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## 12.0 User Guide

WRITE HOW TO USE THE SOFTWARE

* + NOTE: The User Guide is only required for software development projects that have not been hosted somewhere.
  + As a minimum this should indicate how the product can be installed for demonstration, including details of the (minimum) required platform specification.
  + If necessary, there may also be information on how the system can be used or operated.

## 12.1 Licensing for external libraries

Python-dotenv = https://github.com/theskumar/python-dotenv

Rospy = http://wiki.ros.org/rospy

speech\_recognition = <https://github.com/Uberi/speech_recognition>

## 12.2 Meeting Minutes

### Date & Time: 17/10/22 | 4.10PM – 4.40PM

Location: A327 PSQ Building

Participants: Gregory Kua, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende, Hai-Van Dang

**Introduction**

* Name & Course names, Quick introduction
* The students have the call to do their own projects. The supervisor is there to advice if there are any risks / problems that might arise.
* You need to think about your careers now. Check out the careers / opportunity available.

**Main**

* Shared folders for the documents, Version Control shared, Planners,
* Quick rundown on the assessment brief
* Writing a main outline for the final report
* Break-down the main tasks into subtasks
* Define a clear output, User Journey Maps implementation (Show clear steps how to use your project)
* MVP needs to be done by Christmas (If not there is a chance you might fail)
* Reminder on the deadlines
* Objective, Output, MVP, Features + Plans for Sprint 1 is written on a paper

### Date & Time: 28/10/22 | 11.15AM – 12.59PM

Location: Room 205 Library

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Alvaro Resende, Michael McDonald

* Noah could not attend the meeting due to an illness

**Project Discussions**

* Quick introduction on what each student’s topic are for their Final Year Project
* Hosting Ideas for the project
* Sprint Planning Ideas
* Discussed frameworks and languages
* Affordable Hosting Sites
* Shared Discord contacts

### Date & Time: 4/11/22 | 11.15AM – 12.00PM

Location: Smeaton 101

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende

**Intro**

* Discussion by supervisor
* Rounds on what each student have done for their sprints, Suggestions and advice have been given to each student accordingly

**Supervisor Notes**

* Write the documentation about the Microphone in the Project Portfolio
* LuxAI structure on how the robot works can be taken but needs to be documented in the references.
* Ask Thomas about the ethical approval for User testing

### Date & Time: 11/11/22 | 11.15AM – 12.00PM

Location: Room 112 Library

Participants: Gregory Kua, Noah Keedle-Isack, Alvaro Resende, Michael McDonald, Xinyao Huang

* Nathan could not attend the meeting due to an illness.
* Quick update on our final year project
* Chatting about frameworks
* Aurelia
* Sprint Review
* **Sam**
* **Michael**
* **Gregory**
* Followed up on feedback since last week,
* Added more headings to final report
* Updated Project Plan with numbered
* **Noah -**
* Added missing headings to project report template.
* Updated project plan and project initiation based on feedback from DLE, and from previous meeting.
* Created Gantt chart and added it to project initiation.
* **Xinyao -**
* Modify the project template content.
* Join the school's software engineering discord.

### Date & Time: 18/11/22 | 11.15AM – 12.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Nathan Everett, Noah Keedle-Isack, Alvaro Resende, Michael McDonald, Xinyao Huang

**Sprint Planning**

* Checking Sprint Planning for every students

**Main**

* Kind reminder to write everything in the portfolio

**Greg**

What was done in sprint 2?

1. Resolve issue with robot

What to do in sprint 3?

1. The robot needs to save the audio
2. Write infrastructure of the robot
3. Design of the protocol/modules
4. Planning: Meet me on Monday,2-3pm for planning, data research

**Michael**

What was done in sprint 2?

1. Backend development: basic functionalities (show the names of gamers, actual data) using public API from games, show the data in web)

What to do in sprint 3?

1. Frontend development
2. Whole picture: API prototypes, front end design, list of features
3. Project vision and market research, list of features

Meet me on Monday,2-3pm for planning

**Nathan**

What was done in sprint 2?

1. Gateway, implementing the services
2. Uploading, downloading data to gcloud storage

What to do in sprint 3?

1. Draw the interaction picture into the report
2. Write about the flexity to switch to a cloud into the report
3. Combining compression with uploading/downloading
4. Paper to compress using machine learning: select the best one and integrate it into the system

**Noah**

What was done in sprint 2?

1. Web socket server set up
2. Test
3. Half way to authentication
4. Finalise the plan

What to do in sprint 3?

1. Write the report: infastructure, put the project initiation into the report0
2. Write about technology
3. Write about authentication system with microsoft identity into the report
4. Design the front end

**Sam**

What was done in sprint 2?

1. API for log in, listing plants, adding plants

What to do in sprint 3?

1. UI implementation
2. Set up landing page
3. Add more details of plants
4. Feature to add more plants of own user
5. Report: 1 section about security consideration/ sign up
6. Write section about the used devices/sensors

**Xinyao**

What was done in sprint 2?

1. Demo for log in is not working

What to do in sprint 3?

1. Organise the backlog into sprints
2. Make log in page running
3. More details about the plan
4. Design of the websites
5. Design the database schema
6. Implement the page to show the exam to the students

### Date & Time: 25/11/22 | 11.15AM – 12.00PM

Location: Room 216 Library Building

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Alvaro Resende,

**Gregory -**

* Showed Project designs via phases, UML diagrams
* Explained how the enrolment and validation phases work

**Xinyao –**

* Showed database ER diagram

### Date & Time: 02/12/22 | 11.15AM – 12.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende,

**Gregory**

* What was done in sprint 3?
  + Writing the infrastructure for the robot
  + Readjusted Sprint Dates
  + Program base Designs
  + Filled in Trello
  + Meeting with Dr Hooman, Read through notes that was given
  + Chose where to store the audio recordings
    - AWS
      * 2000 Puts
      * 20000 Gets
      * 5GB Storage
* What to do in sprint 3?
  + Showing MVP by then,

**Sam:**

What was done in sprint 3?

* Landing page implementation refined (probably complete)

What to do in sprint 4?

* UI Implementation for plant details
* Signup page (endpoint completed)
* Deleting/Updating plants
* Endpoint for collecting metrics (POSTable by any device)

Issues:

**Nathan**

What was done in sprint 3?

* fixing bugs

What to do in sprint 4?

* Add security to gateway (authorisation, access control)
* Frontend to upload/download
* Draw the interaction picture into the report
* Write about the flexity to switch to a cloud into the report
* Combining compression with uploading/downloading
* Paper to compress using machine learning: select the best one and integrate it into the system

Issues: no

**Noah:**

What was done in spritn 3?

* Design for mobile ui in report
* Technology section in report
* Found dataset for AI

Issue: may need to use matlab online for training online

Next sprint?

* Finish mobile front end
* Detection of text messages

**Melissa**

What has been done

* AI algo to predict possible trains using data from gwr

Next sprint

* Implement UI
* Integrate AI backend with frontend in mobile

Issue: no

**Xinyao**

What has been done

* Finished the database and drew an ER diagram
* Basically done with the login and registration screen

Next sprint

* Finding server Issues

Issue:

* Servers sometimes fail to start

### Date & Time: 09/12/22 | 11.15AM – 12.00PM

Location: Room 205 Library Building

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Alvaro Resende, Michael McDonald

* Gregory
  + Shows audio recordings from the robot
  + Explaining the debugging problems that I've been having
* Xinyao
  + Readjusted Sprint content
* Sam
  + Added locations, refactored app to use locations
  + Lots of UI work, particularly the signup page is now functional
  + Need ability to update/remove plants and locations
  + Need to create the routes for POSTing data to locations and plants

### Date & Time: 16/12/22 | 11.15AM – 12.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Nathan Everett, Noah Keedle-Isack, Alvaro Resende, Xinyao Huang, Melissa, Jasper

**Gregory**

What has been done in Sprint 4

* Robot is finally able to save recordings of voice (From Sprint 2)
* Robot is able to understand Human Voices and ignores background noise (From Sprint 2)
* Processing in the NUC automatically
* Cloud API Research on how to use Boto3 to implement S3 storage uploading
* Stored Data file name will be randomised
* To avoid the same file name be uploaded to the cloud that will cause conflictions
* Robot is now able to record the voice within a certain time, (10 seconds at the moment)
* This is to allow the user to know when they’ll be recorded and allow for time for user to “prepare”
* Project Portfolio
* Reference List updated
* Market Research has been done
* HSBC Bank UK
* Google Assistant
* Windows 10 / 11
* ~~Audio Data is Storing Correctly and Safely~~
* ~~File Uploading on AWS S3~~

What to do in Sprint 5 (Starting 9th January)

* Research into streaming services on how they process their audio

Issues: Code for Uploader is correct but currently there are authentication issue with the credentials.

**Noah**

What has been done in Sprint 4

* Got mobile project compiling on Android (iOS remains to be looked at)
* Messages can now be sent and received via the app
* Formatted abusive speech dataset for use in training
* Trained first version of Neural Network and exported network as DLL. This will then be loaded into the API next sprint.

What to do in Sprint 5

* Refine Mobile UI
* Add authentication to mobile app
* Pass messages through Neural Network to ensure they are safe to send

Issues:

* Way too many other assignments were due during this sprint... 🙁

**Sam**

Completed in Sprint 4:

* Angular frontend containerised (Docker) on samoboolean/ng-plantmo
* Node TS Express backend containerised (Docker) on samoboolean/plantmo-server
* Lots of code quality improvements, moved common code to npm package (plantmo-common)
* Refactored code base to allow for locations (locations store collections of plants)
* Metrics collecting is available for locations and plants. However not viewing/displaying it yet
* Wired up the raspberry pi to the sensors with the analogue to digital converter and got data collecting (soil moisture) in a percentage

To do in sprint 5:

* Pick charting library
* Write python on the Pi to collect and send metrics to the server

Issues:

* Containerisation + constant build issues, but it is all stable now. Sometimes the docker build takes like 20 minutes on my x64 PC

**Demonstration:**

Greg demonstrated with recording of robot: robot can record but not upload to cloud yet

Noah showed the code of model training using neural network, and messaging application with simple GUI

Xinyao showed webpages for user registration, login, exam with multiple choice questions (single answer only)

Melissa showed the mobile app with GUI for choosing train route. It would show train, time, destination. Melissa also presented the code for training model to learn about the available seats on the train.

Luke demonstrated a mobile app which can show the list of manga with basic information.

Jasper demonstrated a remote server sending and running a script on a windows machine.

### Date & Time: 20/01/23 | 11.15AM – 12.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende, Michael McDonald

**Gregory:**

Completed in Sprint 5

* Due to assignments Not much was done due to other assignments that needs to be done

To do in Sprint 6

* Sprint 5’s Tasks and some of Sprint 6’s Task
* Includes working on reports
* Project Testing and ethical approval

**Sam**:

Sprint 5: completed suggestions based on last meeting. Charts implemented but not fetching from live data. More recently, worked on the report. Did not complete the requirements of the sprint because of other deadlines

Sprint 6: Continue working on report, crud implementations and security considerations implemented (sql injection protection etc). Start to plan the user experiments

### Date & Time: 27/01/23 | 11.00AM – 1.00PM

Location: Library Room 108

Participants: Gregory Kua, Noah Keedle-Isack, Alvaro Resende

**Sam**

* Investigating and experimenting with charts for showing location temperature history. Data is being collected for locations (from Pi Pico)
* Working on updating and deleting locations and plants
* Dark mode interface
* Need to expand more sections in the report, and discuss how the Pi’s have been wired up

**Noah**

* Continued filling out report for work done for MVP.
* Investigating ways to improve AI detector, and looking at switching to a pattern recognition implementation.
* Next Week: UI Overhaul + Store previous messages in Database.

**Gregory**

Documentation Updates

* Reference List is now done properly and has been cited
* Meeting Minutes document for the Project portfolio has been rewritten to accommodate the portfolio
* Sprints has been rewritten as well

By Next Meeting

* Testing Methodologies will be done
* Ethical Forms have been checked

### Date & Time: 03/02/23 | 1.15PM – 2.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Alvaro Resende

**Xinyao:**

Completed admin managemnent

Next: fix the bug, start working on documentation, continue with implementation

**Gregory:**

Completed in Sprint 6

* Project Testing Draft is done on how it’ll work
* Ethical Approval Forms have been checked and can be used

To do in Sprint 7

* Uploaded File should be processed via aws rekognition
* Poster template for the submission + Description will be started

**Sam:**

Completed in Sprint 6:

* SQL query sanitization changes (made API injection proof)
* Location CRUD changes (updating now works, still no DELETE as it required extra contrainst on the tables and model/schema changes
* Fully implemented dark theme throughout

Next sprint:

* Viewing plants properly (and their moisture info) + Updating/Deleting
* Investigation into the email (smtp) settings for sending notifications
* Implement toasts into the app
* Have a platform for integration tests

### Date & Time: 10/02/23 | 11.15AM – 12.00PM

Location: Library Room 216

Participants: Gregory Kua, Xinyao Huang, Alvaro Resende

* **Xinyao -**
  + Improve the document
* **Gregory -** 
  + Documentation is 20% Completed (2K Words)
  + Updates on an alternation token based authentication for AWS Is in the works
    - Contacted Nathan for help
  + Gantt Chart Section has been updated as well to take into account of changes
  + Sprint 6 needs to be rewritten due to some health issue that has happen
* **Sam -**
  + Added constraints to some tables to allow for cascading when entities are deleted (Locations)
  + Locations can be deleted, carries across to temp + humidity data
  + Currently halfway through this sprint, I still need to expand the same functionality into the plants (editing, deleting and cascading)

### Date & Time: 17/02/23 | 11.15AM – 12.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende

* **Gregory:**
  + Completed in Sprint 7
    - Documentation
      * Project Development Section has been updated
        + Early Stages still
        + Tools and software's updated in Dev Section
      * Other sections has been revised to reduce word count
        + Eg, Using hyperlinks
    - Development
      * Have been busy working with AWS Auth, Rewrote some code
        + Still not working properly (Might need to look at alternative)
      * Tested AWS Rekognition with their demo file
        + Works well for video and image recognition

Audio recognition needs some tweaking but it is possible

* + - * + Does not work directly with the audio files from the QTrobot

(Which is concerning)

* + To do in Sprint 8
    - Documentation
      * Poster + Desc has not been started, will be started ASAP
    - Development
      * Continue to try to fix the aws issue
    - Continue to work on the voice recognition with recognition
  + Challenges:
    - There is no existing implementation for recognize which person based on voice
* **Noah:**
  + Completed in Sprint 7
    - Report
      * Introduction and Background Sections
      * Found references for Background section
    - Development
      * Added authentication to SignalR (WebSockets)
      * Still not working 100% of the time.
      * Currently working on adding authentication to mobile app – looking at secure ways to store credentials on devices
      * Created functionality for group chats. Changed how the database was modelled.
  + To do in Sprint 8
    - Report
      * Add UML and UI Designs
      * Write more on technologies used and reasoning
    - Development
      * CI/CD Setup with Microsoft Azure
      * App UI Overhaul
      * Export Trained Neural Network from MATLAB as a DLL and link to project – add to Chat pipeline
* **Sam:**
  + Sprint 7: plants showing moisture information (finally have a viewer for this). Location temperature shown on plants in dashboard
  + Sprint 8: need to setup the raspberry pi to post data so I have live data for testing. Still need to add editing/deleting functionality for plants. Also need to fix a few inconsistencies with adding plants (related to the choose from template functionality) The testing environment also needs to be set up so that I know when something becomes a breaking change (for the API)
* **Xinyao:**
  + Completed in Sprint 7
    - Documentation
    - Teacher’s functionalities
  + To do in Sprint 8
    - Plan for testing: unit test/ functionality test/ usability test
    - Work on the documentation

### Date & Time: 24/02/23 | 11.00AM – 1.00PM

Location: Library Room 111

Participants: Gregory Kua, Nathan Everett, Alvaro Resende, Xinyao Huang,

* **Xinyao:**
* Improve the document
* **Gregory:**
* Things that has been done this week
* Research into documentation
* Redid the trello board
* AWS Auth does work sometimes after checking, still has not found what was fixed
* Things to be done next week
* Research more into facial recognition and it’s possibilities
* **Sam:**
* Both of the raspberry pi’s are communicating with the server and sending their data. The pico is sending location temperature to the server, the pi 4 is collecting and sending the soil moisture to the server.
* The web app is showing the soil moisture and location temperature in a graph with a timeline (to allow for data zooming)
* Still haven’t added the ability to edit/delete plants yet

### Date & Time: 03/03/23 | 11.00AM – 1.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende

**Gregory:**

Completed in Sprint 8

* Poster confirmation on what needs to be written on it
* New Program Design has been made
* OTP Functionality
* Email Upload functionality started

To do in Sprint 9

* Documentation Update, Proj Vision, Proj Designs,
* Sprint 7 & 8’s updates
* Poster Template started
* Authentication phase for the user after OTP

**Sam:**

Completed in Sprint 8:

* Hosting the stack on the internet now
* Pis have collected enough data for testing, got a few thousand rows in the database.

To do in sprint 8:

* Still need to fix inconsistencies with the plant add/edit interface, and start on testing functionality
* Migrate some plant data to the hosted version
* Look into an email container to use as a service for sending emails

**Noah:**

Completed:

* Finished “chat” UI and started on Friends List UI
* Tried adding authentication to SignalR (WebSockets). Having issues with setting up CORS for requests coming from Android Emulator. To negate this have been testing on a physical device but this is eating up a lot of time.
* Not much was done this sprint as focussing on other assessments.

To Do in Sprint 9

* Solve CORS issue and start on CI/CD.
* Finally build MATLAB Neural Network DLL and integrate with API (focused)
* Polish up UI
* Continue with the report: dataset and evaluation criteria

**Xinyao:**

Completed in Sprint 8

* Documentation: survey and results
* Testing: functionality test (incomplete)

To do in Sprint 9

* Try to solve the problem
* Work on the documentation

### Date & Time: 10/03/23 | 11.00AM – 1.00PM

Location: Library Floor 1

Participants: Gregory Kua, Alvaro Resende

Sam

* Planning the user studies to begin asking questions about the interface. Need to narrrow it down to a specific group of people (technical users) to get feedback relevant to the project
* Hosted site works well and is stable. Plant has been posting data to the public site just fine
* Still haven’t added plant editing/deleting (coming soon)
* Need to add a section to my report about this user study and my plan of action for it. How it will play through and the expected feedback (goals) of the study

Gregory

* Things that have been done this week
  + Docker Crash course
  + Database Server has been completed
  + Mail Server is up, but has not yet been used
* Things to be done next week
  + OTP via mail?
  + Robot is uploading correct information to the db server
  + Leftover documentation, target 3K

Date & Time: 17/03/23 | 1.15PM – 2.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Nathan Everett, Xinyao Huang, Noah Keedle-Isack, Alvaro Resende, Michael McDonald

**Gregory:**

Completed in Sprint 9

* Database Tables for storing User Details
* Learnt Docker, Using it in test environment
* Sprint 7 & 8’s Documentation, Project Designs,

To do in Sprint 10

* Documentation Sprint over Easter

**Sam:**

Sprint 9:

* User studies planning/investigation

To do in Sprint 10:

* Still need to look into email container + look into testing the frontend

**Xinyao:**

Completed in Sprint 9

* Documentation: Requirements

To do in Sprint 10

* Work on the documentation

**Noah:**

Completed in Sprint 9:

* Compiled Neural Network to DLL and linked with API Project
* Messages are now checked for offensive language, and blocked from being viewed by the other connected client.
* Continued with poster, due at the end of the month.

To Do in Sprint 10:

* Further report work
* Documentation
* Tidy up UI and bug test

**Nathan:**

* Front end: re-design, hosting on cloud
* Log in, getting data
* Using cloud provider for data storage
* Features implemented: upload, download, view files, compress files

Date & Time: 24/03/23 | 11.00AM – 12.00PM

Location: Library Room 107

Participants: Gregory Kua, Alvaro Resende

**Gregory**

* Things that have been done this week
  + Rewrote meeting minutes in the portfolio
  + Updated Documentations

(Not much was done within this week on the side of development)

* Things to be done next week
  + Have a second demonstration
  + Video demonstrations and Slides
  + Poster and Description

**Sam**

* Previous Week
  + Redesigned some parts of the dashboard page
  + Added weather tracking functionality (based on users location)
  + Added plant searching from external API, and local caching of results for performance
* Next Week
  + Work on the poster

Date & Time: 31/03/23 | 1.00PM – 2.00PM

Location: A327 PSQ Building

Participants: Gregory Kua, Xinyao Huang, Alvaro Resende,

**Sam:**

Completed in Sprint 10:

* Redesigned some UI parts to make them more clear
* Added emailing. A self hosted user can provide SMTP details and the server will use it to send emails from their own email address.
* Added an option to verify new users (send registration codes)
* Added a weather forecasting section to the dashboard, users can share their location to the server and provided they have an API key, it will fetch weather information for their location. Users with no API key can just skip this
* Added plant searching – also with an API key, users can enable extra functionality to search for their plant species for information to use on soil moisture and care notes.

To do in Sprint 11:

* I still haven’t added plant editing!
* Start adding some tests to the backend to test functionality upon every change

**Gregory:**

Completed in Sprint 10

* Email sending in python using SMTPLIB (Will be using dotenv for secrets)
* Have not implemented checks for the OTP
* Posters and Thumbnails

To do Sprint 11

* + Be done with Software
  + Be done with Portfolio
  + Be done with Video

**Xinyao:**

Completed in Sprint 10

* Documentation: Development Stage & System Design
* Poster: first edition

To do in Sprint 11

* Work on the documentation
* Try to optimise the UI for generating questions
* Redesigned poster

## 12.3 Sprint Reviews

## 7.1 Sprint 0

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 0 runs from the 6th October till 20th October. The project initiation document (PID) was made that includes the title of the project, project vision, risks, Gantt chart. This initial document will be the basis for the whole project which shows where the project would head in the future and acts as a steppingstone. The GitHub Repository has also been made during this sprint. A Trello board has also been set up to allow for management of tasks and within Trello automations has been set up for automatic labelling.

## 7.2 Sprint 1

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 1 runs from 20th October till 3rd November 2022. During this sprint the QTrobot was checked to make sure that it can turn on and off it’s microphone via the ROS service. The base code was pushed with a template. It was here where there was a Linux GUI issue which did not allow me to run the terminal or any system apps. (Images can be found in the Links section of this document) It was then fix within a week.

## 7.3 Sprint 2

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 2 runs from the 3rd of November 2022 until the 17th November 2022. This sprint went into more research into Audio Recognition. Google’s speech recognition library and Amazon’s Rekognition was also checked accordingly to see which is more suitable for this project. Project Planning for the base designs for the enrolment phase and the recognition phase has been made using draw.io. The internet issue that has been persistent has been fixed during this time.

## 7.4 Sprint 3

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 3 runs from 17th November 2022 until the 1st December 2022. This sprint consisted of a meeting with Dr Hooman from the University of Hertfordshire on the 18th November. This meeting consisted of information on Visual and Spoken interfaces, Dealing with Voice Biometric. There was talks on Fourier Transformation, Frequency domain and time domains. This meeting helped with the base understanding for Speech Recogntion. S3 by Amazon was chosen as the file server to store the audio recordings. Base first designs were made for the infrastructure section of the report and was written out. Sprint Dates were also readjusted to follow the winter holidays.

## 7.5 Sprint 4

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 4 runs from the 1st of December till the 15th of December 2022. At the end of this sprint, there will be a showcase to the supervisor that shows the progress of what has been done over the past 4 sprints. One of the main developments of the project that can be stated is that the robot is able to save the audio that is recorded. The data is stored locally. Other than that, considerations on what data that is need to be stored has been taken into account. Within the same spectrum, the user would be able to know when they are being recorded. Other competitors and / or similar projects has been checked out and written within this report [here](#_5.2.3_Market_Research). A quick PowerPoint presentation was made up to show the concept that has been done as well. The PowerPoint presentation can be found over [here](https://liveplymouthac-my.sharepoint.com/:p:/r/personal/gregory_kua_students_plymouth_ac_uk/Documents/Year%203%20(Stage%204)/COMP3000%20Computing%20Project%20(22AYAUM)/Submissions/Final_Submission_COMP3000_GregoryKua/MVP%20Folder%20(Including%20Video%20Footage)/MVP_3.pptx?d=w5b47efffb8244b78b2f723cc2345f623&csf=1&web=1&e=nIbkaq).

## 7.6 Sprint 5

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 5 runs from 9th January to 23rd January. Documentation has been updated during this sprint. Meeting Minutes has been reworked to be easier to read and to prepare for insertion within the documentation. References has been reworked to follow Harvard referencing instead of short links. There has been no major development to this project due to other modules taking over most of the time. Main heading for Sprint Review section has been written out here as well.

## 7.7 Sprint 6

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 6 runs from 23rd January to 6th February. This sprint, Ethical approval forms have been checked. Document has been updated with more hyperlinks and have surpassed 2000 words within this sprint.

## 7.8 Sprint 7

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 7 runs from 6th February to 20th February. During this sprint, plans for downscaling the project was made here. This is due to the fact that there were some unknown issues with boto3’s API. This caused some inconsistency on when it will run. Timeline from here on out has been affected slightly.

## 7.9 Sprint 8

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 8 runs from 20th February till 6th March. During this sprint, the poster designs were started to be made. This includes with checking what topics and text would need to be on the poster. This is for the March submission. Next, program designs were made as well. Email uploading functionality have been started. OTP (One Time Passcode) functionality has also been implemented. During this sprint, the developer decided to learn docker in full to make development easier.

## 7.10 Sprint 9

Graphical user interface, text, application

Description automatically generated

Sprint 9 runs from the 6th of March to 20th March. With this sprint, the database server (PostgreSQL) is made and tested. The email server was then put and set up but due to some issues the self-hosted email server was than not used within the project after this. Project Vision was then updated with the new changes to the project that was done. Finally, for the next submission there was a poster deadline and the template for it was started.

## 7.11 Sprint 10

Graphical user interface, text, application, chat or text message

Description automatically generated

Sprint 10 was a short sprint due to the deadlines for the other modules that the author was taking. The poster was completed and submitted on time. The description for the website and the poster was also written down and uploaded to the DLE on time. This report was then sent in for checks during this sprint.

## 7.12 Sprint 11