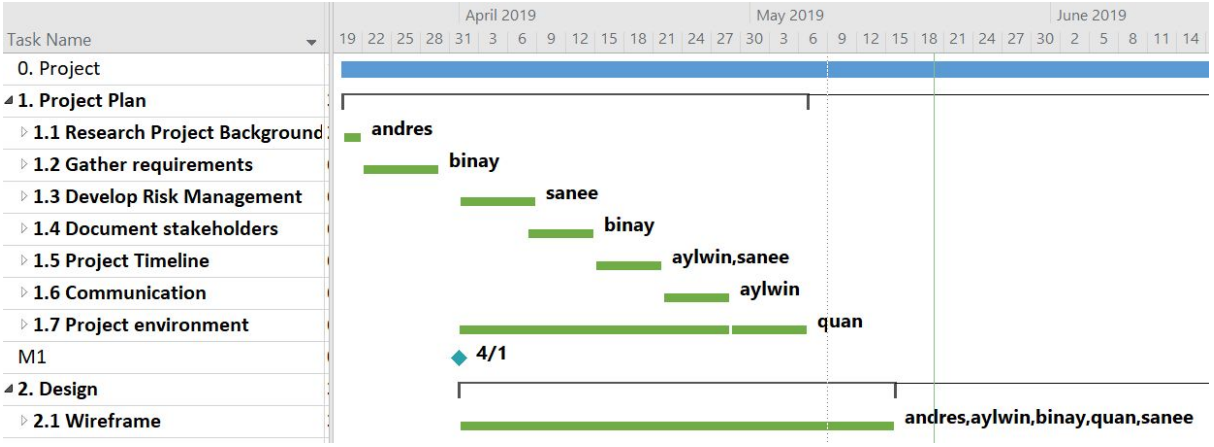

Figure 2 *Project Plan Document Timeline*

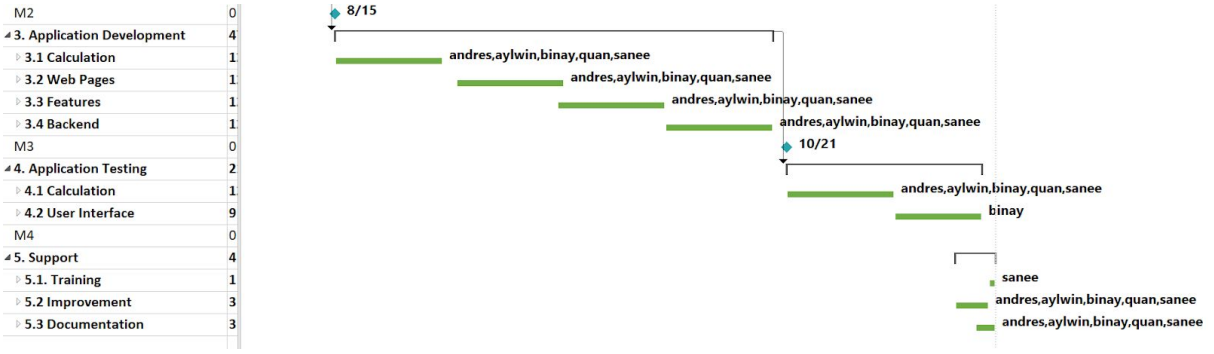

Figure 3 *Product Development Timeline*

On the right of each bar, the resources for that task are mentioned. In some instances, the resources might look crowded but each task has been divided into subtasks and resources are re-assigned accordingly which can be found in the appendix. The Gantt Chart shown above has been created using MS Project. According to the ***Gantt Chart,*** there are four milestones in our project that are listed below

- M1: Completion of the Project Plan
- M2: Completion of the Design Phase
- M3: Completion of the Development Phase
- M4: Completion of the Testing Phase

7.2. EXTERNAL DEPENDENCIES

We require data from the client during the project development stage for the implementation to be proper and functional.

Our application is also dependant on Nectar cloud services being functional at all times, the nectar cloud is to be functional at all times but in case of their server does get some downtime, the site will no longer be running.

7.3. ASSUMPTIONS

Application

We have assumed the user prototype to be functional and tailored towards the use of the client. The current assumptions are based on web structure of this application, the Google API framework along with nectar cloud instance needs to be running for the current software to be functional.

Cloud

We have assumed the data to be inserted into cloud for calculation and most of the backend. Thus the data loaded will be dependant upon active cloud instances. Thus we have assumed our client to have a proper internet connection and the cloud instance to be functional at all times.

Data

We have also assumed data to be available at proper points for the project to be functional. The front end works will be almost completely dependant upon google maps points. The algorithm for computing speed and distance are needed for proper visualization.

Data format

We have assumed that our data will be provided on the format of ***CSV*** format. Any other format will not be able to be converted into ***JSON*** format. The design assumes that the user doesn't have a proper database that all new data are uploaded through ***CSV*** file on a proper order

8. BUDGET

We've calculated the budget to be according to the hours we've spent on the project. We've taken into account the time spent on the planning, implementing and bug fixing the application and have fixed our hourly rate to be at ***40 AUD***. Considering all of the people are junior developer nearly graduated from Swinburne.

The hours are derived from the ***WBS*** structure where we have written down our expectations of time expectations for each feature to be complete and functional. We also have planned for the iterative nature of the project. The regular meetings and time factor so that we may be as accurate as possible, however, it is to be noted that the expected time is merely an estimation and may or may not be the actual time required for the project to be completed.

Total Hours: 500$

Rate:40$

Total estimated cost: 20000$

9. APPENDIX

9.1. TERMS AND DEFINITIONS

Table 8 Terms and Definitions

Term	Definition
GitHub	Github is a web-based hosting service that provides version control using a system called Git that tracks source code during software development. It allows programmers to integrate on their work together and can be used to track changes in any file system. It gives the user the required data space, integrity and non-linear workflows.
Scrum	Scrum is an agile framework for managing development projects. It mainly adhered although not limited to the software development environment for people working together in teams. It focuses on development works emphasizing on short goals running on short periods to maximize the efficiency of the entire team. The whole process of scrum takes place in a number of sprints.
Sprint	A sprint is a short time, a period where the team works to complete a certain amount of work. There are daily standups done to see whether the work is progressing forward and each sprint defines a list of goals. There a sprint backlog and a sprint review where the project needs and reviews of the current sprint are updated respectively. The sprint review gives the team an opportunity to understand where they went wrong and to improve upon their mistakes. Scrum has predefined roles wherein each Sprint people are expected to work within their work environment and roles to ensure the progression of the project. There is a product owner who is the client responsible for the project, scrum master who is the supervisor/team leader who ensures the project is moving in the right direction.
Definition of Done (DoD)	Definition of Done is a checklist that acts as a guide to make sure the software is completed in quality by complying with the given standard.
Nectar Cloud	Nectar Cloud provides computing infrastructure, software, and services that allow Australia's research community to store, access, and run data, remotely, rapidly and autonomously. Nectar Cloud's self-service structure allows users to access their own data at any time and collaborate with others from their desktop in a fast and efficient way.
HTML	Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications.
CSS	Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is used to style and layout web pages — for example, to alter the color, font, size, and

	spacing of your content, split it into multiple columns and other decorative features.
JavaScript	"*JavaScript (JS) is a lightweight interpreted or just-in-time compiled programming language with first-class functions. JavaScript is a prototype-based, multi-paradigm, dynamic language, supporting object-oriented, imperative, and declarative styles*".
D3	"*D3.js is a JavaScript library for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation*." D3 helps you bind your data to DOM (programming interface for HTML documents) elements. Then you can use HTML, CSS3 and SVG showcase this data. Additionally, you can make the data interactive using D3.js data-driven transformations and transitions.
PHP	PHP is a popular general-purpose scripting language that is especially suited to web development. PHP is a server scripting language and a powerful tool for making dynamic and interactive Web pages.
SQL	SQL is a standardized query language for requesting, adding and removing information from a database.
Google Maps API	A set of functions and procedures developed by Google Maps allowing the creation of applications that access the features or data of Google's operating system, application, or another service.
Project Risk	Project risk is an uncertain event or condition that, if it occurs, has an effect on at least one project objective
WBS	A work breakdown structure that shows the number of the hours required for eac task and task hierarchies and way the project is expected to be completed.

9.2. DETAILED PROJECT PLAN DOCUMENT TIMELINE

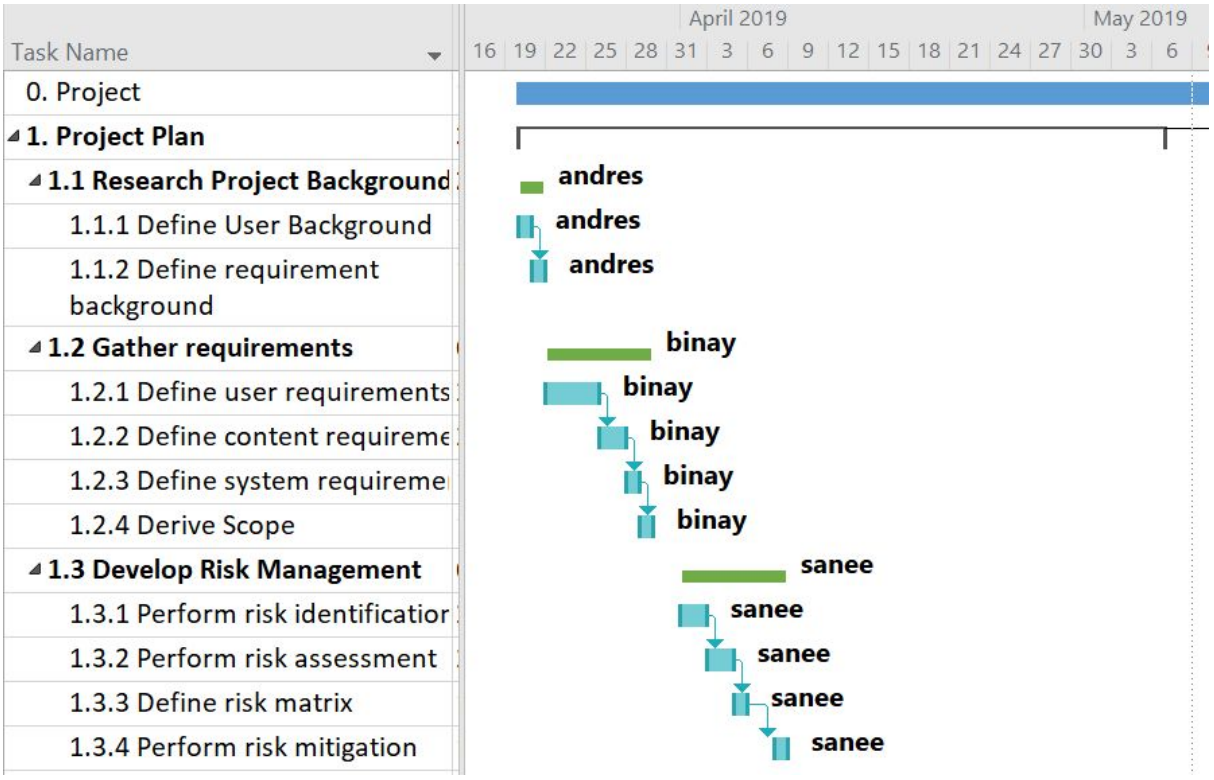

Figure 4: *Detailed Project Plan Document Timeline*

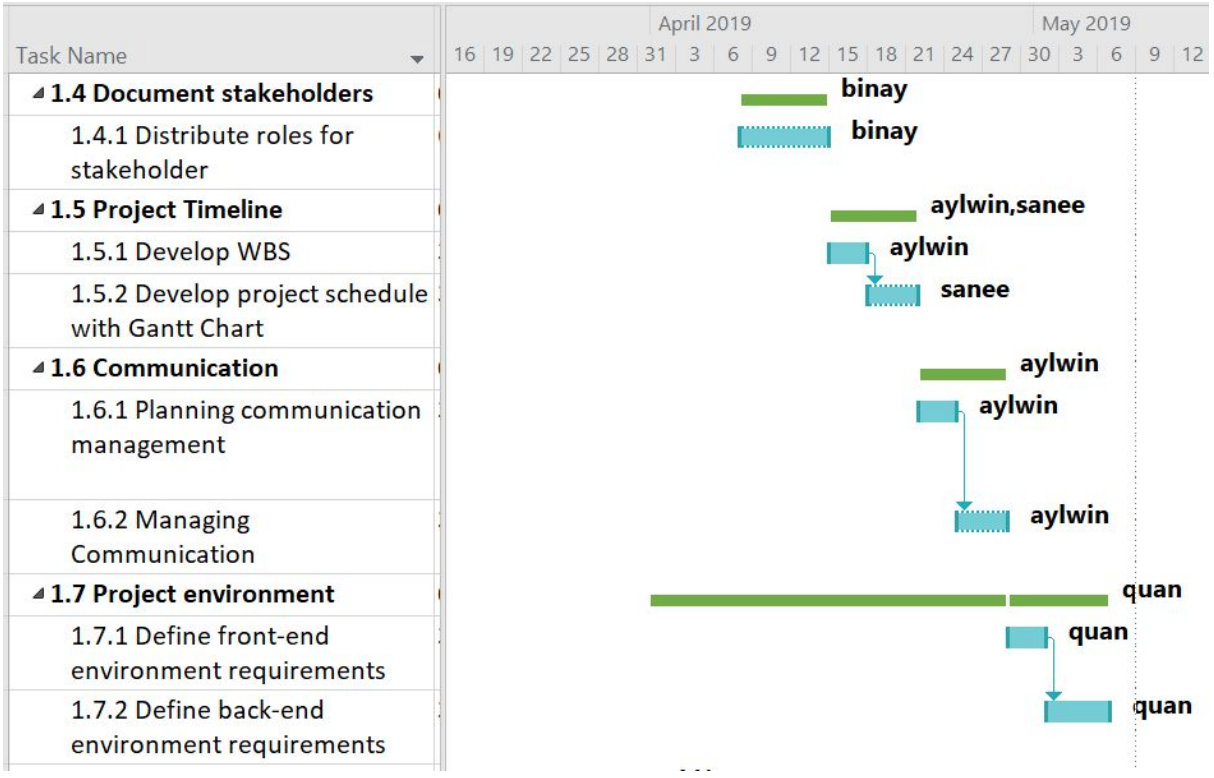

Figure 5: *Detailed Project Plan Document Timeline 2*

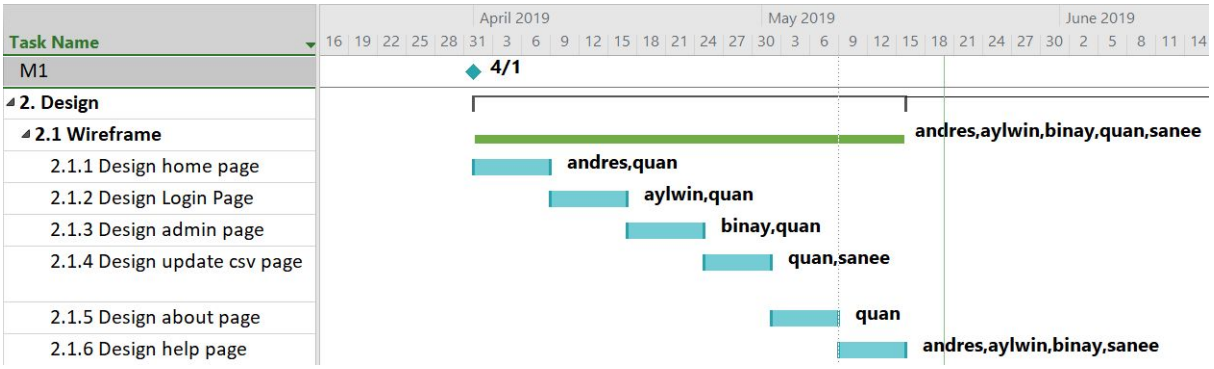

Figure 6: *Detailed Project Plan Document Timeline 3*

9.3. DETAILED PRODUCT DEVELOPMENT TIMELINE

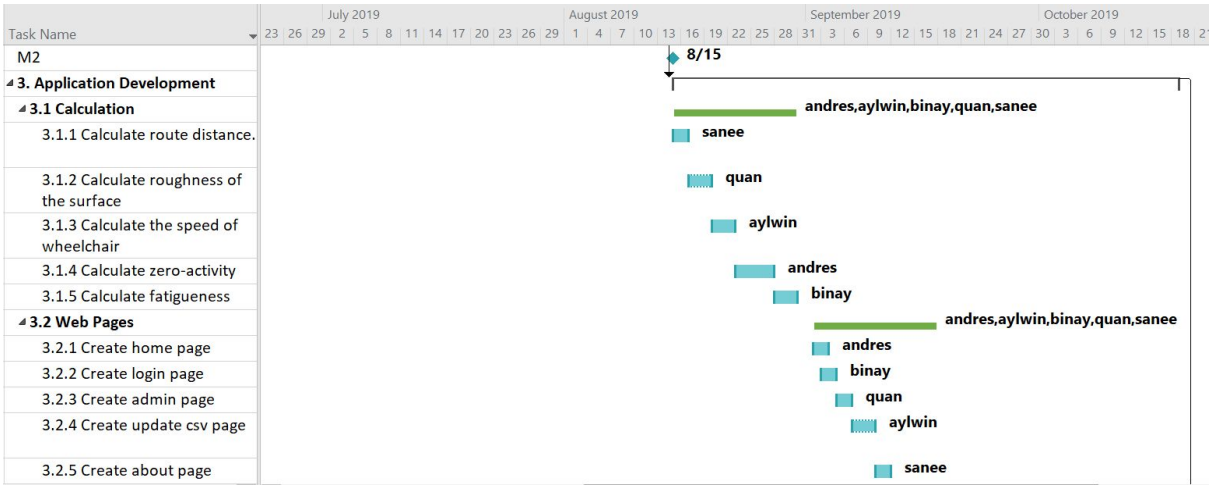

Figure 7: *Detailed Product Development Timeline 1*

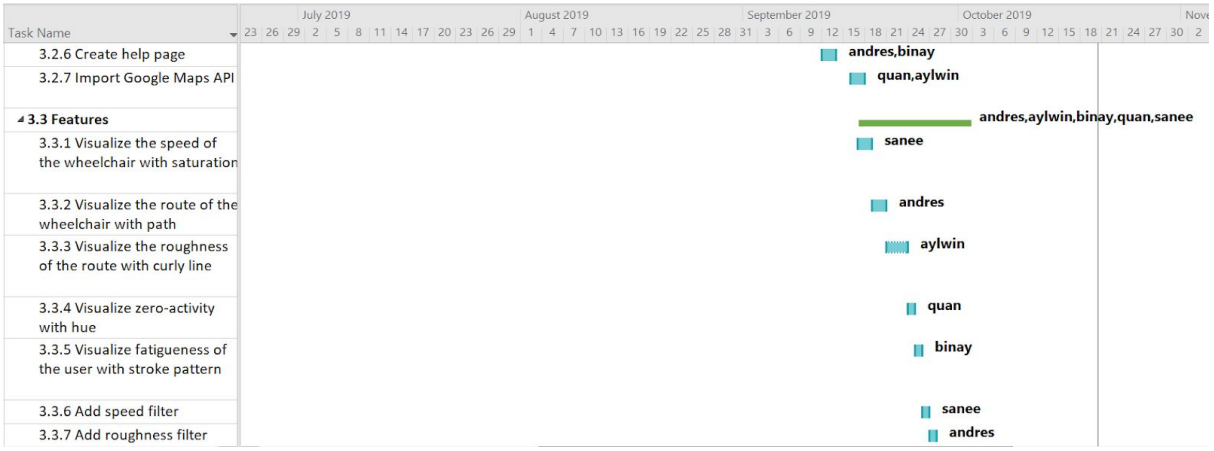

Figure 8: *Detailed Product Development Timeline 2*

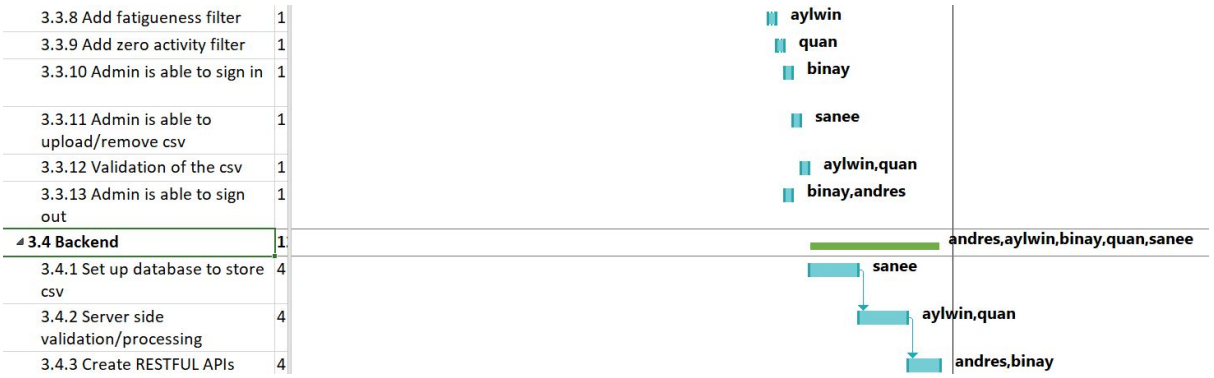

Figure 9: *Detailed Product Development Timeline 3*

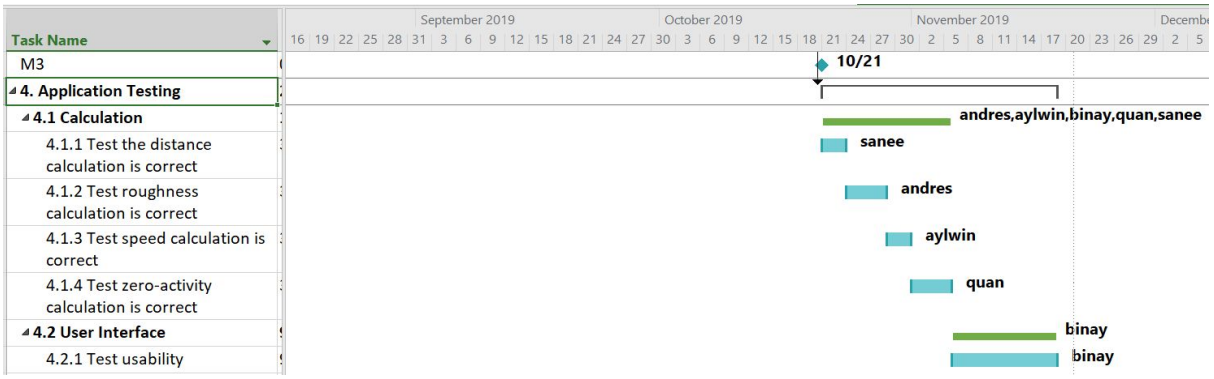

Figure 10: *Detailed Product Development Timeline 4*

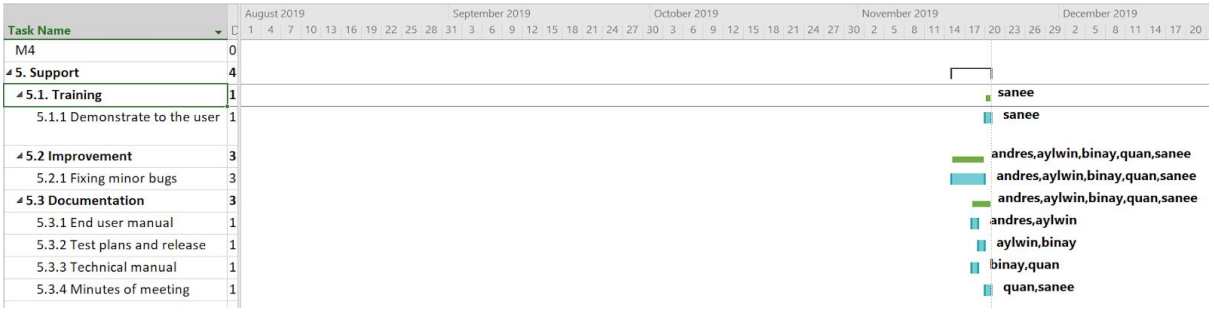

Figure 11: *Detailed Product Development Timeline 5*

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VISUALISATION OF URBAN MOBILITY RELATED WHEELCHAIR DATA

Design and Software Requirements Specification

TEAM NAME: SABAQ

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SWE40001, Software Engineering Project A, Semester 1, 28/05/2019

Table of Contents

1. INTRODUCTION

The software is mainly developed to help our clients (team of researchers) to apply visualization on a map in order to understand the different variables collected during the active session of the wheelchair. Data subsets are provided by our client, data are then converted into GPS coordinates and plotted into a virtual map, pathways and graphs are encoded according to the desired specifications.

1.1. PURPOSE

The purpose of this SRS is to clarify user stories and architecture of the product. The target audience is mainly our clients.

1.2 SCOPE

1.2.1. Scope

The Scope of the product side of this project will be to incorporate a PC and mobile friendly application that will visualize GPS location coordinates and sensor data on a map Interface and implement data manipulation and extra visualization like graphs and numbers according to client specifications. Also, data must be uploaded first to be processed by the application then visualizes on the map. Data validation will be implemented to validate uploaded data for data integrity before adding into the database.

1.2.2. Scope Creep

The application will not interface to wheelchair hardware sensors for real-time use. Also, the application will not implement any machine learning algorithms.

1.3. DEFINITIONS, ACRONYMS, ABBREVIATIONS

TO BE DEFINED IN THE APPENDIX SECTION

2. OVERALL DESCRIPTION

The web application is developed specifically for researchers at Swinburne University to aid visualization in urban mobility with the given data from their experimental wheelchair sessions. The web application is a high-level prototype that allows researchers to upload their existing data set into a database and visualize route, speed, roughness, zero-activity, and fatigueness of the wheelchair path.

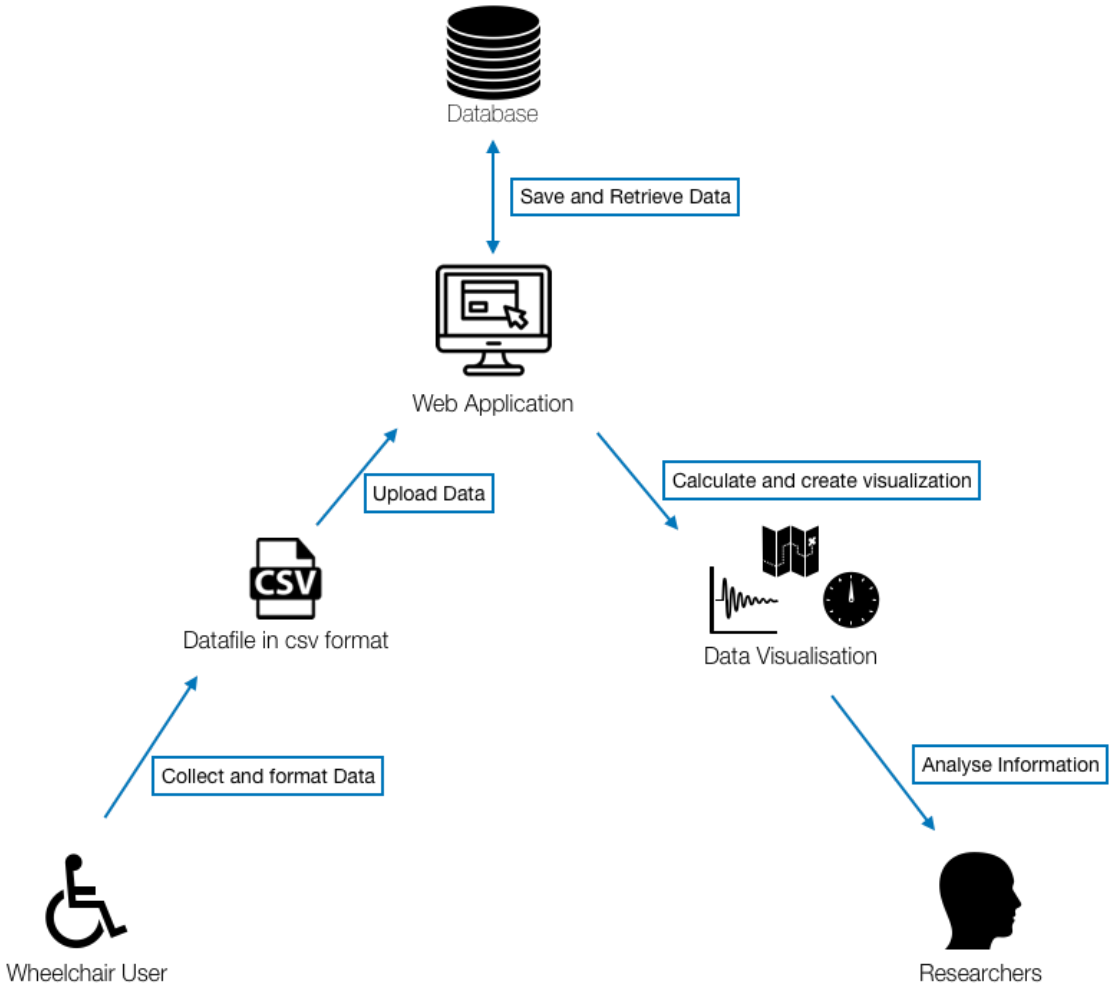

Figure 1: *High-level overview of the system*

2.1 PRODUCT FEATURES

This section includes all the significant features and requirements that will be in the final product.

The following points below give an overall description of the Product features.

- Web application
- Visualizes given data-coordinates into a Map Interface.
- Integrates Google Maps API and visualizes data coordinates on maps into meaningful resultset.
- Implements data load and transfer mechanism into the website
- Performs validation and notifies the user if the data doesn't meet the requirement.
- Implements security protocols into the database and website to ensure data safety.

Visualize Instantly

Researchers can upload the data collected from wheelchair by login to the web application anytime in everywhere provided with an internet connection. The web application will handle all the complex calculation that allows the user to visualize the speed of the wheelchair user, surface roughness, zero activity, and even stroke pattern instantaneously on the map.

Access Data Securely

All the data uploaded will be securely stored in a database using an ***HTTPS*** connection and only researchers with a valid account can access the data. User can have peace of mind storing data in the database meanwhile having the convenience of data access anywhere.

Insights for everyone

Although the application is tailored for professor and researchers, every design elements and channels are taken into consideration and tested carefully so that the clients and researchers can visualize the data effectively and interact with the data with ease.

Auto Validation

The system has the capability to check all the data uploaded to the database whether or not to meet the requirements for visualization. The system will notify researchers if the data is incomplete or does not meet the requirements. As a result, researchers can focus more on getting precise insights from the data.

Mobile Friendly

Researchers can access and visualize the data on their smartphones or tablets. The web application is designed to be responsive from handheld devices to a desktop browser.

2.2. USER CENTRED DESIGN PROCESS

User-centered Design is a process driven design development cycle which emphasizes on the development of life cycle centered towards user experience. The user-centered design process takes place in mainly four main sections:

Context of Use
The context of use is identifying the target audience this application is focused towards our clients, our web app is mainly targeted towards professionals who are involved in research regarding futuristic wheelchair. Most of our target audiences are from an IT background and have basic, if not a broad understanding of the field.

Requirements
From the meetings we have conducted for our clients, we have understood the requirement to range from broad to small subset, thus we have decided to implement the requirements in different phases, from our gatherings in the interviews, the application needs to be designed to locate wheelchair coordinates on a map. The basic needs for this software are;

1. Visualization of parameters as paths on Google Map using Google Maps API
2. User-friendly Interface
3. Store data in the database
4. Analyze data and patterns
5. Display analyzed results

Design solutions
From the basis of requirements listed above and discussions we have had both with and without a client, we created wireframes that will be helpful to build our application. The wireframes will be helpful for the user to understand the features and visibility. We listed these features and created a prototype using Adobe XD.

Design evaluation
The design was then compared against Nielsen's Heuristics for Interface Design to produce a viable product. A quick and dirty, quasi-empirical data evaluation was done on the prototype. We picked a few principles from the Nielsen's heuristics which would be accustomed to the application, The design principles considered were:

- Visibility of system
- Match between system and the real world
- User control and freedom
- Consistency standards
- Error preventions
- Recognition rather than recall
- Flexibility and efficiency of use
- Minimalist design

User Persona

A user person of a Professor Kurtin gives a short and detailed description of the problem at hand. It helps to create user stories based on the user's requirement. The user given creates a scenario which lights up our client's existing situation. The user scenario was created similar to our client's environment and needs.

Figure 2: *Picture of a user persona*

Name: Professional Kurtin

Summary quote: "I want to be able to visualize the path and corresponding information of a wheelchair simply by uploading data"

Personal Background

Professor Kurtin is a lead researcher at Monash University. He is currently leading a team of postgraduate students to study and analyze urban mobility near the university. His main research is to analyze the urban mobility of the suburb. Their team has developed a smart wheelchair that is able to collect data such as GPS coordinates, gyroscope and wheel rotation. Their team has to perform a calculation on the data every time the wheelchair completed the route in order to find out the roughness, zero activity of the route.

Goal

Professor Kurtin and his team have to do the calculation each time they collected the data. They hope to have software that allows them to visualize the wheelchair path and have the data calculated so that they can focus more on analyzing the urban mobility of the suburb.

2.3. FUNCTIONAL REQUIREMENTS

This section uses user stories to specify the fundamental requirements for the application.

Table 1: *User story 1*

User story 1	
Title	Visualization of data parameters as a path on the map
Description	The user wants to explore data in detail
Actor	Researchers
Trigger	Any data on the data list or red circles on the homepage
Pre-condition	User is on the homepage
Scenario	1. The user wants to explore data in detail 2. User clicks into the data from the list on the homepage 3. User is redirected to the selected data page 4. User can see each data parameter visualized as a path on the map and plotted a graph on the right pane of the interface.
Alternative Scenario	1. The user wants to have a look at a data in detail 2. User clicks the red data circle on the map on the homepage 3. User is redirected to the selected data page 4. User can see each data parameter visualized as a path on the map and plotted a graph on the right pane of the interface.
Post-condition	The application retrieves selected data from the database then visualize them on the map and as graphs on the right pane of the interface

Table 2: *User story 2*

User story 2	
Title	Ability to hide or unhide data parameters as a path on the map
Description	The user wants to hide or unhide a data parameter
Actor	Researchers
Trigger	Checking the checkbox on the right pane of the interface
Pre-condition	User is on a selected data page
Scenario	1. The user wants to hide or unhide a data parameter on the map. 2. The user checks or unchecks the checkbox on the right pane of the interface 3. A parameter on the map is hidden or unhidden.
Post-condition	Data parameters on the map are hidden or unhidden

Table 3: *User story 3*

User story 3	
Title	Ability to create comments/ labels on the map
Description	The user creates a comment/label on the map
Actor	Researchers
Trigger	Clicking the “make comment/label tool”
Pre-condition	None
Scenario	1. The user wants to make a comment/label on a spot on the map 2. User clicks the “make comment/label tool” to enable label editing 3. User clicks a spot on the map 4. A small description window pops out from the clicked spot 5. User fills in the text box in the description window and clicks enter 6. A comment/label marking is made and is displayed on the map
Post-condition	A comment/label marking is made and is displayed on the map

Table 4: *User story 4*

User story 4	
Title	Ability to delete comments/ labels from the map
Description	The user deletes a comment/label from the map
Actor	Researchers
Trigger	Clicking the delete button in the small description window of a comment/label marking
Pre-condition	None
Scenario	1. The user wants to delete a comment/label from the map 2. User clicks into the comment/label marking on the map 3. A small description window pops out from the marking 4. User clicks the delete button in the small description window 5. User clicks the confirmation button 6. The comment/label marking is deleted
Post-condition	The comment/label marking is deleted

Table 5: *User story 5*

User story 5	
Title	Login
Description	User logins to the application
Actor	Researchers
Trigger	Clicking the login button
Pre-condition	None
Scenario	1. The user wants to log in to the application 2. User clicks the login button 3. User fills in username and password then click login 4. User is logged in
Post-condition	User is logged in

Table 6: *User story 6*

User story 6	
Title	Import data
Description	User imports new data into the application
Actor	Researchers
Trigger	Clicking the import button
Pre-condition	User has to login, see User story 5
Scenario	1. The user wants to import new data into the application 2. User clicks the import data button 3. User browses a .csv file to import 4. The file is validated for data integrity 5. After successful validation, the user clicks the import button to confirm the import
Post-condition	A new set of data is entered into the database and is visualized on the application accordingly

2.4. NON-FUNCTIONAL REQUIREMENTS

This section specifies and explains the **non-functional requirements** for the project

2.4.1. Performance Requirement

Performance

The application must be responsive and must perform tasks under an acceptable time frame. So in every case of retrieving data from the database and then visualizing the data on the map, they must be performed under 5 seconds.

Meter of measurement: 1000 measurements to be performed under stress testing during development

Reliability

Database server and the web server must be able to response to application > 95% of the time

Meter of measurement: 1000 measurements to be performed under stress testing during development

2.4.2. Software Quality Attributes

The software quality attributes listed below are the traits of quality software. The list below follows ***ISO/IEC 25010:2011 Software Engineering standard.***

Functionality

Functional Appropriateness, the maps should be able to visualize coordinate points and process algorithms with 100% accuracy

Security

1. Without entering the right login credentials, the user should not be logged in.
2. Communication between the application and web server must be encrypted and secure 100% of the time.
3. The web server must be able to prevent SQL injection and Remote code Injection through .csv file upload 100% of the time.

Meter of measurement: These listed security vulnerabilities above will be tested for 100 hours of combined usage during the development phase.

Maintainability

The application should be easily extendable in the future. The code will be written with maintainability in mind.

Usability

The user will be able to safeguard against errors, the user will be able to understand any errors he/she encounters, each error will be conveyed using user-friendly words.

The interface will be strictly based on ***User personas*** thus the users will be able to master the learning curve quickly.

Portability

The application should support web browsers of all form factor (mobile and PC)

2.5. FLOW CHARTS

On the basis of the user stories and models we created Flow charts to understand processes and system requirements. The diagrams below will show the flow of functions within the system:

CLIENT SIDE:

VIEW/SELECT DATA:

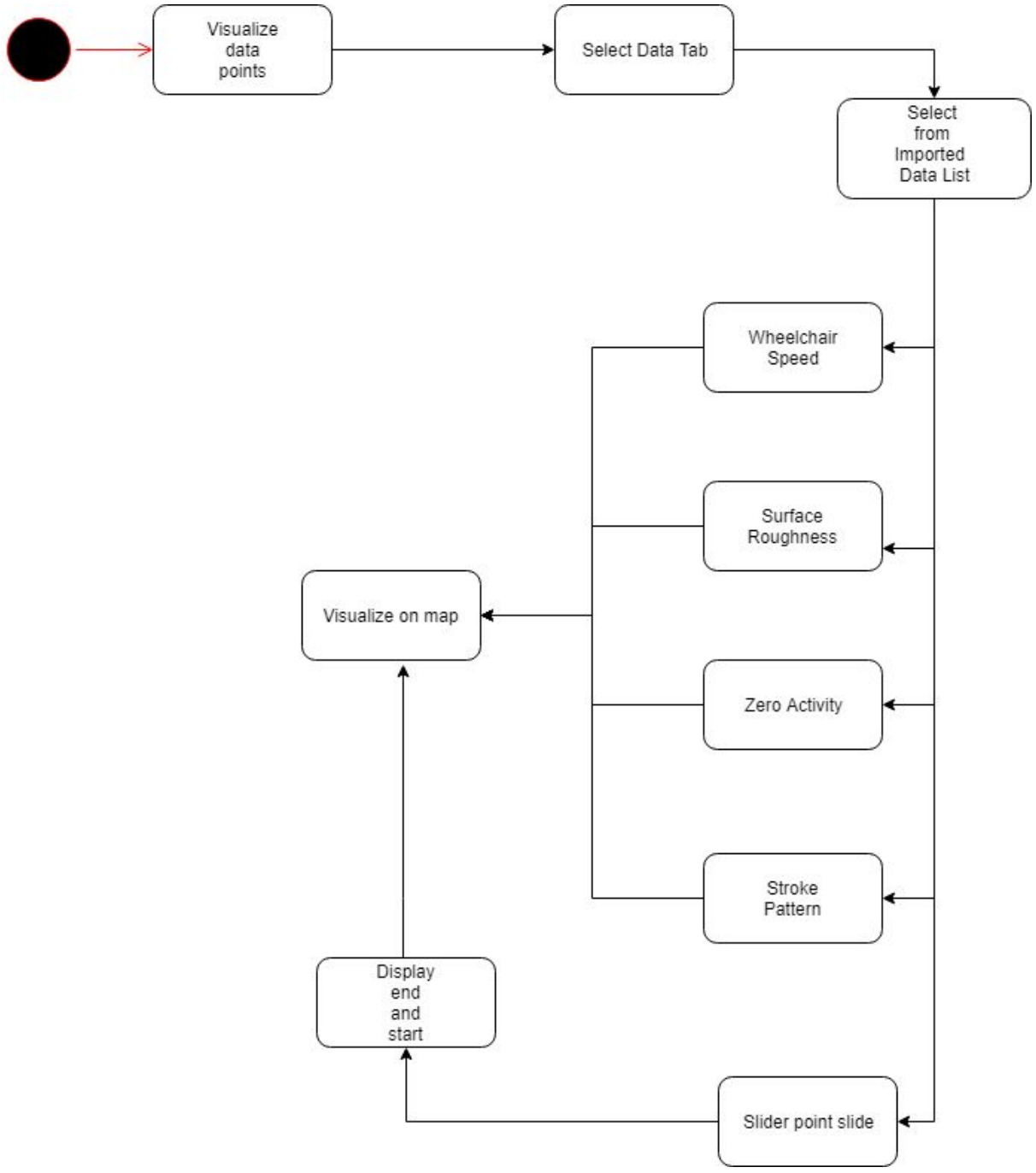

Figure 3: *Select data flow chart*

Import Data:

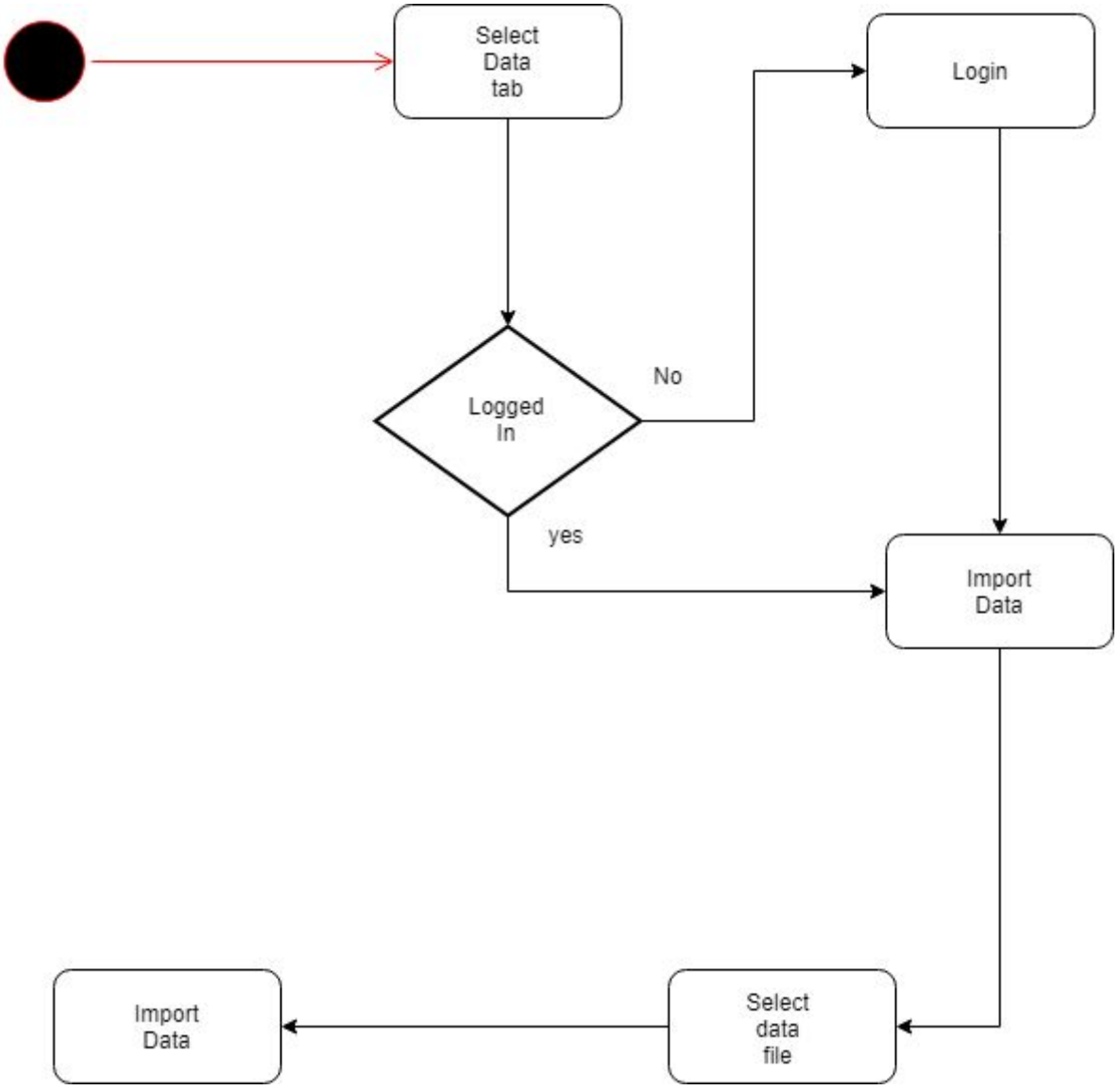

Figure 4: *Import data flow chart*

About page:

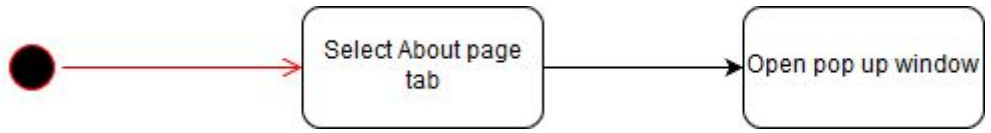

Figure 5: *About page flow chart*

Help page:

Figure 6: *Help page flow chart*

SERVER SIDE/BACKEND

get request:

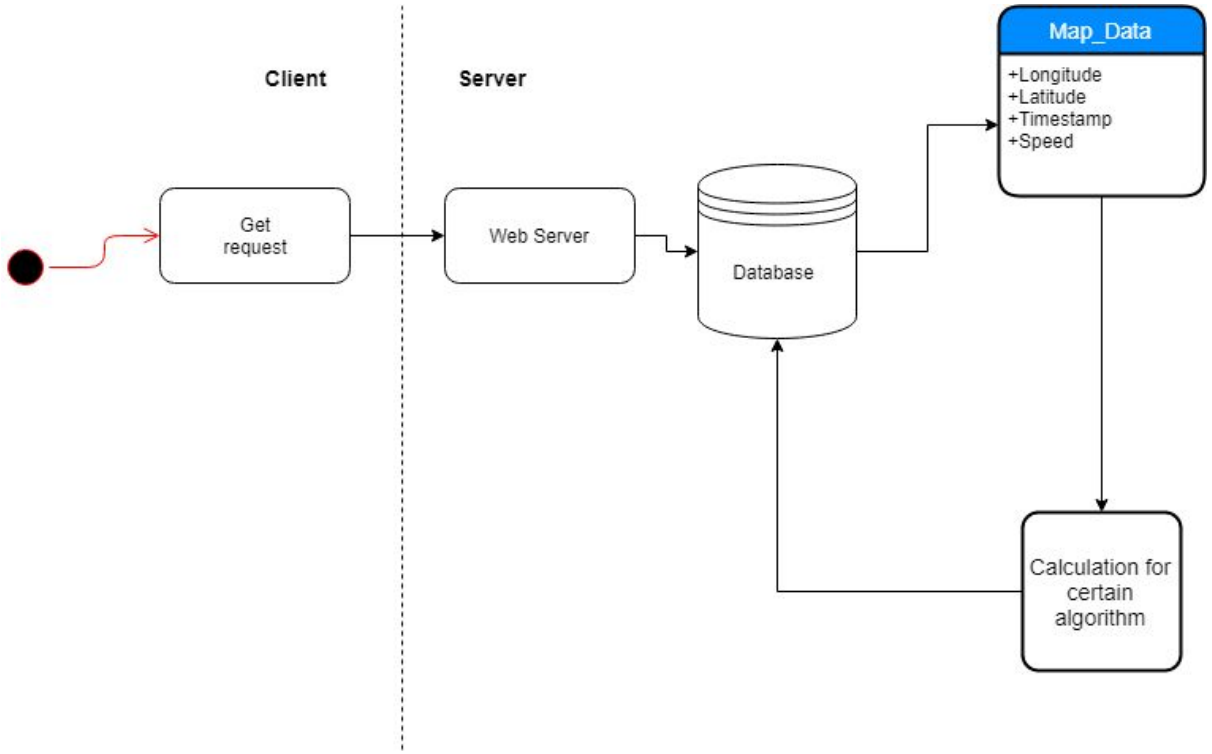

Figure 7: *Get request flow chart*

Post Req:

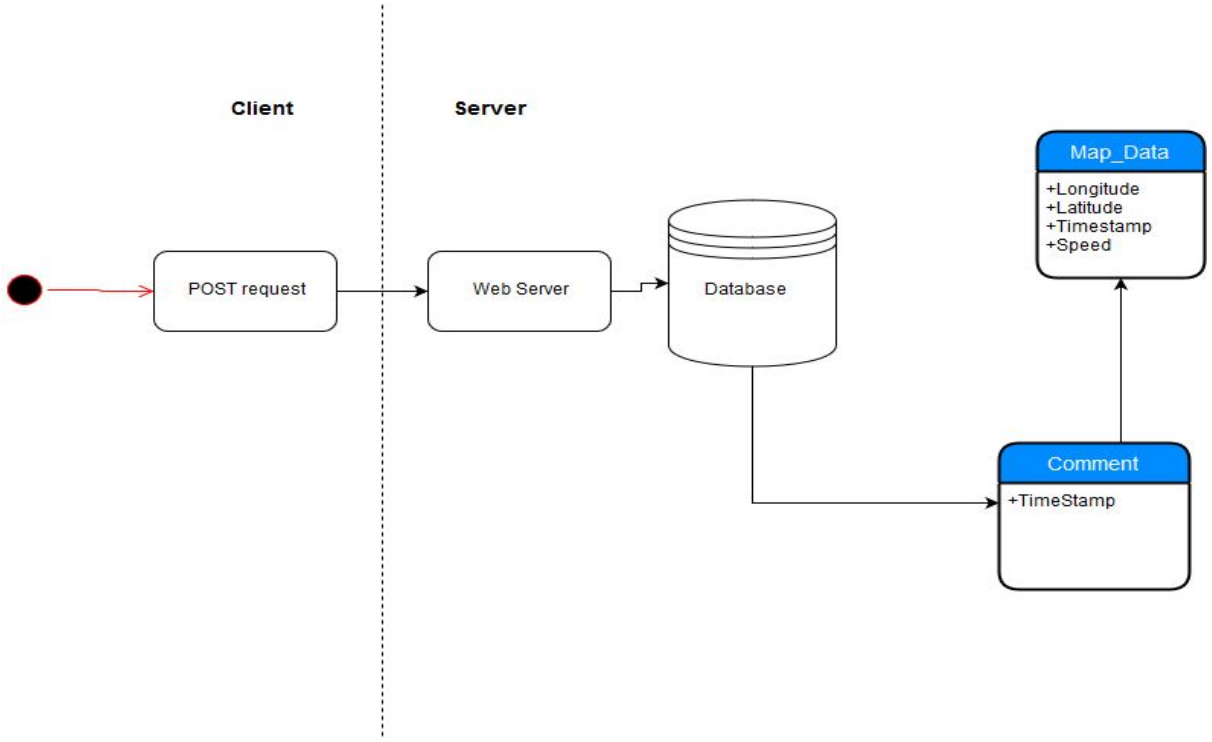

Figure 8: *Post request flow chart*

Export to Database:

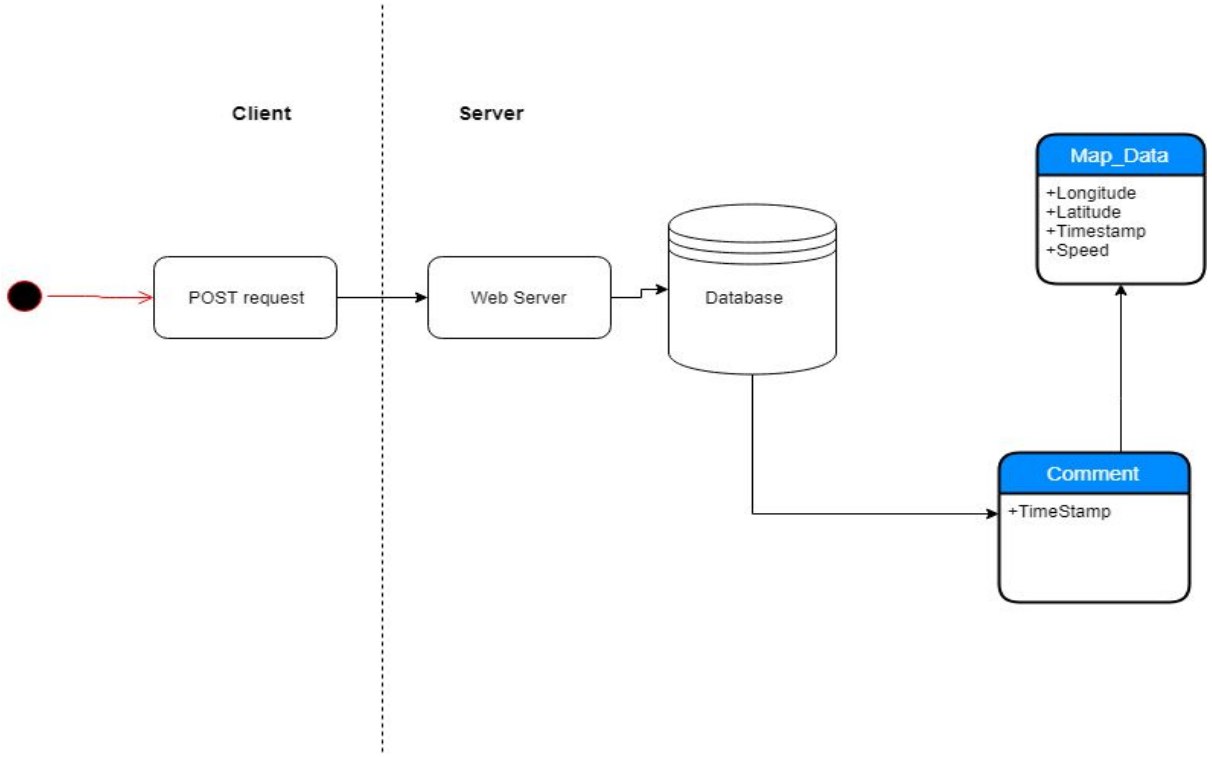

Figure 9: *Export flow chart*

2.6. ENTITY RELATIONSHIP DIAGRAM (ERD)

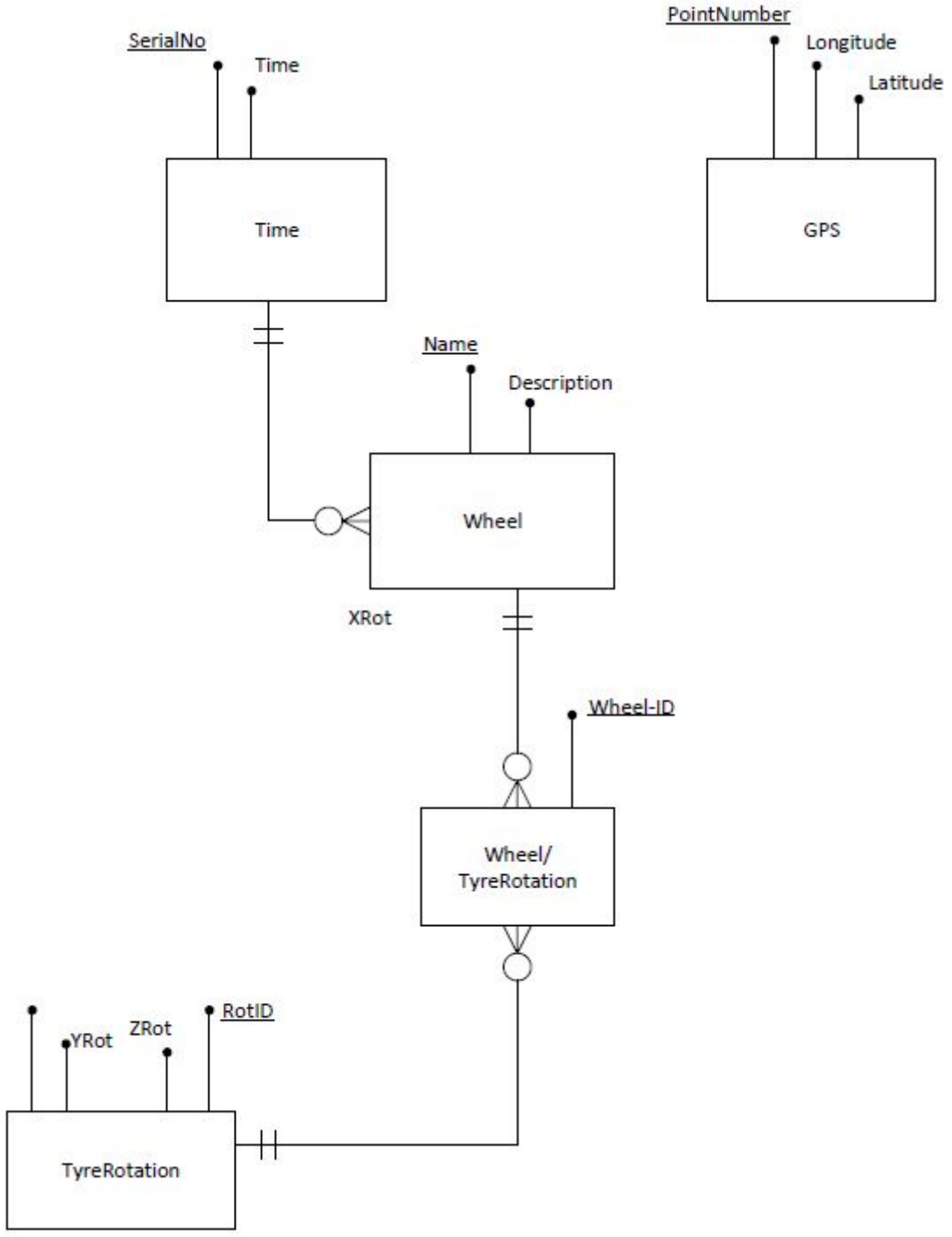

Figure 10: *ER Diagram*

2.7. LOW FIDELITY WIREFRAMES

2.7.1. WIREFRAMES

The wireframes below represent low fidelity wireframes that we initially drew up for the client interface.

Home Page

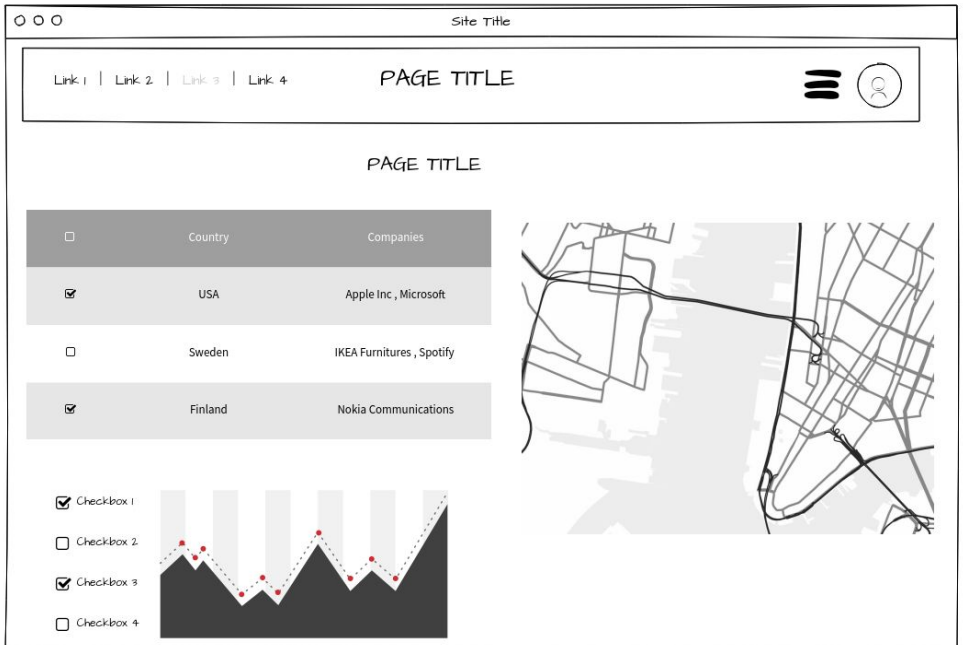

Figure 11: *Homepage*

Add Maps Page

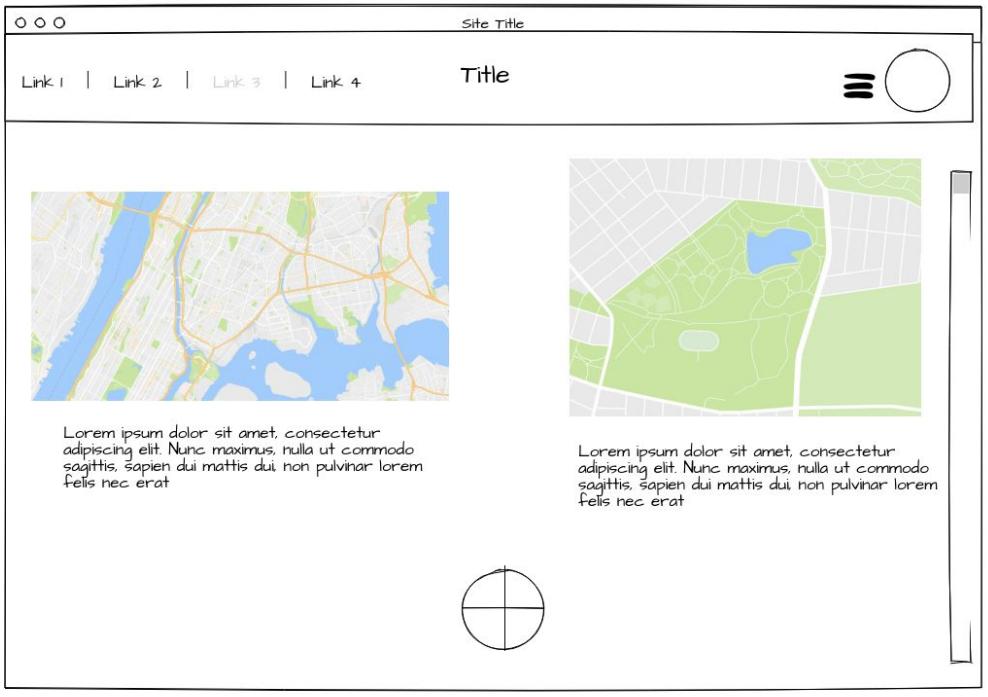

Figure 12: *Add Maps Page*

Import Data

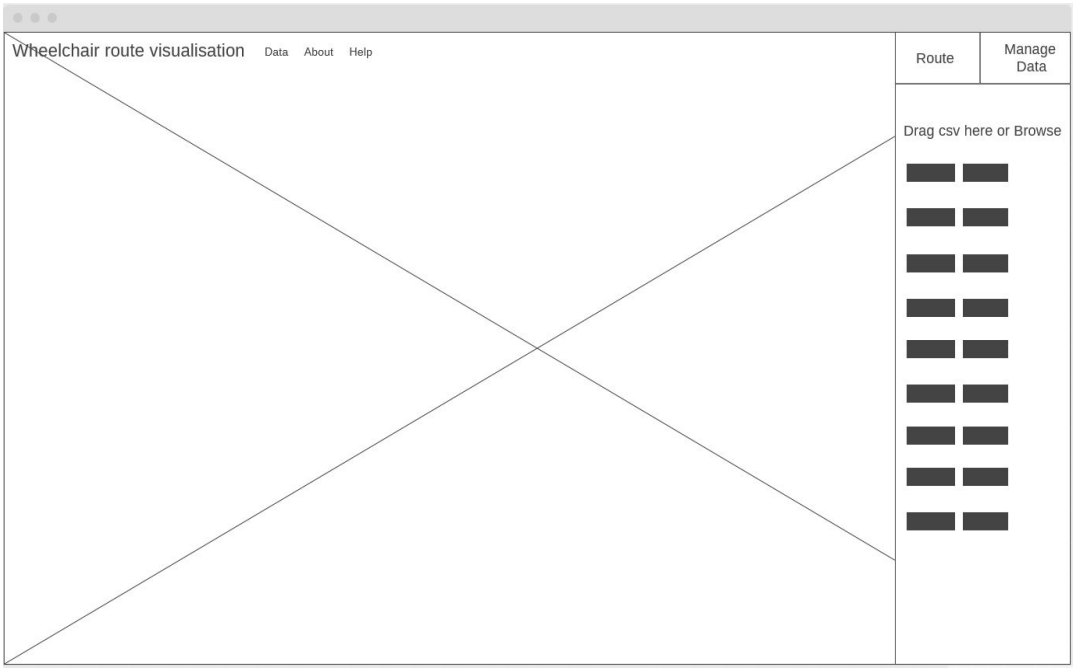

Figure 13: *Import data page*

Visualize parameters

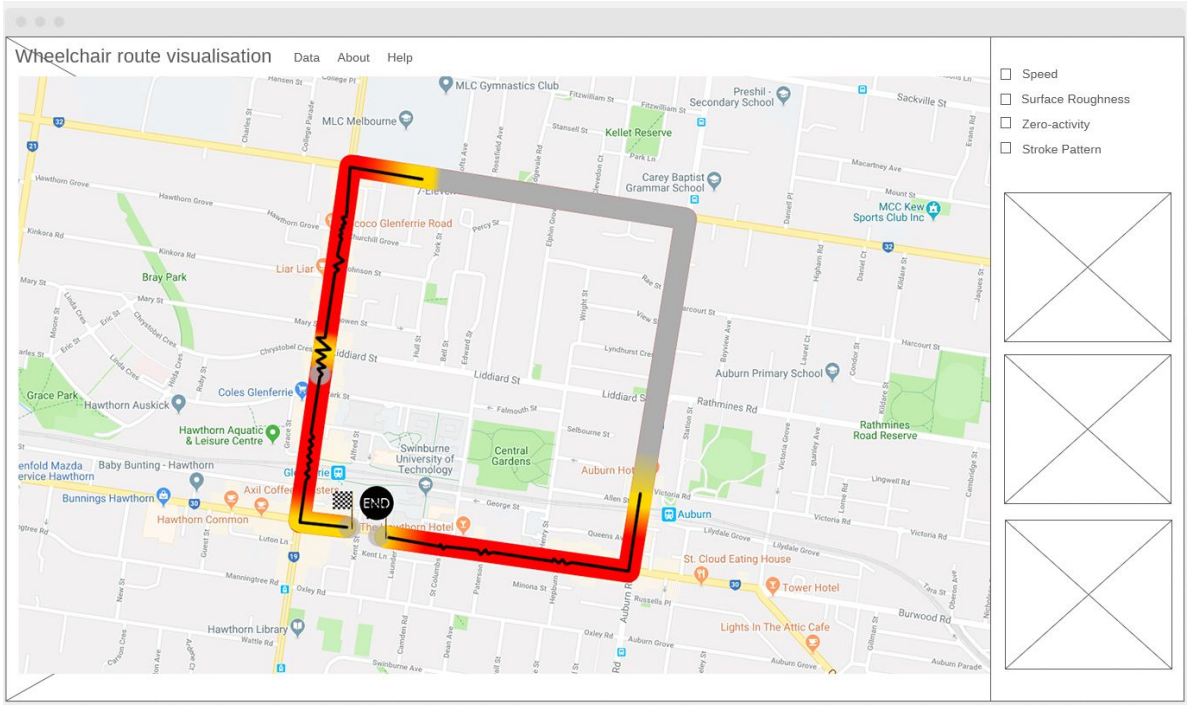

Figure 14: *Visualisation of selected data*

2.7.2. DRAWBACKS ON THE LOW-FIDELITY FRAMEWORKS

The drawbacks were formed after having a discussion with our client as well as a group discussion on our own that helped us to realize the problems with the existing design schematics.

1. HomePage

The homepage on our page was too crowded and while it did look great but a lot of things it wasn't needed. A lot of stuff in the maps were unnecessary such as graphs to on the side, the page didn't give much space to visualize maps in the interface.

2. Add Maps Page

The Add Maps page was unnecessary page as we would not be uploading maps into the database but just be plotting points on available maps. Uploading maps was not just a design error but also a functional error.

3. Import Data

The import maps above designed was not a design flaw but had a few errors such as the maps could be imported into the database by anyone. We needed a security feature to help secure database.

4. Visualize parameters

The visualization parameters were quite right but our client needed a more detail visibility standard, different colors for hues regarding different parameters were needed; hue correction in surface roughness and speed. A time function that can help users to address start and end times of the parameters. These issues will be fixed during deployment.

Final Prototype:

The drawbacks on the prototype were taken into consideration and a final prototype considering drawbacks were drawn. *Please refer to section 4.1 User Interface for the final version of the prototype.*

2.8. SYSTEM REQUIREMENTS

System Requirements

Table 7: *System Requirements of Database*

Database	
Database software	MySQL stable release
Storage	At least 5 GB
RAM	At least 4 GB
CPU	At least 4 CPU
Network	Broadband internet connection

Table 8: *System Requirements of PC*

PC Requirements	
RAM	Recommend at least 4 GB
Software Requirement	The most recent Chrome, Safari, Mozilla Firefox with JS enabled.
CPU	An Intel Pentium 4 processor or later that's SSE2 capable
OS	Windows 7, Windows 8, Windows 8.1, Windows 10 or later OS X Yosemite 10.10 or later 64-bit Ubuntu 14.04+, Debian 8+, openSUSE 13.3+, or Fedora Linux 24+

Table 9: *System Requirements of Android Devices*

iOS Requirements	
Version	iOS 10 or later

Table 10: *System Requirements of iOS Devices*

Android Requirements	
Version	Android 4.4 (KitKat) or later

2.9. DOCUMENTATION

Table 11: *Documentation deliverables*

Document Deliverables	Description
End user manual	Provides detailed instruction for the application
Technical manual for front and back end	Documentation will be available on GitHub regarding code snippets and description
Planning	Planning stage scenarios, UCD, Prototype deployment
Test Plans and Release	Test plans and release documents
Minutes of Meeting	Meeting minutes and details regarding each meeting

3. SYSTEM ARCHITECTURE

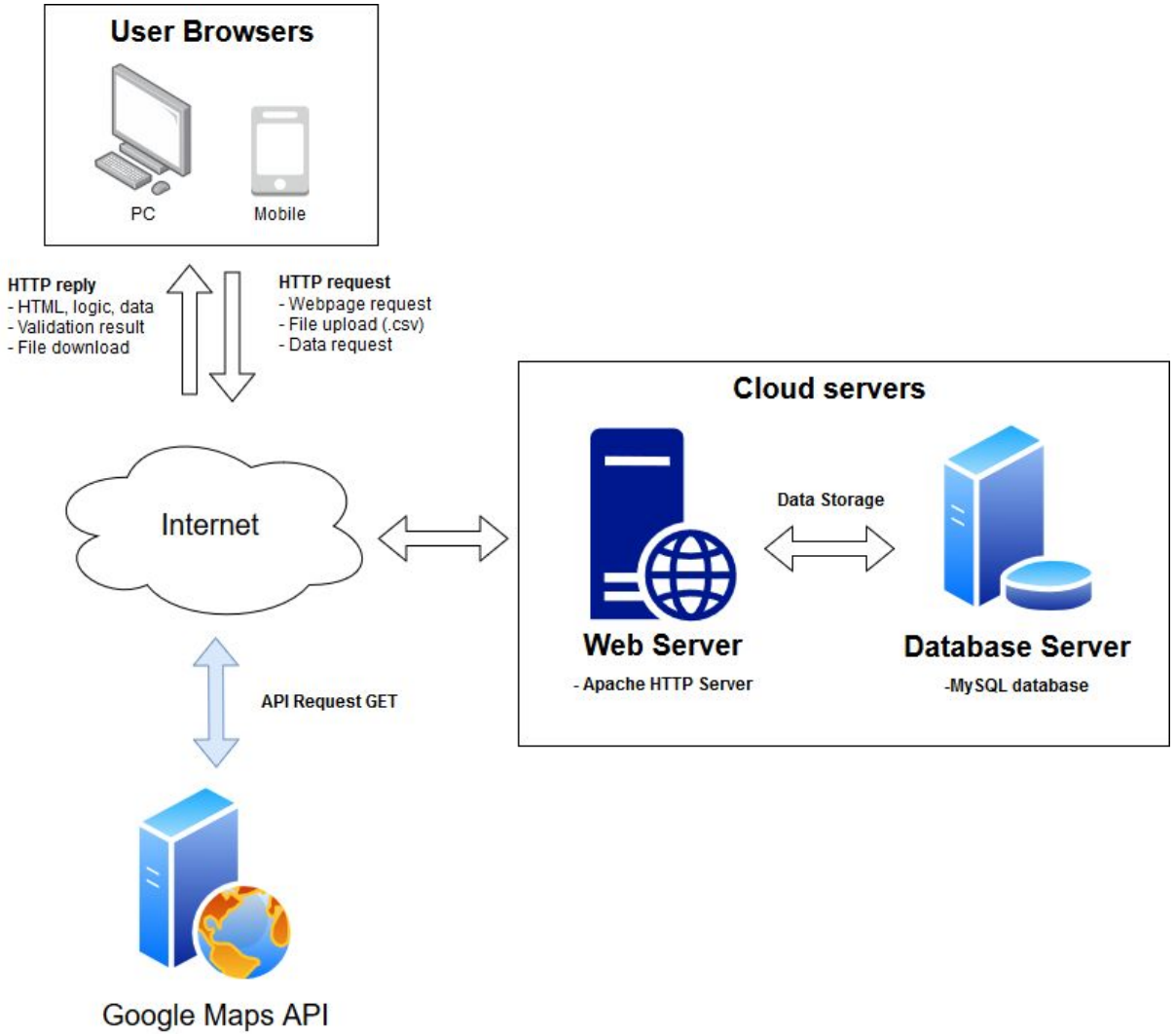

Figure 15: High-Level System Architecture

The Figure above is the high-level system architecture for the web application in Client-Server architecture. It is managed in the web server. The web server is the back-end of the system that processes incoming client requests from the user's browsers over ***HTTPS*** and processes data. The data is uploaded by the user. The processed data will be stored in the database server The server also handles data request from the application. Lastly, the front-end of the application requires the implementation of Google Maps API, for visualization of paths on the map.

4. INTERFACE REQUIREMENTS

Below listed the interface requirements of the project.

4.1 USER INTERFACES

The Design is framed according to usability standards which outline each project with minimalist design principles. The wireframes will be able to navigate users to the principle decisions such as functionalities included in the application.

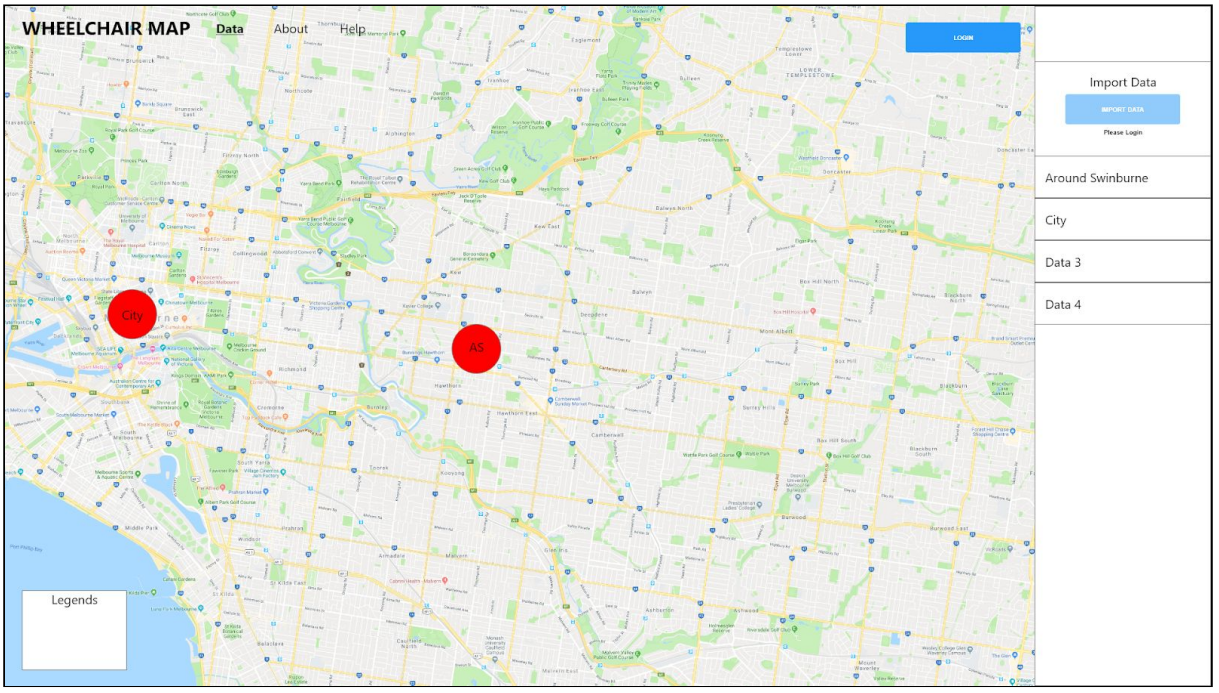

Figure 16: Homepage UI

Figure # shows the homepage of the project. The map is generated using Google Maps API, the red circles on the map are the representation of data clusters retrieved from the database. The right pane shows a list of data which are shown on the map. Also, there is an import data button which allows new data to be uploaded into the application*.

* To import data user must be signed in, see **Figure #** for the sign in the user interface.

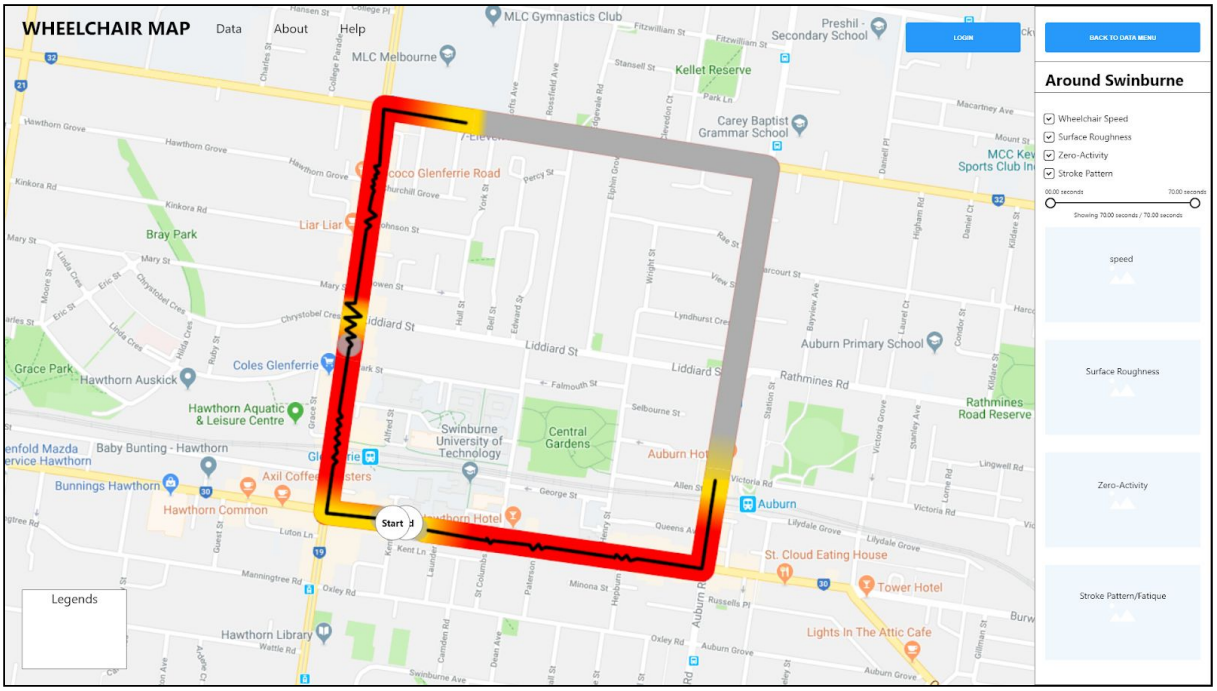

Figure 17: Selected Data UI

The above figure shows when the list around Swinburne is selected or when zoomed into the red circle as from the UI in Figure #. Data is visualized on map and plotted on the interface on right. User is able to show or hide visualisation by checking the checkboxes. User is also able to adjust the start and end time using the slider which is situated at the bottom of the checkboxes.

The map will be visualizing a set of data parameters. The 4 graphs to the right will show 4 parameters that will be coordinated to mouse pointers so it will be displaying real-time data on graphs on the basis of the coordinates.

- Checkboxes allow users to hide or show drawings on the map.
    - Wheelchair Speed - Red, yellow hues
    - Surface Roughness - Superimposed line
    - Zero-Activity - Grey hue
    - Stroke pattern/Fatigue*
- Graphs are enabled if a route sample is selected
- The slider allows users to adjust the starting time and end time.

*Visualisation for Stroke Pattern and Fatigue is to be confirmed with the client during project development.

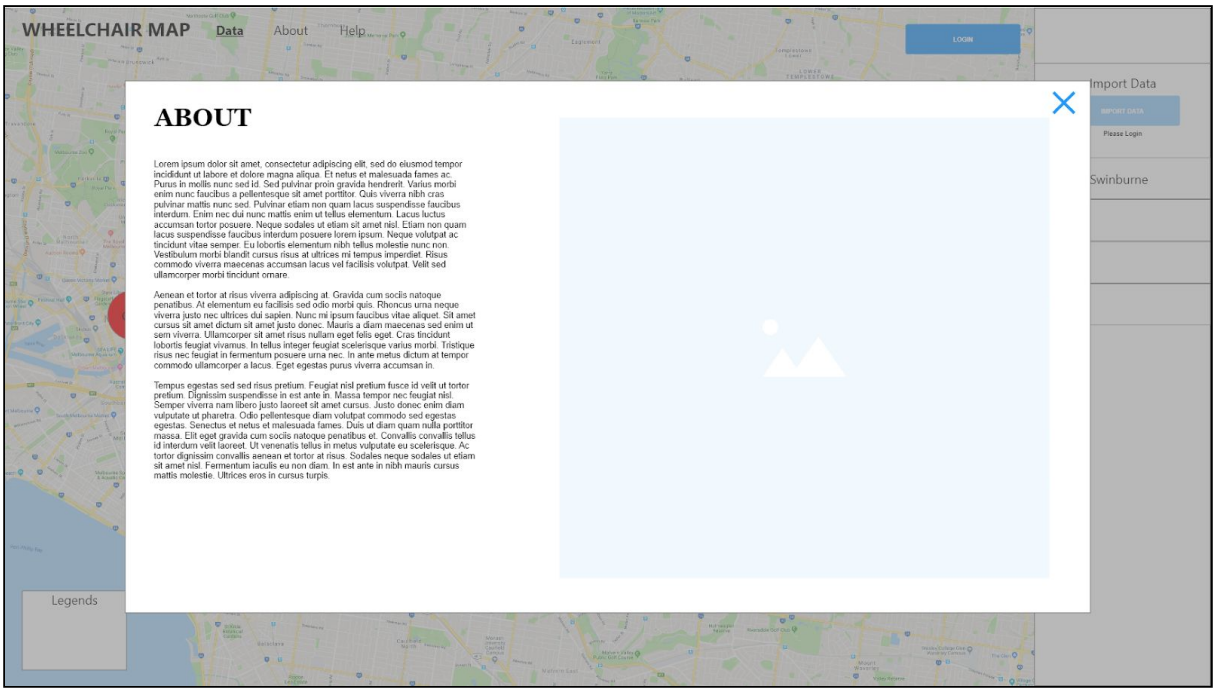

Figure 18: About page pop up UI

The user interface for About page pops out when the about tab is clicked.

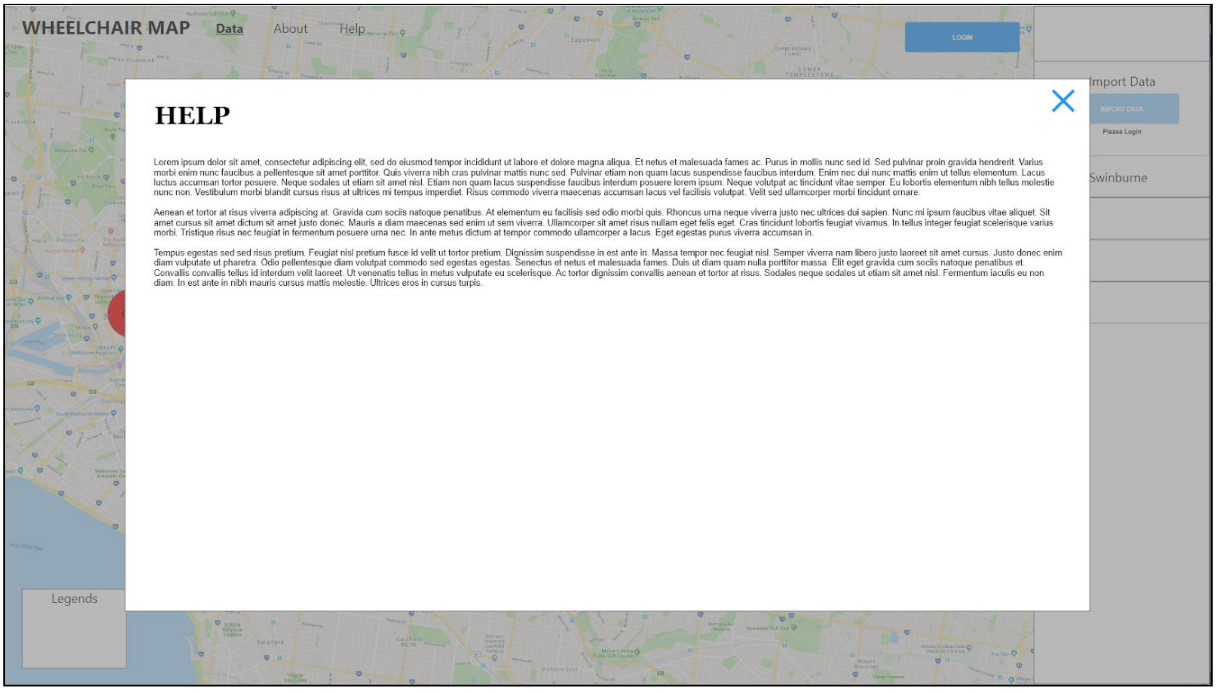

Figure 19: Help page pop out UI

The user interface for Help page pops out when the help tab is clicked.

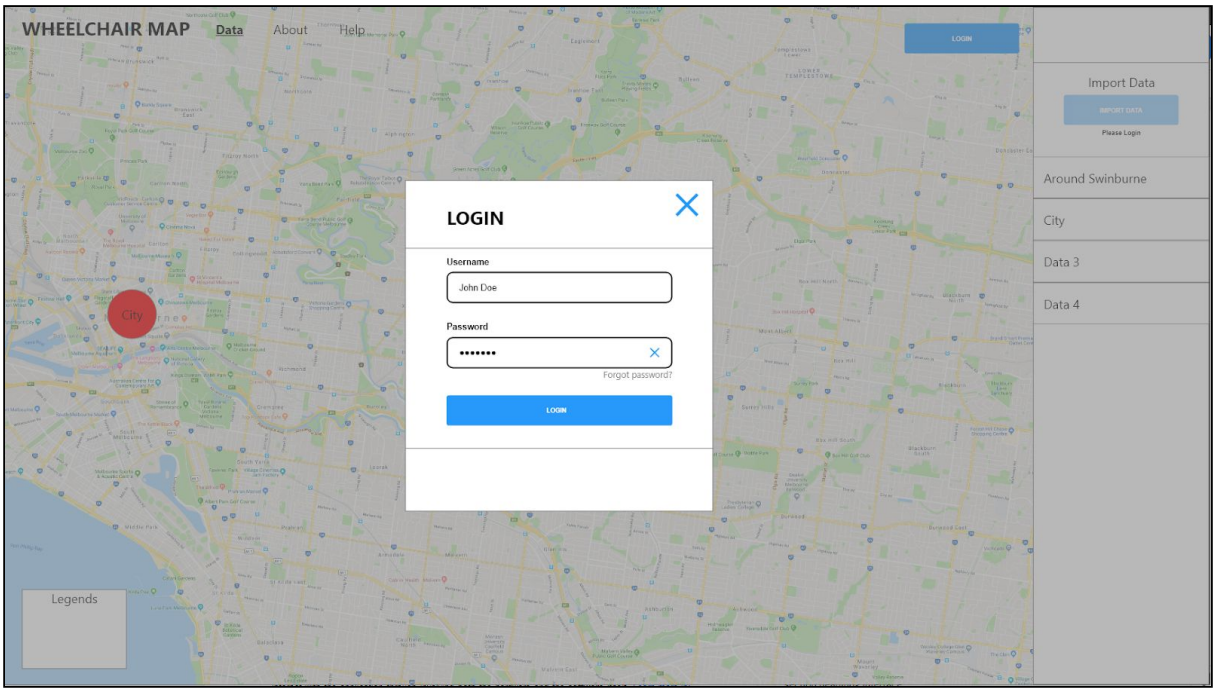

Figure 20: Login UI

The user interfaces for the Login page. User must log in to import new data.

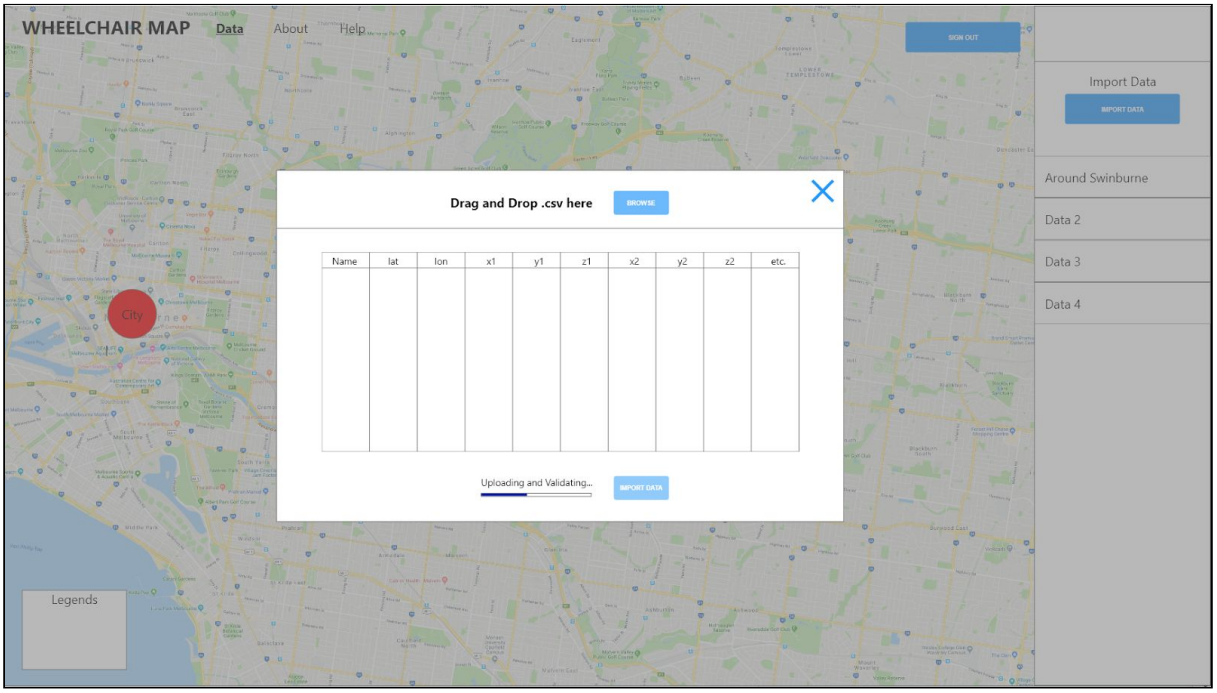

Figure 21: Import data UI

The user interfaces for Import data page. The page allows the user to upload a new .csv file. To upload data, the user has to browse a file by clicking the browse button or drag and drop a file straight from PC or mobile device. The selected file will be validated for data integrity before allowing the user to upload.

4.2. HARDWARE INTERFACES

There are no specific hardware requirements for this project unless the project needs to be turned into a real-time application in which case ;

The **sensors** of the wheelchair are required to fetch sensor data into a local server which will be interfaced to the cloud server in order to make a request. A server with better processing and coolant might be required as real-time load might put a greater impact on the server on its own.

The sensors that would be required be :

1. **Gyroscope**: measure angular velocity
2. **Accelerometer**: measure speed
3. **GPS**: data to fetch location coordinates constantly

4.3. SOFTWARE INTERFACES

The software interfaces are deployed mainly in the cloud side saving the client the hassle to install any applications into their own system. The software below was deployed straight onto the cloud interface.However, the latest browser which is up to date in its releases will be better supported by the application. The web application will require the following software:

Table 12: *Required Software Interfaces on cloud*

Required Software	Description
1. Remote Desktop instance	- Hosted on **Nectar Cloud** - **Ubuntu Linux LTS 18.04** is chosen as the operating system - Hosts the web server, - Accessible through remote desktop software like VNC
1.1. Web server software	- The latest stable release of **Apache HTTP server** is chosen to be installed on the remote desktop - Post-processes backend data and stores them in the database server
2. Database server instance	- Hosted on **Nectar Cloud** - The latest stable release of **MySQL** is chosen as the database system - Stores data from the web server.

Table 13: *Required Software Interfaces on client-side*

Required Software	Description
Web Browser	- The web application supports PC and mobile form factor - JavaScript and PHP enabled

The table above describes the name, version, and source of each dependent software application which is needed for the project. The Remote Desktop and Database server instances will be hosted on **Nectar Cloud.** The web server will be hosted on the remote desktop which connects to the database for data storage.

4.4. COMMUNICATION INTERFACES

The communication of the application will be handled by Apache web server and web browsers with JavaScript and PHP enabled. Also, the application will require the implementation of Google Maps API. Therefore, the application must require an internet connection to communicate with the API.

5. APPENDIX

Table 14: *Definitions, Acronyms, and Abbreviations*

Term	Definition
Functional requirement	In software engineering and systems engineering, a **functional requirement** defines the functionality a system must achieve.
Non-Functional requirement	Non-Functional requirement describes how the system works
ISO/IEC 25010:2011 Software Engineering Standard.	A product quality model that is composed of eight characteristics that a good quality software has.
System Architecture	A conceptual model that defines the system
HTTP	The Hypertext Transfer Protocol is an application protocol for distributed, collaborative, hypermedia information systems.
Apache HTTP server	The Apache HTTP Server, colloquially called Apache, is free and open-source cross-platform web server software.
MySQL database	MySQL is an open-source relational database management system.
Interface Requirement	Interface requirement is the identification of software, hardware and communication elements that an application requires or interacts with.
Nectar Cloud	Nectar Cloud provides computing infrastructure, software, and services that allow Australia's research community to store, access, and run data, remotely, rapidly and autonomously. Nectar Cloud's self-service structure allows users to access their own data at any time and collaborate with others from their desktop in a fast and efficient way.

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Meeting Notes

Meeting Date: 6th March 2019.

Details: Team Meeting.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Binay Dhawa.

Duration: 30 minutes

Agenda:

- To introduce ourselves to each other.
- To discuss about the soft and hard skills required for the project.
- Discuss the proposal and brainstorm on the proposal.
- Decide a group leader.

Announcements:

- A GITHUB repository was created and shared with all the group members to upload and collaborate on project tasks.
- A Slack chat group was created for immediate communication within the group.
- Binay Dhawa was assigned as the group leader.

Discussions:

We read the project proposal as a group and discussed our individual ideas and ambitions that should be fulfilled in this project. It was decided that risk analysis and management report, status reports, minutes of the meetings, log books and a main report would be maintained and established. The presentation would consist of interactive visualizations, PowerPoint Slideshows, video presentation and Gantt chart as the time management presentation. We discussed the leadership skills amongst each other and decided on the group leader.

Tasks:

Re-read the proposal and try to develop some basic skills that might be required for the project.

Meeting Date:19th March 2019

Details: Supervisor Meeting

Attendance: All team members and supervisor were present.

Duration: 30 minutes

Agenda: Meet supervisor and discuss project directions, client meeting procedures

Announcements:

- Project Template (thesis sort of) : Compilation of the whole project description
- Hours for work log
- Interview questions for the client

Discussions:

We discussed on how to proceed with the project, we met with Graham, our Supervisor, he gave some supervision on how to contact client throughout the week. We discussed how to separate agenda, create a video presentation for the project, hour logs for each member is needed for the project. Client questionnaires were discussed and pushed into the repository. The Project Template needs to be created and a profile of the group containing each member needs to be designed and prepared.

Tasks:

- Interview questions for client:
- Group profile
    - Printout and pdf
    - Photos included
- Work log should be presented for each member

Meeting Date: 20th March 2019

Details: Client Meeting

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Binay Dhawa.
- Professor Franz Fuss
- Udi Weizman
- Adin Tan

Duration: 1 hour

Agenda:

- To discuss the expectations of the project.
- To discuss the scope of the project.
- Introduction with other team associates.
- Familiarity of external stakeholders.

- Understand the current progress of the project.

Announcements:

- A sample data will be shared by the client to be understood.
- Another meeting will be held in which the data variables will be explained and discussed.
- A third meeting will be held to conduct the experiment to better understand the data.
- All the data and scripts are currently present in MATLAB

Discussions:

- The given project is an extension of an ongoing research in Wheelchairs and seating systems of future. We met with three team members of the project team; Professor Tino Fuss, Udi Weizman and Adin Tan. It was discussed that the aim of the project is to improve the urban mobility. There is one smart wheelchair available and an experiment is performed to get the data out of the wheelchair. That data includes stroke patterns, GPS and other data that can be used to determine the speed, power energy and fatigue of the user. The data can also be used to identify the type of terrain and how it affects the user. It is expected that we will produce a google maps integrated visualization reflecting different measured aspects. SCOPE is one of the external stakeholders in this project.

Tasks:

- Revise MATLAB and familiarize yourself with it.
- Play around with the data set and formulate questions to be asked about it in the next meeting.

Meeting Date: 26th March 2019.

Details: Supervisor Meeting.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Binay Dhawa.
- Graham Farrell

Duration: 30 minutes

Agenda:

- To discuss the progress of our project.
- To discuss the weekly work completed in last week.
- To evaluate our communication with the client.

Announcements:

- An email was sent to the client in aim of getting the data.
- All the work and communication is up to date and good.

Discussions:

We discussed with the supervisor that we are waiting to get data from the client and that the next meeting would be scheduled after the data is studied by us and we will prepare questions that need to be asked from the client regarding the dataset. The client has been unresponsive through email since

our last meeting with the client but it is expected that we would receive a response and would be back to pace soon

Tasks:

Prepare yourself for the data that will be revealed soon.

Meeting Date: 2nd April 2019.

Details: Supervisor Meeting.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Graham Farrell

Duration: 30 minutes

Agenda:

- To discuss the progress of our project.
- To discuss the weekly work completed in last week.
- To evaluate our communication with the client.

Announcements:

- The client has been unresponsive, and a second point of contact has been reached out.
- Work needs to be started on the project plan and other important documents.

Discussions:

No progress was made throughout the week in terms of communication with the client, it was expected that the client would deliver us the data last week and we would explore the data to question the client, but the data was not released yet. The progress of the group has been decreasing but it has been realized that we must start working on our project plan and other documentation as that is also an integral part of our assessment. Weekly work logs were discussed, and more work is required. Guidance on how to get started with our documentation was provided.

Tasks:

- Prepare yourself for the data that will be revealed soon.
- Start working on project documentation.

Meeting Date: 2nd April 2019.

Details: Team Meeting.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Binay Dhawa.

Duration: 2 hours.

Agenda:

- To discuss the progress of our project.
- To discuss the weekly work completed in last week.
- To evaluate our communication with the client.
- To make further plans for our project

Announcements:

- Tasks were assigned to individual to start working on the project plan
- High Distinction project plans were analyzed.
- Scrum will be used for project management
- A Trello board will be created for further communication.

Discussions:

Despite the fact, that we don't have the dataset, but we can still build on the project plan based on the information that we know. Some research into Google API was made to make it easier to use that in the future. The discussion of specific database storage was conducted although a conclusion has not been reached yet. Some of the ideas for that are Thingspeak, Firebase and SQLite. The tasks mentioned below needs to be started and progress should be presented in the next meeting.

Tasks:

- Aylwin: User Centered design and Quality of Service
- Andres: Visualization definition and Scope research
- Quan: Google API
- Sanee: Risk Assessment and Mitigation
- Binay:Scrum & version control

Meeting Date: 8th April 2019.

Details: Team Meeting.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Binay Dhawa.

Duration: 2 hours.

Agenda:

- To discuss the progress of our project.
- To evaluate our communication with the client.
- To make further plans for our project
- To prepare for supervisor meeting
- To understand the dataset

Announcements:

- Dataset was analyzed and explored

- Questions were collected

Discussions:

Considering that we received an email from UDI Weizman last week in which we received some research papers and 2 excel documents, we decided to review it individually and in this meeting the aim was to share the personal understanding and cross question each other to understand the dataset. The research papers were skimmed, and the dataset was also skimmed. The data set felt limited and more data was required to calculate other variables we are supposed to. Some of the fields in the dataset are confusing and need to be clarified and discussed with the client.

Tasks:

- Formulate questions for the client.
- Fix a meeting with the client.

Meeting Date: 18th April 2019.

Details: Team Meeting and Client meeting.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Aylwin Sim.
- Binay Dhawa.
- Client Team, UDI, Ahsan and

Duration: 4 hours.

Agenda:

- To prepare for client meeting
- Resolve questions from the client
- Work distribution for the project plan
- Understand the scope and the project plan

Discussions:

From our past works and team meets we have had few problems in collaboration considering the data from client was very difficult to interpret. The main issue our project was how to make some base assumptions. We were initially planning on a software that deploys a dataset on the basis of analysis and algorithm of a dataset. We were unsure about the software needing to be local or cloud based, We had planned out a set of problems and solutions for the software based upon our assumptions but having few interactions with the client, the work we needed to do was incomplete especially the project plan. We discussed on all the prior needs of the projects and came upon the realisation that the client required a cloud functional database, Nectar cloud was suggested by our co-client, a basic web application that retrieves and is able to operate a CRUD application was needed for the first stage and the analytics would be implemented in the second stage of the application.

Tasks:

- Finish up on the wireframe
- Finish up project plan
- Set up a cloud database
- Set up a web application

Meeting Date: 23rd April 2019.

Details: Team Meeting and Client meeting

Client meeting: 1hr

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa.

Note: Alywin was on a trip for the mid sem break but he was assigned his task sheet for his part

Duration: 2 hours.

Agenda:

- To work on the client info
- Check up on the tasks completed

Discussions:

We finished up the tasks and the requirements for the project plan. We checked up on the framework for the UI and had a round of discussion what could be implemented better. A login interface was added for better security. We also ended up finishing most of the requirements for the project. We hadn't set up a nectar database yet though. We finalised our tasks and ended up to describe the things needed for the next stage of project. A repo for the web application was created and features for bootstrap were added.

Tasks:

- Finish up on the wireframe for mobile
- Video
- Format the project plan
- Set up nectar
- Start on the project proposal

Meeting Date: 30th of April 2019.

Details: Team Meeting

Supervisor meeting

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa
- Aylwin Sim

Duration: 2 hours.

Agenda:

- Project Plan revisions
- Video Ideas and Discussions

Tasks:

- SRS document
- Client meeting and project plan update
- Video plans and idea implementations
- Set up nectar instance
- Usability report development

Meeting Date: 2nd of May 2019.

Details: Team Meeting and Client meeting

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa
- Aylwin Sim

Duration: 2 hours.

Agenda:

- Finalise wireframe
- Nectar instance revisions
- Project Plan Documents

- Get feedback and plan for the second deployment phase
- Data instance running and client agreement sign off
- Video samples of a KPMG grad role or collegehumor apple might be better

Tasks:

- SRS document
- Usability review for the wireframe
- Set up nectar instance and database
- CRUD application setup
- Scheduling tasks and final version of project plan

Meeting Date: 7th of May 2019.

Details: Team Meeting and Supervisor meeting

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa
- Aylwin Sim

Duration: 3 hours.

Agenda:

- Project plan and SRS work division
- Video works confirmations
- Resolve Nectar issue
- Video clips analysis
- Client issues on wireframes fixtures

Tasks:

- SRS document and Project Plan
- Nectar cloud resolution
- ERD, Scenarios and Persona creation
- Grammatical errors and software requirement proposal fixtures
- Send Project plan to client

Meeting Date: 14th of May 2019.

Details: Team Meeting and Supervisor meeting

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa
- Aylwin Sim

Duration: 2 hours.

Agenda:

- Video feedbacks
- Grammar check on Project plan
- Budget division
- Division of both project plan and SRS
- Client document and sign off sheet

Tasks:

- Interface Requirement and Software interface revision
- Client doc sheet review
- Gantt chart correction
- Final review of the project plan

Meeting Date: 16th of May 2019.

Details: Team Meeting and Client meeting

Duration: 1 hours.

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa
- Aylwin Sim

Agenda:

- Project plan feedback
- Error correction
- Reviews on project
- Headings additions

Tasks:

- Interface Requirement and Software interface revision
- Appendix and video finalisation
- Client doc sheet review
- Gantt chart correction
- Final review of the project plan

Meeting Date: 21st of May 2019.

Details: Team Meeting

Attending:

- Sanee Salim.
- Andres Alvarez Ramirez.
- Quan Chong.
- Binay Dhawa
- Aylwin Sim

Duration: 1 hours.

Agenda:

- Project plan correction
- Client issues resolution

Tasks:

- Interface Requirement and Software interface revision
- Appendix and reference addition
- Definition addition
- Gantt chart separation
- ERD addition and Wireframe and Structure additions
- Email client the final project plan

Peer Contributions Report

Software Requirement Document

	Binay Dhawa	Aylwin Sim	Sanee Salim	Andres Alvarez	Yong Quan Chong
UCD (User-centred-Design)	✓				
Software Requirements				✓	✓
Basic Structure of Wireframe		✓			✓
JavaScript Framework				✓	✓
System Requirements		✓			✓
Video Shooting	✓	✓	✓	✓	✓
Relational Schema					
Video Improvement (1)		✓			
ERD	✓		✓		
Relational Schema			✓		

PROJECT PLAN

	Binay	Aylwin	Sanee	Andres	Quan
Add Scrum members	✓				
Complete SWOT analysis	✓	✓			
Improve Scope and Out of Scope	✓			✓	✓
Gantt chart			✓	--	
Risk Management			✓		
Document Finalisation and editing	✓	✓		✓	✓
Resources				✓	
Software Deliverables	✓				✓

Schedule Planning			✓		
Critical Success Factor		✓		✓	
Add Gantt Chart Broad Overview			✓		
WBS	✓	✓			
Background	✓			✓	
Acceptance Criteria				✓	✓
Introduction	✓		✓		
Client meeting and scope		✓			✓
Risk Assessment Procedures			✓		
Visualisation definition and research				✓	

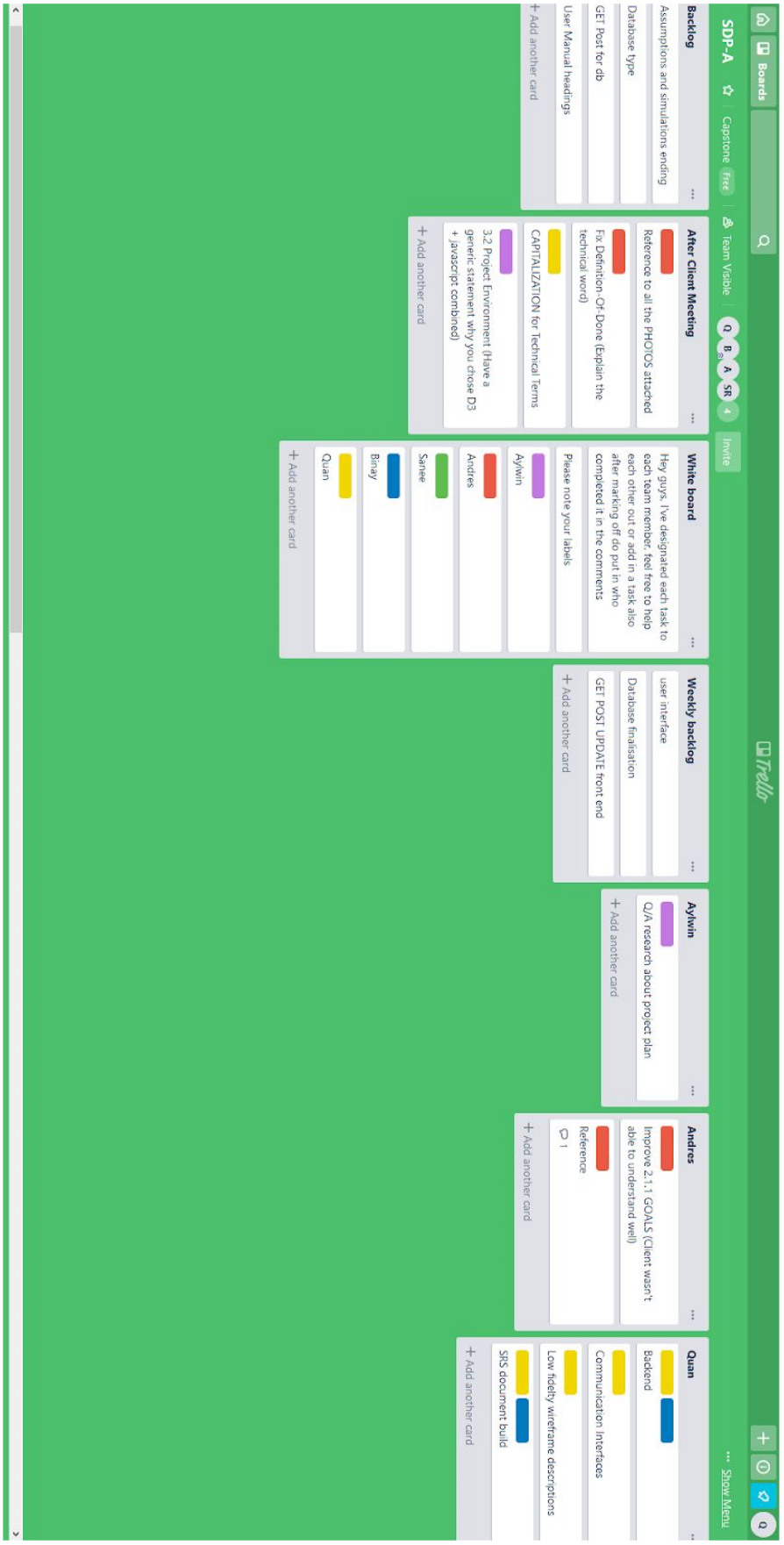
References				✓	

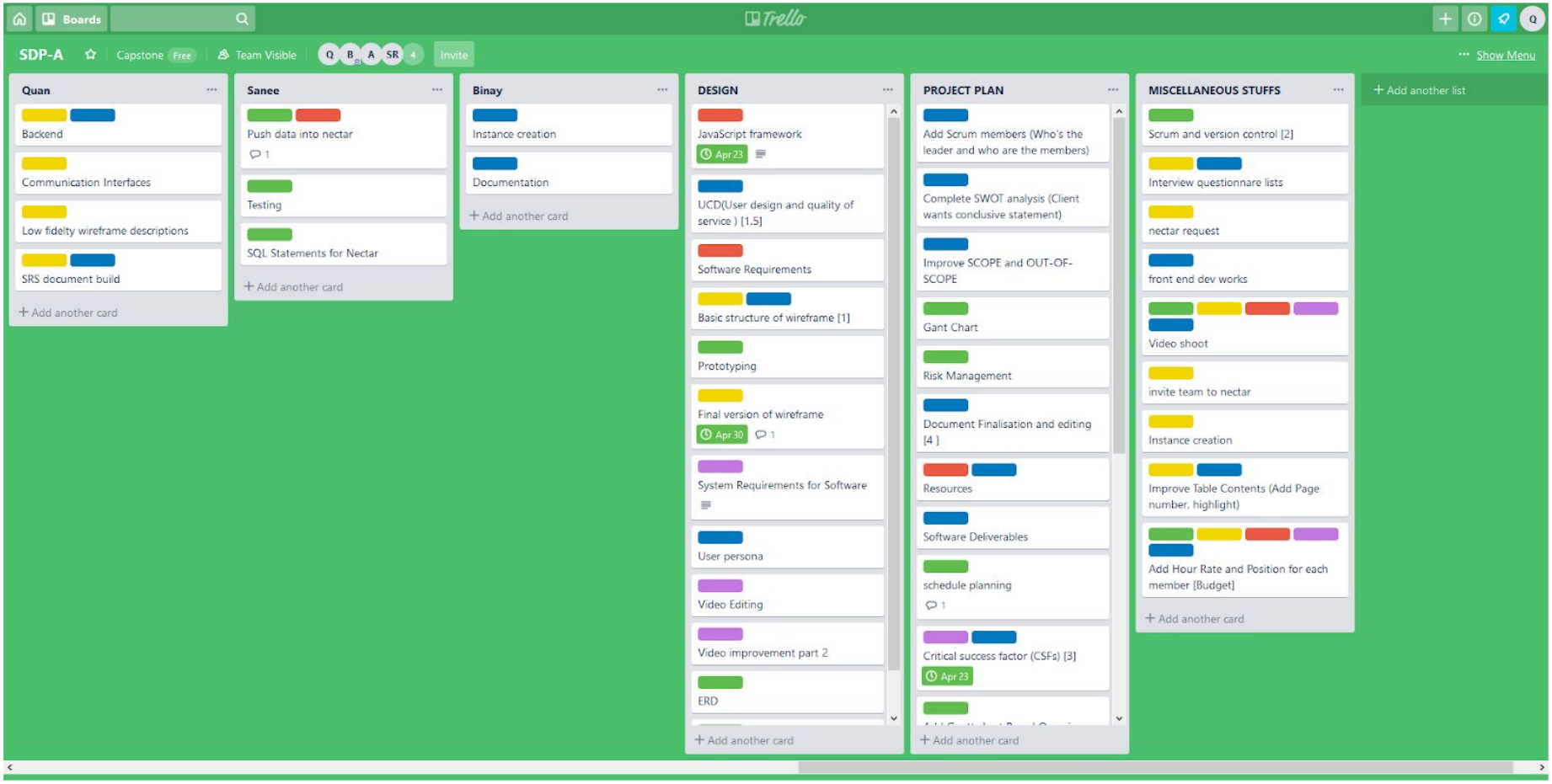
MISCELLANEOUS

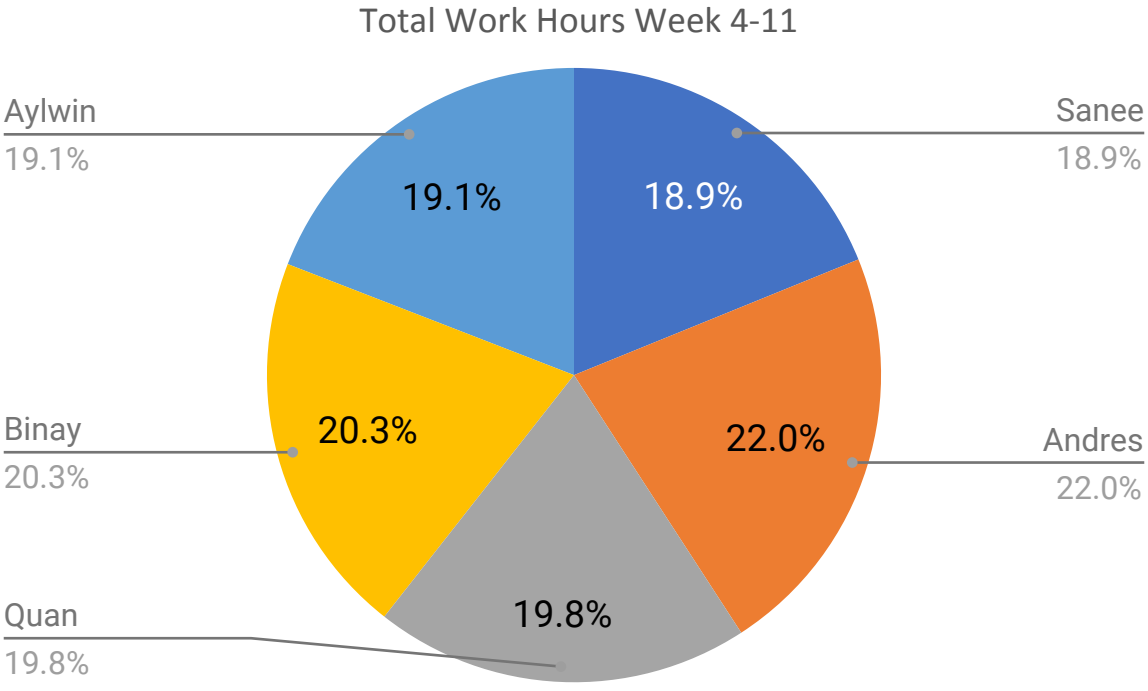
	Binay	Aylwin	Sanee	Andres	Quan
Add Scrum and Version Control	✓				
Interview questionnaire lists	✓	✓			✓
Nectar Request				✓	✓
Front End Dev Works	✓	✓			
Invitation to Nectar			✓		✓
Instance creation (Nectar)				✓	✓
Table of Content Improvements				✓	
Hourly Rates and Deliverables Editing	✓	✓	✓	✓	✓

Add Gantt Chart Broad Overview			✓		

Trello work distribution images




Boards
Trello
SDP-A
Capstone Free
Team Visible
Invite
Show Menu
Quan
Backend
Communication Interfaces
Low fidelty wireframe descriptions
SRS document build
Add another card
Sanee
Push data into nectar
1
Testing
SQL Statements for Nectar
Add another card
Binay
Instance creation
Documentation
Add another card
DESIGN
JavaScript framework
Apr 23
UCD(User design and quality of service) [1.5]
Software Requirements
Basic structure of wireframe [1]
Prototyping
Final version of wireframe
Apr 30
1
System Requirements for Software
User persona
Video Editing
Video improvement part 2
ERD
Add another card
PROJECT PLAN
Add Scrum members (Who's the leader and who are the members)
Complete SWOT analysis (Client wants conclusive statement)
Improve SCOPE and OUT-OF-SCOPE
Gant Chart
Risk Management
Document Finalisation and editing [4]
Resources
Software Deliverables
schedule planning
1
Critical success factor (CSFs) [3]
Apr 23
Add another card
MISCELLANEOUS STUFFS
Scrum and version control [2]
Interview questionnare lists
nectar request
front end dev works
Video shoot
invite team to nectar
Instance creation
Improve Table Contents (Add Page number, highlight)
Add Hour Rate and Position for each member [Budget]
Add another card
Add another list


Total Work Hours Week 4-11
Aylwin
19.1%
Sanee
18.9%
Binay
20.3%
Andres
22.0%
Quan
19.8%
19.1%
18.9%
20.3%
22.0%
19.8%