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Farmbot Project Home






Project Overview:

Project Overview	Goals of the Whole Project	Confluence Shortcuts:
<ul style="list-style-type: none">The overall goal of our part of the project is integrating a thermal camera to a robot named farmbot, so that the users could collect thermal data of plants remotely. Users should access the camera on farmbot web-app and can take thermal pictures if they wish. Once there is an emergency (for example threatening temperature) the system could send alarms to user.click here for detailed project information	<ul style="list-style-type: none">Integration of an e-nose sensor within the web-app controlling the robotIntegration of an thermal camera within the web-app controlling the robot (our part)Integration of AI solvers that automatically control the robot.	Requirements for courses Timeline Developments and Deployments Products of the project meeting minutes

Client and Supervisor

	
Nir Lipovetzky Client Nir Lipovetzky	Lin Li Supervisor Lin Li

Team Members

				
Dikai ZHU Scrum Master Dikai ZHU	Chengtian Jiang Software Developer Chengtian JIANG	Yuxi He Product Owner YUXI HE	Tingzheng Ren Test Leader Tingzheng Ren	Zhiyu Chen Software Developer Zhiyu Chen

Resource Links:

Team work space:

[github repository](#)
[trello board](#)
[conference home](#)
[goodle drive](#)

Other Resources:

[Farmbot Control](#)
[Farmbot Training](#)
[Farmbot Official Github](#)
[Farmbot Previous Project](#)

RoadMaps and Plans:

Project Plans:

- Our goal is to finalize the project development during Sprint 2 and Sprint 3. To achieve that, we have reorganized the user stories into user cases, meanwhile taking into account their priorities of the user cases. Our team has created a well-defined development plan, which can be viewed on Trello: [FA-Boxjelly development plan](#).
- Click [here](#) for detailed project plan

Road Map:

Sprint 1	Friday, March 31st 2023 Team Building and Project Design
Sprint 2	Friday, April 28th 2023 Finish Half Stories and First Release
Sprint 3	Friday, May 26th 2023 Finish Project Release and Final Present
Sprint 4	Friday, June 9th 2023 Review and Self-Reflection

Recent updates:

Recent space activity



Dikai ZHU

[PRODUCT BACKLOG](#) 1 •



Zhiyu Chen

[Sprint 2 Retro](#) 11:20 •

[Sprint 1 Retro](#) 11:17

[Project Timeline](#) 11:04 •

[Timeline](#) 10:48 •

Space contributors

No contributors found for: authors on selected page(s)

REQUIREMENTS

- [ACCEPTANCE CRITERIA](#)
- [CODE REVIEW](#)
- [DEVELOPMENT ENVIRONMENT](#)
- [PERSONAS](#)
- [PRODUCT BACKLOG](#)
- [PROJECT INFORMATION](#)
- [PROJECT PLANNING](#)
- [SCOPE AND REQUIREMENTS](#)
- [USER STORIES](#)

[Farmbot Project Home](#)

ACCEPTANCE CRITERIA

Versions

VersionID	Description	Date
2.0	1. Update test cases for following features 2. Modify user story add test cases	2022-04-24
1.0	Created first version	2022-03-15

User Story Global ID	User Story	Acceptance Criteria ID	Given	When	Then	Test Result	Comments
1	As a teacher/researcher/farmer, I want to use the camera to capture pictures of different stages of crops, so that the students can learn the lifecycle of crops.	1.1	I have a camera on the farmbot	I click the capture button	The teacher /researcher/farmer can see the photo of the crops on farmbot web app	PASS	
2	As a teacher, I want to show the students the automated process of planting, watering, and harvesting crops, so that they can understand how technology works in agricultural production.	2.1	I have logged in the web app	I click the planting /watering /harvesting button	The farmbot will execute the planting /watering/harvesting actions	PASS	
3	As a teacher, I want to deploy the Farmbot in class so that students can gain hands-on experience in high-tech farming.	3.1	I have farmbot	I deploy the web app	I can teach students about how to use farmbot with the web app interface	PASS	
4	As a farmer/researcher/teacher, I want to farm remotely so that I can reduce costs and get more time.	4.1	I have access to farmbot remotely	I click the buttons on the web app	I can control the farmbot by different buttons	PASS	
5	As a teacher/researcher, I want to receive alarms when the crops are dry so that I can remind students that they forgot to water the plants.	5.1	I have connect the web app to the farmbot	The crop needs water	The farmbot will detect the needs and send alarm to the web app		
6	As a sustainable farm owner, I want to use the thermal camera to detect whether the crops are infected with pests and diseases so that I can timely detect and treatment of pests and diseases.	6.1	I have logged in the web app	Pests or diseases on crops	The farmbot can detect the situation and give me feedbacks		
7	As a sustainable farm owner, I want to use thermal cameras to help me accurately control the irrigation water quantity so that I can accurately control irrigation volume, thereby improving crop growth efficiency.	7.1	I have logged in the web app	I click the irrigation button	I can control the irrigation volume of farmbot by the button of irrigation controller on the farmbot web app	PASS	
8	As a farmer/researcher, I want to use the infrared imaging function to detect the temperature of the environment including the plant and the soil so that I can improve the quality and nutritional value of crops through precision agriculture techniques	8.1	I have logged in the web app	I start the infrared imaging function by clicking the button	The farmbot can detect the temperature of environment and return the data back.		
9	As a teacher/researcher, I want to collect thermal data through farmbot so that it could be used for further study.	9.1	I have logged in the web app	I click the button of thermal camera	The farmbot will take a photot of crops and send back the data of the photo		
10	As an agricultural researcher, I want to manage my database related to the plants so that I have a clean and reliable dataset for my study.	10.1	I have deployed my farmbot	I want to do research about the plants	The farmbot database can provide a clean and reliable dataset collected from farmbot		

[Farmbot Project Home](#)

[Parent Page: Requirement](#)

CODE REVIEW

DATE

2023-3-23

PARTICIPANTS

MEMBER GROUP	MEMBER
Team Members	<input checked="" type="checkbox"/> Dikai ZHU
	<input checked="" type="checkbox"/> Chengtian JIANG
	<input checked="" type="checkbox"/> Tingzheng Ren
	<input checked="" type="checkbox"/> YUXI HE
	<input checked="" type="checkbox"/> Zhiyu Chen

GOALS

- Review the code of web app front-end and thermal camera control script
- Find issues and fix the bugs

CODE REVIEW

Link to the original file: https://github.com/COMP90082-2023-SM1/FA-Boxjelly/blob/main/docs/COMP90082_FA_Boxjelly_CodeReview.xlsx

ORGANISING CODE REVIEW								
Name and local of artifact (on Github) to be reviewed:			https://github.com/COMP90082-2023-SM1/FA-Boxjelly/tree/main/src					
What to be reviewed?			web app interface/ thermal camera control script					
When's the code review meeting happening:			Read artifact: April 25th / Code review meeting: April 26th					
Reviewers:			Dikai Zhu, Chengtian Jiang, Yuxi He, Tingzheng Ren, Zhiyu Chen					
CODE REVIEW MEETING (STARTING THE MEETING)								
Team:	<FA>-<Boxjelly>							
Date:	<26/04/2023>							
Time:	<14:30:00>							
Facilitator:	Dikai Zhu							
Reviewers:	Chengtian Jiang, Yuxi He, Tingzheng Ren, Zhiyu Chen							
CODE REVIEW (DURING MEETING TIME)								
Item	Artifact (on GitHub)	Location (where the issue was found in the reviewed artifact?)	Severity	Type	Defects Category	Description	Fixed by the author?	Verified by the Moderator?
1	FA-Boxjelly/src/python_script/control_script_version_2.1.py	general	High	Improvement	Documentation Defects (Comment)	Code should have a better documentation describing each functionality and usage.	Yes	Yes
2	FA-Boxjelly/src/python_script/control_script_version_2.1.py	function send_command	Trivial	Issue	Structure Defects (Dead Code)	Improve the exit condition for the loop	Yes	Yes
3	FA-Boxjelly/src/python_script/control_script_version_2.1.py	function camera_ssh_trigger_single	Trivial	Improvement	Resource Defects (Variable Initialization)	Variable sshCamCap.JPG is not the same format as other variables	Yes	Yes
4	FA-Boxjelly/src/python_script/control_script_version_2.1.py	function jpg_download	Medium	Investigate	Interface Defects (Parameter)	The function should accept parameters instead of having values hard-coded within it	Yes	Yes
5	FA-Boxjelly/src/python_script/control_script_version_2.1.py	general	Medium	Improvement	New Functionality (Use Standard Method)	Organize the code into functions or modules	Rejected	Rejected
6	FA-Boxjelly/src/python_script/control_script_version_2.1.py	function camera_ssh_trigger_single	Trivial	Improvement	Structure Defects (Duplication)	Use a function to wrap repeated code	Yes	No

7	FA-Boxjelly/src/front_end/frontend/camera/photos.tsx	general	High	Improvement	Documentation Defects (Comment)	Code should have a better documentation describing each functionality and usage.	No	No
8	FA-Boxjelly/src/front_end/frontend/camera/photos.tsx	general	Trivial	Improvement	Structure Defects (Dead Code)	Delete unused packages	Rejected	Yes
9	FA-Boxjelly/src/front_end/frontend/camera/photos.tsx	function render	High	Improvement	New Functionality (Use Standard Method)	Lack of implementation of button logic	No	Yes
10	FA-Boxjelly/src/front_end/frontend/camera/photos.tsx	general	Medium	Improvement	New Functionality (Use Standard Method)	Organize the code into functions or modules	No	No
11	FA-Boxjelly/src/front_end/frontend/camera/photos.tsx	componentDidMount	High	Issue	Resource Defects (Variable Initialization)	Parameter undefined	No	No
19								

END OF CODE REVIEW MEETING

Number of severe/critical errors:	<1>						
Number of medium errors:	<N>						
Number of trivial errors:	<1>						
Total inspection time (hs):	<150 mins>						

DEVELOPMENT ENVIRONMENT

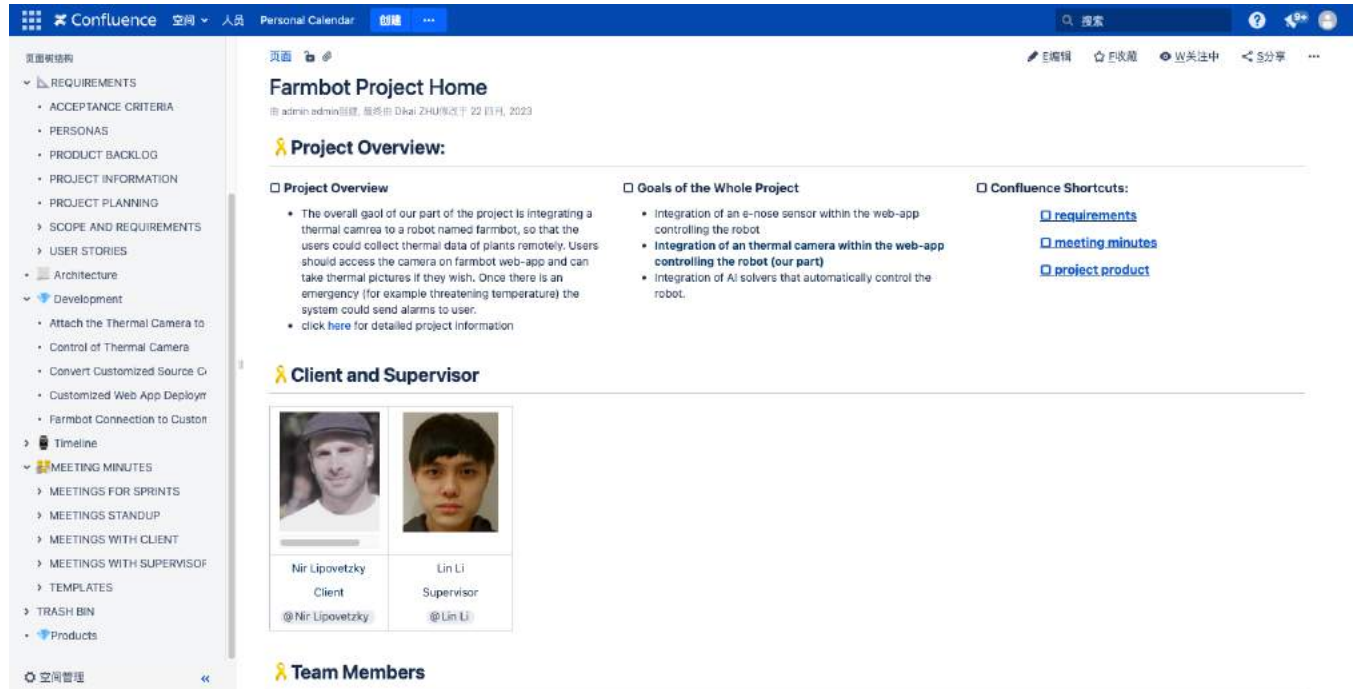
This page is about the overall development environment of the project, which includes the following:

1. Project documentation
2. Project progress tracking
3. Project code hosting
4. Project deployment URL

Project documentation:

All development-related documents are recorded on Confluence, which basically includes 6 aspects: REQUIREMENTS, Architecture, Development, Timeline, MEETING MINUTES, and Products.

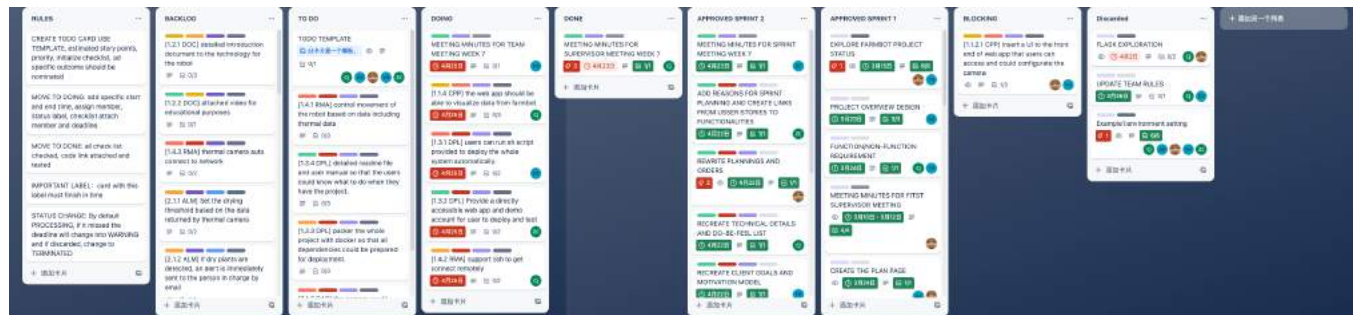
[Farmbot Project Home](#)



Project progress tracking:

All development progress tracking and task assignments are recorded on Trello.

[Farmbot Trello Dashboard](#)



Project code hosting:

All development-related code is hosted on GitHub.

[FA-Boxjelly Github Page](#)

COMP90082-2023-SM1/FA-Boxjelly

Watch1Fork0Star1

CodeIssuesPull requestsActionsProjectsSecurityInsightsSettings

main8 branches7 tags

Go to fileAdd fileCode

Your main branch isn't protected

Protect this branch

ecolismith

reupload of the same file on the root page

22f1644 last week29 commits

data samples

Create sample_data.md

last month

docs

reupload of the same file on the root page

last week

prototypes

Create sample_high_fidelity.py

last month

src

Create sample_code.py

last month

tests

Create sample_test.py

last month

ui

Create sample_ui.png

last month

COMP900822023SM1FABoxJelly-...

Add files via upload

last month

README.md

Update README.md

last month

About

our boxjelly team for farmbot project

Readme

1 star

1 watching

0 forks

Releases4

Sprint 1Lateston Mar 24

+ 3 releases

Packages

No packages published

Publish your first package

Contributors2

ecolismithDikai Zhu

TingzhengRenTingzhengRen

Languages

Python100.0%

FA-Boxjelly

Project overview

The overall goal of our part of the project is integrating a thermal camera to a robot named farmbot, so that the users could collect thermal data of plants remotely. Users should access the camera on farmbot web-app and can take thermal pictures if they wish. Once there is an emergency (for example threatening temperature) the system could send alarms to user.

More information :
<https://confluence.cis.unimelb.edu.au:8443/display/COMP900822023SM1FABoxJelly/Farmbot+Project+Home>

Goals of the Whole Project

- Integration of an e-nose sensor within the web-app controlling the robot
- Integration of an thermal camera within the web-app controlling the robot (our part)
- Integration of AI solvers that automatically control the robot.

Client : Nir Lipovetzky

Supervisor : Lin Li

Team Members

Name	Role	E-mail
Dikai ZHU	Scrum Master	dikai.zhu@student.unimelb.edu.au
Chengtian Jiang	Software Developer	chentian.jiang@student.unimelb.edu.au
Yuxi He	Product Owner	yuxi.he2@student.unimelb.edu.au
Tingzheng Ren	Test Leader	tingzheng.ren@student.unimelb.edu.au
Zhiyu Chen	Software Developer	zhiyu.chen3@student.unimelb.edu.au

Repository structure and navigation

```
├── docs/ # Documentation files (you can create subfolders here to organize your requirements)
├── src/ # src code
├── tests/ # User/system tests
├── prototypes/low fidelity/ # low fidelity files (screens, mockups and so on)
├── prototypes/high fidelity/ # high fidelity files (screens, source files and so on)
├── ui/ # All the images created for the prototypes (icons, fonts, backgrounds... should be here. This is different from the prototypes' folders. These are the graphical elements that goes into the prototypes)
├── data samples/ # Documents you need to generate with all the data (inputs) necessary to simulate/demonstrate your prototype (whatever can be provided as an input in your prototype)
└── README.md #(this file must be updated at all times, please, make sure you explain your github structure here and generate changelogs for each sprint before you tag it)
```

Branch details:

- main: The place to release the final version.
- vanilla_farmbot_app: Default deployment code, project starting point

Baseline tag convention: COMP90082_2023_SM1_<TwoDigits>_<team>_BL_<sprint>

- BL means BASELINE. A baseline is a reference point in the software development life cycle marked by the completion and formal approval of a set of predefined work products

- Example of TAG in this subject: COMP90082_2023_SM1_CM_Wombat_BL_SPRINT1

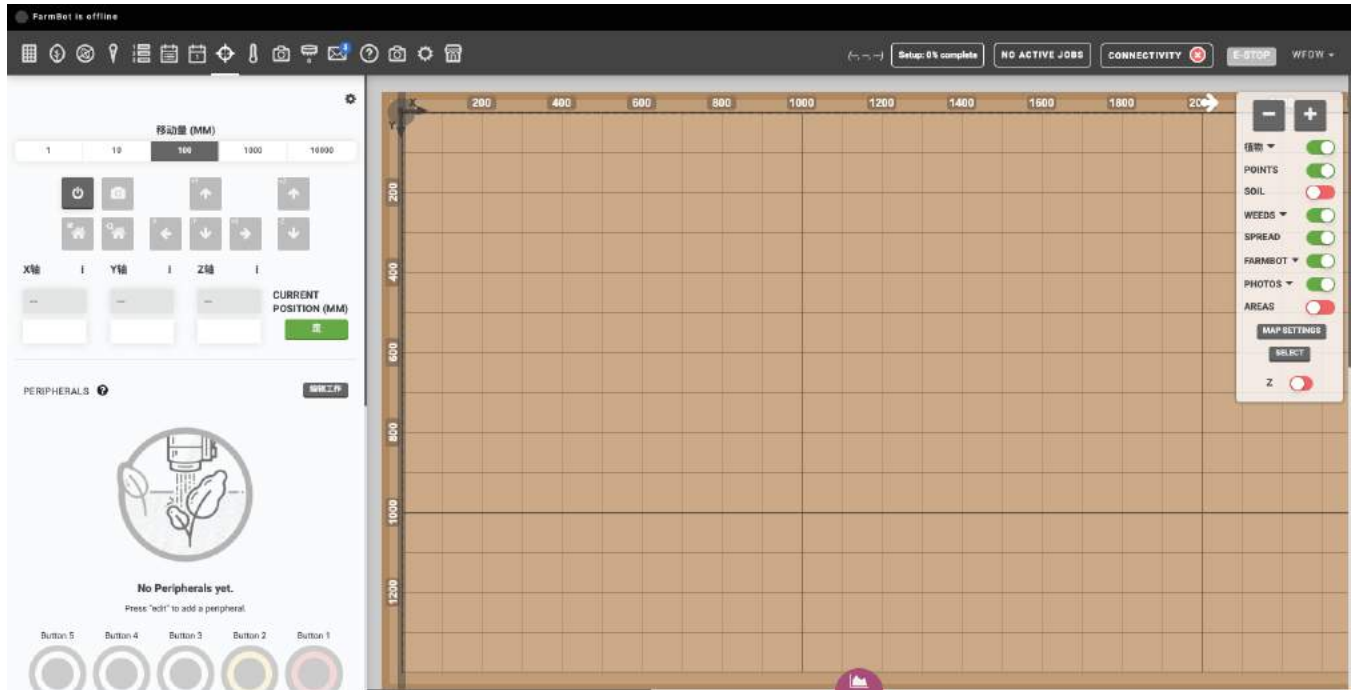
Current Status:

- Just started and without any implementations

Project deployment URL

The links to all developed pages are as follows:

[Project Entrance](#)



Farmbot Project Home
Parent Page: Requirement

PERSONAS

Type	Bio	Goals	Frustrations
Sustainable Farm Owner	Samantha is 36-year-old lady, and owns a small-scale sustainable farm that grows a variety of fruits and vegetables. She is passionate about using environmentally friendly methods and wants to ensure that her crops are free from pests and diseases without the use of harmful chemicals.	<ol style="list-style-type: none"> 1. Avoid using harmful chemicals 2. Reduce the amount of time spent monitoring farm manually 3. Quickly detect any pests or diseases 	<ol style="list-style-type: none"> 1. Focus on Cost and Time 2. Competing against larger farms with more resources and funding 3. Provide healthy and chemical-free produce
High School Teacher	Yamanaka Sawako is a 35-year-old high school teacher in Tokyo who devoted to teaching agriculture. Grown up in countryside, she worked at sakura high school as a teacher after complete her degree, . She is responsible for leading the school's agriculture program, which provides students with hands-on learning experiences by allowing them to plant and harvest real crops.	<ol style="list-style-type: none"> 1. Ensure the crops are well-cared 2. Give student better understanding of farming and agriculture 3. Enable students stay update to latest agricultural technologies. 	<ol style="list-style-type: none"> 1. Large class size to manage 2. Student not proper care the crops 3. Not familiar with robots
Agricultural Researcher	Dr. John Smith is 39-year-old agricultural researcher based in Australia. Growing up on a family farm in rural New South Wales, John developed an early interest in the natural world. After completing a degree in agricultural science at the University of Sydney, John went on to earn his Ph.D. in plant genetics from the University of Melbourne. His research has focused on developing new plant varieties that are resistant to pests and diseases, as well as improving crop yields through precision agriculture techniques.	<ol style="list-style-type: none"> 1. Develop new plant varieties that are resistant to pests and diseases 2. Improve the quality and nutritional value of crops through precision agriculture techniques 3. Increase the efficiency and productivity of farming practices through the use of innovative technologies 	<ol style="list-style-type: none"> 1. Limited time and resource to collect data from crops. 2. Lack of effective alarm that can quickly notify crop emergencies. 3. Currently equipments are not precise enough.

Yamanaka Sawako



"Education is not about filling a bucket, it's about lighting a fire."

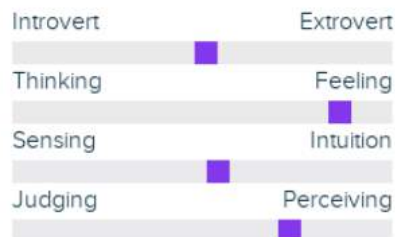
Age: **35**

Work: **High School Teacher**

Family: **Married**

Location: **Japan**

Personality



Friendly

Hardworking

Goals

- Ensure the crops are well-cared.
- Give student better understanding of farming and agriculture.
- Enable students stay update to latest agricultural technologies.

Frustrations

- Large class size to manage.
- Student not proper care the crops.
- Not familiar with robots.

Bio

Yamanaka Sawako is a 35-year-old high school teacher in Tokyo who devoted to teaching agriculture. Grown up in countryside, she worked at sakura high school as a teacher after complete her degree, . She is responsible for leading the school's agriculture program, which provides students with hands-on learning experiences by allowing them to plant and harvest real crops.

Samantha



"We have not inherited the earth from our ancestors, we have borrowed it from our children."

Age: **36**

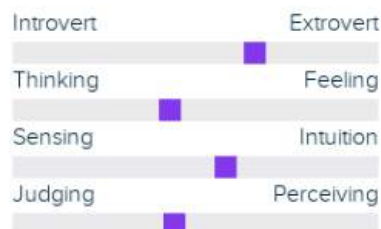
Work: **Sustainable Farm**

Owner

Family: **Married**

Location: **India**

Personality



Hardworking

Enthusiastic

Goals

- Avoid using harmful chemicals
- Reduce the amount of time spent monitoring farm manually
- Quickly detect any pests or diseases

Frustrations

- Focus on Cost and Time
- Competing against larger farms with more resources and funding
- Provide healthy and chemical-free produce

Bio

Samantha is 36-year-old lady, and owns a small-scale sustainable farm that grows a variety of fruits and vegetables. She is passionate about using environmentally friendly methods and wants to ensure that her crops are free from pests and diseases without the use of harmful chemicals.

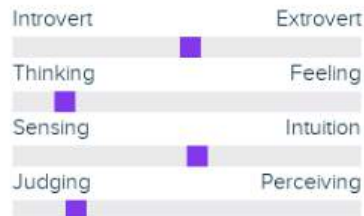
John Smith



"The future of agriculture is not about better recipes, it's about a better understanding of ecology."

Age: **39**
Work: **Agricultural researcher**
Family: **Married**
Location: **Australia**

Personality



Professional

Enthusiastic

Goals

- Develop new plant varieties that are resistant to pests and diseases.
- Improve the quality and nutritional value of crops through precision agriculture techniques.
- Increase the efficiency and productivity of farming practices through the use of innovative technologies.

Frustrations

- Limited time and resource to collect data from crops.
- Lack of effective alarm that can quickly notify crop emergencies.
- Currently equipments are not precise enough.

Bio

Dr. John Smith is 39-year-old agricultural researcher based in Australia. Growing up on a family farm in rural New South Wales, John developed an early interest in the natural world. After completing a degree in agricultural science at the University of Sydney, John went on to earn his Ph.D. in plant genetics from the University of Melbourne. His research has focused on developing new plant varieties that are resistant to pests and diseases, as well as improving crop yields through precision agriculture techniques.

Farmbot Project Home
Parent Page: Requirement

PRODUCT BACKLOG

Versions

1.1	Rename column user case ID into task ID, rename column user description to task description	2023-03-24
1.0	Initialize user cases based on user stories version 2	2023-03-22

Some rules for this table:

1 Story point equals around 0.5 days of work (3 hours)

Small-sized user case is less than 1 day. (1 to 2 points)

Medium-sized user case is 2 to 3 days (3 to 6 points)

Large-sized user case is 4 to 5 days (7 to 10 points)

User Story ID	User Stories	Story Priority	Story theme	Estimate Story Points In Total	Task ID	Task Description	Supplementary notes	Story Points	Size	Status	Assigned Sprint
1.1	As a teacher /researcher /farmer, I want to use the camera to capture pictures of different stages of crops, so that the students can learn the lifecycle of crops.	MEDIUM	Capture pictures, CPP	21	1.1.1	The camera should be attached to the robot so that the camera could move with the robot	By moving the robot arm. we can adjust the position of the camera	2	SMALL	DONE	Sprint 2
					1.1.2	Insert a UI to the front end of a web app that users can access and could configure the camera	Configuration includes starting and stopping, configuring camera settings, and taking pictures with the camera.	8	LARGE	BLOCKING	Sprint 2
					1.1.3	After clicking the take picture button, the system could set the camera to real picture mode and take a picture		4	MEDIUM	DONE	Sprint 2
					1.1.4	The web app should be able to visualize data from farmbot		8	LARGE	BLOCKING	Sprint 2
1.2	As a teacher, I want to show the students the automated process of planting, watering, and harvesting crops, so that they can understand how technology works in agricultural production.	MEDIUM	Documentations, DOC	5	1.2.1	Detailed introduction document to the technology for the robot		4	MEDIUM	DONE	Sprint 3
					1.2.2	Attach to video for educational purposes		1	SMALL	TO DO	Sprint 3
1.3	As a teacher, I want to deploy the Farmbot in class so that students can gain hands-on experience in high-tech farming.	HIGH	Deployment, DPL	16	1.3.1	Users can run scripts provided to deploy the whole system automatically.		8	LARGE	DONE	Sprint 2
					1.3.2	Provide a directly accessible web app and demo account for users to deploy and test		2	SMALL	DOING	Sprint 2
					1.3.3	packer the whole project with docker so that all dependencies could be prepared for deployment.		5	MEDIUM	TO DO	Sprint 2

					1.3.4	Detailed ReadMe file and user manual so that the users could know what to do when they have the project.		2	SMALL	DOING	Sprint 2
1.4	As a farmer /researcher /teacher, I want to farm remotely so that I can reduce costs and get more time.	HIGH	Remote Access, RMA	20	1.4.1	Control movement of the robot based on data including thermal data	Keep detecting; ai planning for abnormal status	8	LARGE	TO DO	Sprint 2
					1.4.2	Support ssh to get connect remotely		4	MEDIUM	DONE	Sprint 2
					1.4.3	Thermal camera auto-connects to the network	Plug and play	8	LARGE	TO DO	Sprint 3
2.1	As a teacher /researcher, I want to receive alarms when the crops are dry so that I can remind students that they forgot to water the plants.	LOW	Alarms, ALM	8	2.1.1	Set the drying threshold based on the data returned by a thermal camera		4	MEDIUM	TO DO	Sprint 3
					2.1.2	If dry plants are detected, an alert is immediately sent to the person in charge by email		4	MEDIUM	TO DO	Sprint 3
2.2	As a sustainable farm owner, I want to use the thermal camera to detect whether the crops are infected with pests and diseases so that I can timely detect and treatment of pests and diseases.	LOW	Disease Detection, DTC	20	2.2.1	Data pre-processing of data on plant body surface temperature distribution		8	LARGE	TO DO	Sprint 3
					2.2.2	Analysis of changes in plant body surface temperature to determine the presence and extent of pests and diseases		8	LARGE	TO DO	Sprint 4
					2.2.3	If any pests and diseases are detected, an alert is immediately sent to the farm owner by email		4	MEDIUM	TO DO	Sprint 4
2.3	As a sustainable farm owner, I want to use thermal cameras to help me accurately control the irrigation water quantity so that I can accurately control irrigation volume, thereby improving crop growth efficiency.	MEDIUM	Thermal Based Controls, TBC	20	2.3.1	Use Farmbot software to set up the irrigation program, including irrigation time and water volume.		4	MEDIUM	TO DO	Sprint 4
					2.3.2	Set up the camera program in Farmbot software to automatically capture thermal images of plants during irrigation.		4	MEDIUM	TO DO	Sprint 4
					2.3.3	Analyze the thermal images of plants captured automatically during irrigation to determine their water status. Thermal images can display the surface temperature of plants, and based on the temperature changes, it is possible to determine whether the plants need irrigation.		8	LARGE	TO DO	Sprint 4

					2.3.4	Based on the thermal images and the irrigation program settings, Farmbot can automatically control the irrigation water amount. If the plant needs more water, Farmbot will increase the irrigation water amount, and vice versa		4	MEDIUM	TO DO	Sprint 4
2.4	As a farmer /researcher, I want to use the infrared imaging function to detect the temperature of the environment including the plant and the soil so that I can improve the quality and nutritional value of crops through precision agriculture techniques	HIGH	Thermal Picture Analysis, TPA	17	2.4.1	Continuous monitoring of soil conditions with stream data from a thermal camera.		4	MEDIUM	TO DO	Sprint 3
					2.4.2	Identify each plant on the thermal picture with computer vision algorithms.	Ensure that each plant is individually recognized through image-processing techniques	4	MEDIUM	TO DO	Sprint 3
					2.4.3	Analyzing the thermal energy of each plant's leaves using a thermal imaging camera.	Help to assess the environmental stress on the plants.	8	LARGE	TO DO	Sprint 3
					2.4.4	Calculate the environmental stress on each plant and save the data.	This data can be used to guide other processes and research.	1	SMALL	TO DO	Sprint 3
3.1	As a teacher /researcher, I want to collect thermal data through farmbot so that it could be used for further study.	HIGH	Data Auto Collection , DAC	12	3.1.1	The thermal camera should be able to take thermal pictures automatically.		2	SMALL	TO DO	Sprint 3
					3.1.2	The user should have access to control the frequency of auto-collection.		4	MEDIUM	TO DO	Sprint 3
					3.1.3	The camera would categorize data and send the data to the web app so that it could be saved and the user could download it.		8	LARGE	TO DO	Sprint 3
3.2	As an agricultural researcher, I want to manage my database related to the plants so that I have a clean and reliable dataset for my study.	HIGH	Database Management, DBM	10	3.2.1	The data collected from farmbot should be stored in a database	A database that could hold all data including the raw image data.	4	MEDIUM	TO DO	Sprint 2
					3.2.2	The data, including the results of any analysis and raw images, should be well-organized and interconnected.	The design of the data structure should be clear and accepted by the client.	2	SMALL	TO DO	Sprint 2
					3.2.3	The web application should have the capability to select, create, update, and delete any data that has been stored.	This should be accessed through a simple UI on the front, do not need to support multiple users at the same time (maybe in the future)	4	MEDIUM	TO DO	Sprint 2

Farmbot Project Home

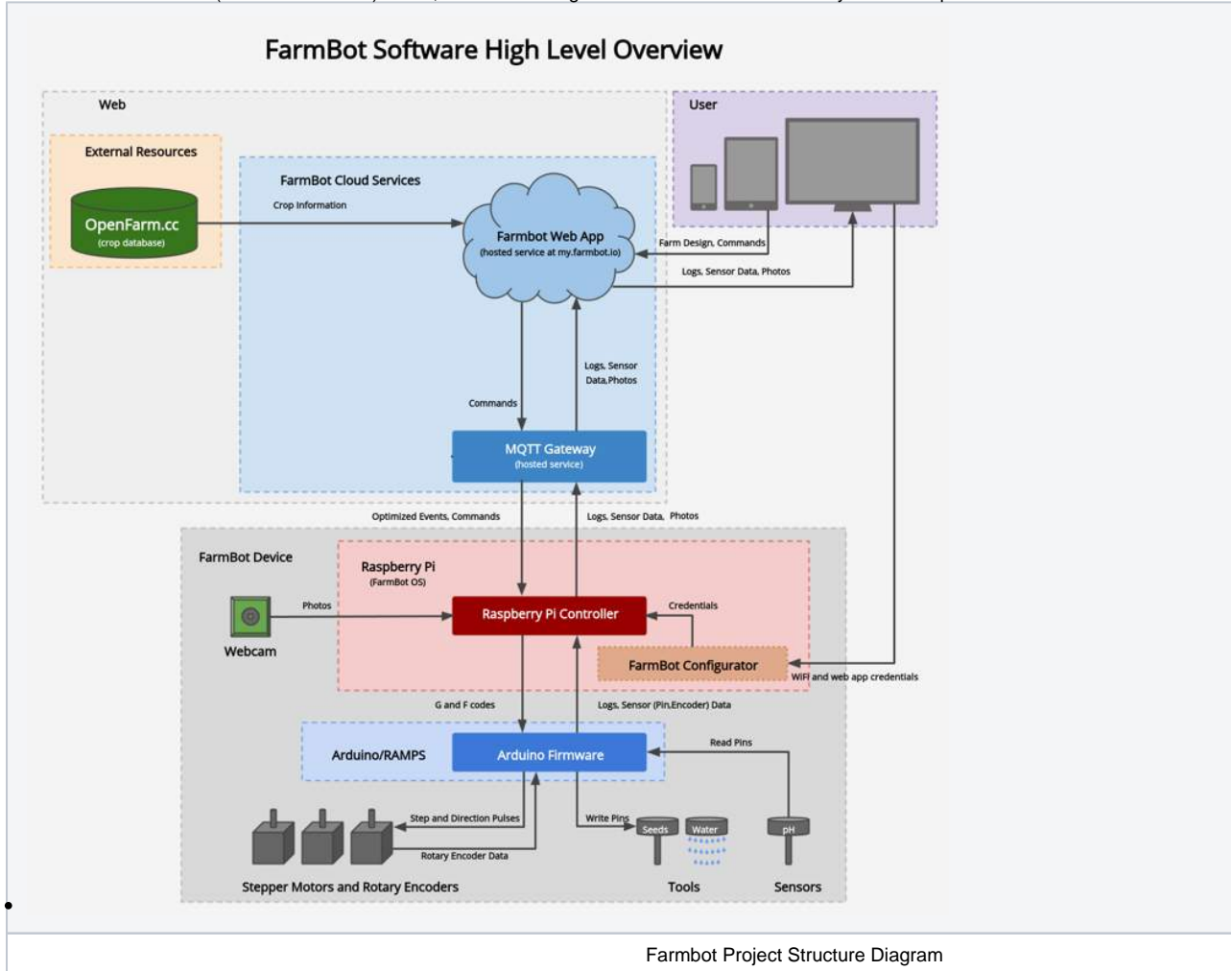
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PROJECT INFORMATION

Project Background

Introduction to the Farmbot Project

- The FarmBot project, initiated in 2011 by Rory Aronson, is an innovative open-source endeavor aimed at automating farming processes. The FarmBot system comprises a robot installed on a raised bed or greenhouse, which is controlled by web-based software. The web app enables users to instruct the robot to perform tasks such as planting seeds, removing weeds, watering plants, and various other farming processes. As the entire system is open-sourced, researchers can customize their robots to fulfill their research interests by modifying the web app and integrating different tools.
- The FarmBot system operates through a process as illustrated in the accompanying diagram. Initially, users send requests from their terminals to the web app, which dispatches the message via an MQTT server. The MQTT server sorts and sends the message to the Raspberry Pi, which then decides what action to take. If the request concerns the sensors, the Raspberry Pi sends the message through pin nodes to the Farmduino (Arduino Firmware) board, which sends signals to the end sensors to carry out the requested task.



Software of the Farmbot Project

- Web-app:
 - The FarmBot web app is a user-friendly interface that allows users to remotely control and monitor their FarmBot robot.
 - Users can easily configure their robot's settings, such as planting patterns, watering schedules, and weed removal.
 - The web app enables users to access the thermal camera and capture thermal images of their plants for further analysis.
- Farmbot OS:
 - Farmbot OS is a self-contained disk image file composed of a Linux system core, a Erlang OTP and compiled Elixir scripts, and is constructed as a Nerves image.
 - FarmBot OS includes all the necessary software and drivers required to control the hardware components of the FarmBot robot, including the Raspberry Pi, Farmduino, and the arm.
 - One piece of unfortunate news is that the current version of Farmbot OS does not support connections through SSH or HDMI. This means that reproducing a customized version of Farmbot OS may require a significant amount of effort and technical expertise.
 - Official source code for Farmbot OS: https://github.com/FarmBot/farmbot_os.git

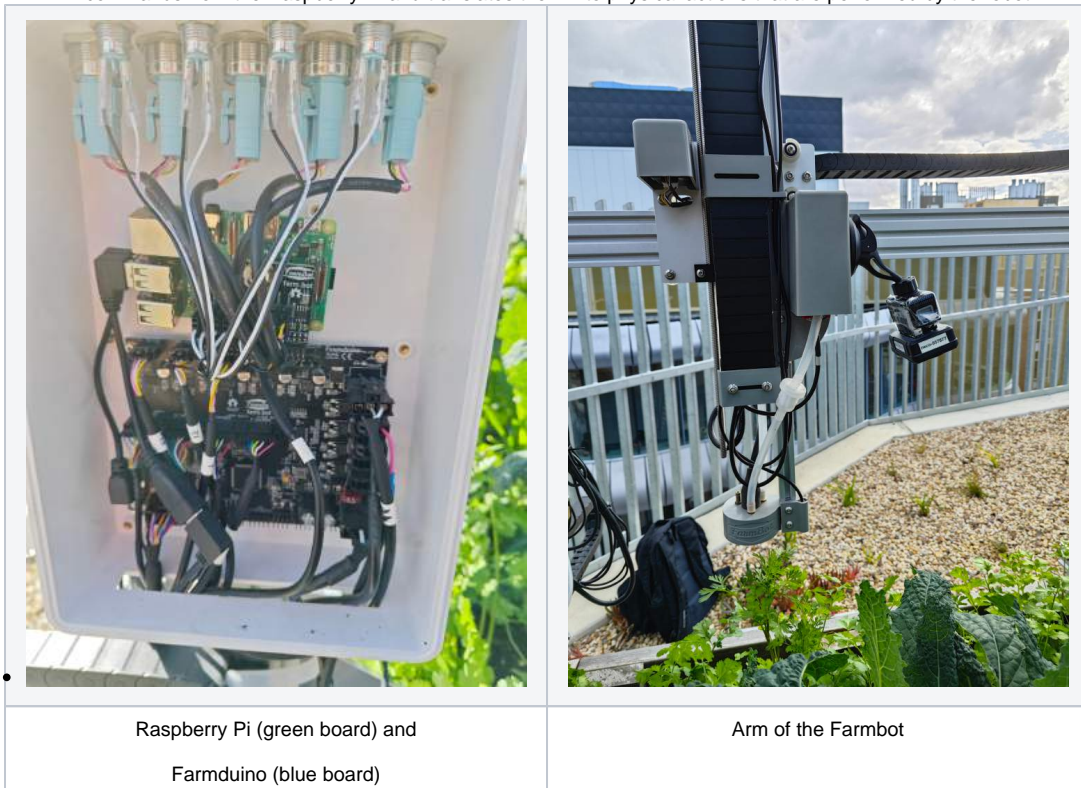
- Official image file download page: <https://my.farm.bot/os>



Official Web App Page (register needed)

Hardware of the Farmbot Project

- Arms of the Farmbot:
 - The arm is responsible for performing all of the actions required to take care of plants in the field.
 - The arm is mounted on a 3-axis platform that allows it to move above the entire plant field and stop at any place, providing the flexibility required to take care of plants at different locations.
- Raspberry Pi of the bot:
 - The Raspberry Pi is a small, single-board computer that is an integral part of the FarmBot system. It has been customized with a specialized operating system and is responsible for managing the connections between the FarmBot robot and the web-app.
 - It receives commands from the web-app and translates them into signals that can be understood by the Farmduino.
 - It receives sensor data from the Farmduino and uploads it to the web-app, allowing users to monitor the conditions of their crops remotely.
- Farmduino:
 - Farmduino is a customized arduino board controlled by Raspberry Pi
 - It is responsible for controlling most of the sensors used by the robot, including those that monitor soil moisture, temperature, and ambient light levels.
 - Farmduino also interfaces with other components of the FarmBot system, including the Raspberry Pi and the robotic arm. It receives commands from the Raspberry Pi and translates them into physical actions that are performed by the robot.



Raspberry Pi (green board) and
Farmduino (blue board)

Arm of the Farmbot

Project Description


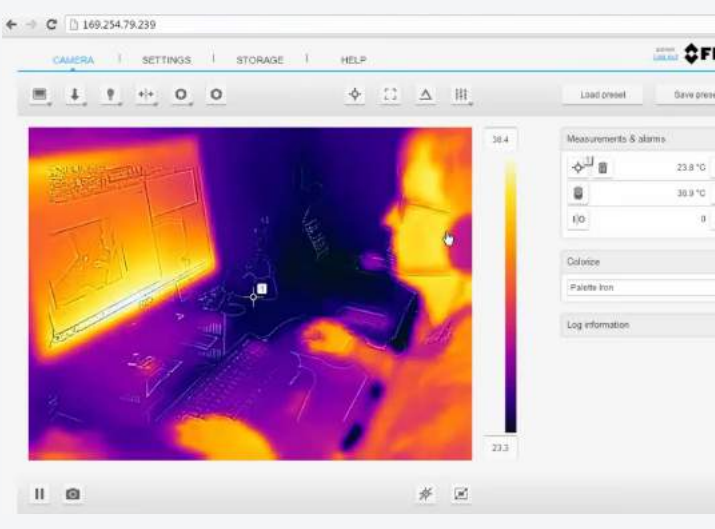
Introduction

- Our project aims to integrate a thermal camera into the FarmBot robot to allow users to remotely collect thermal data of plants. This will enable users to access the camera through the FarmBot web-app and take thermal pictures either by manually clicking a button on the web page or by configuring an auto-collection feature. The thermal camera will capture the image and upload it to the web-app, providing thermal data for future use. The automatically collected thermal data will be used in agricultural research conducted by Professor Sigfredo Fuentes.

	
Prof. Sigfredo Fuentes	Picture for Farmbot

Thermal Camera

- The client has chosen the FLIR_Ax8 camera to be integrated into the FarmBot. This camera can automatically establish a connection to the host via Ethernet when the IP and subnet mask are the same. Although FLIR does not provide any API support for this camera, it can be configured and captures can be taken through its Ethernet website, accessible via its IP address: 80.
- The FLIR Ax8 camera offers three capture modes, including capturing a normal picture, a thermal picture, or overlaying two pictures together. The camera captures the image and stores it within the camera. Users must download the picture manually from the website.
- It is important to note that the camera requires external power as it does not run on batteries.

	
Picture of FLIR Ax8	webpage for FLIR Ax8 Ethernet

Integration Design

- A new thermal-cam page will be introduced to the FarmBot web-app. This page will allow users to control the thermal camera and view the pictures and collected thermal data.
- A control script will be developed to automatically configure and capture images with the thermal camera.
- To ensure that the control script can be run effectively, the FarmBot OS will be updated to support the new control script. By doing this, users can easily use the thermal camera to collect thermal data and automate the process of capturing images.
- To enable the thermal camera to move with the arm of the Farmbot, a holder needs to be designed and implemented. This holder will ensure that the camera remains attached to the arm while it moves, allowing it to capture thermal data from various positions.

Client Goals

1. Integrate the thermal imaging camera into the FarmBot system:

- a. Research and select a suitable thermal imaging camera that is compatible with FarmBot.
- b. Install the camera and ensure proper connection and wiring of the thermal imaging camera to the FarmBot system.

2. Develop a software module to collect and store the thermal data from the camera:

- a. Create a software module to interface with the thermal imaging camera and retrieve the thermal data.
- b. Implement a data storage solution to record thermal data with timestamps and plant information.
- c. Develop user-friendly interfaces for customers to easily access and view the collected thermal data.

3. Analyze thermal data to monitor plant health and growth by

- a. Research methods for interpreting thermal data for specific species of plants.
- b. Implement algorithms to analyze thermal data and gain insights on plant health and growth.
- c. Integrate the analysis module with the FarmBot system to provide real-time feedback on plant condition.

4. Use thermal data to detect pests and diseases by

- a. Investigate thermal signatures of common pests and diseases that affect plants being grown.
- b. Develop algorithms to identify these thermal signatures in the collected data.
- c. Incorporate pest and disease detection features into the FarmBot system.

5. Implement an alarm and notification system for pest and disease detection:

- a. Design a notification system that alerts customers in real time of detected pests or diseases.
- b. Implement customizable alarm thresholds for different types of pests and diseases.
- c. Ensure integration with the FarmBot system and the customer's preferred method of communication (e.g., email, SMS).

6. Optimize FarmBot performance based on thermal data insights:

- a. Use the analyzed thermal data to adjust FarmBot's watering, fertilization and light control strategies for optimal plant growth.
- b. Monitor the effectiveness of adjustments and refine algorithms for continuous improvement.
- c. Ensure that the FarmBot system remains user-friendly and efficient while performing its tasks.

Technique Details

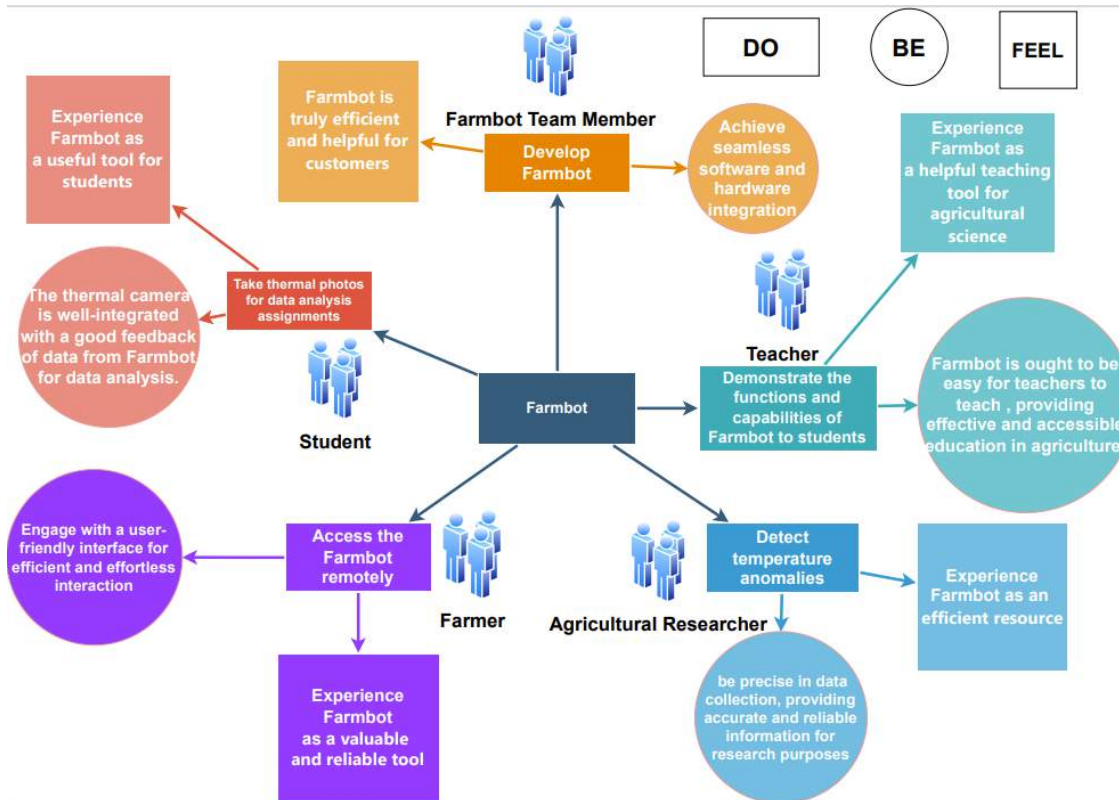
Component	Tool /Framework	Description
Farmbot Web App Deployment	Azure	Azure is a service that provides virtual servers. The farmbot web app is deployed at our own Azure server.
Web Framework / Back End Framework	Flask	Flask is a lightweight web framework for Python. It is used for the back-end development of farmbot web app.

Front End UI Components	ReactJS and TypeScript	ReactJS is a JavaScript library for building user interfaces. TypeScript is a superset of Javascript, which is widely used for large-scale web applications.
Database / Store	MongoDB	The current database used is MongoDB. Classified as a NoSQL database program, MongoDB supports a wide range of programming languages, including Python, Java, JavaScript, Ruby, and many others.
Thermal Camera Controller	Lua	Lua is a versatile and widely-used scripting language that can be embedded in various applications, including embedded systems. It is used in the thermal camera controller to efficiently handle tasks such as capturing, downloading, and transmitting photos from the Farmbot to the web application in this project.
Code Management	GitHub	It provides distributed version control and source code management (SCM) capabilities along with additional features of its own.
Farmbot OS Reproduce	Nerves	The process involves taking the modified Farmbot OS source code and converting it into a nerves image file.
Code Integration	Elixir and Erlang	Our integrated script needs to run on the Lua sandbox, which is supported by the system.
Thermal Camera Connection	Ethernet	The camera is limited to Ethernet connectivity and does not support any other type of connection

Do-Be-Feel List

WHO (Roles)	DO (Functional Goal)	BE (Quality Goal)	FEEL (Emotional Goal)
Farmer	Access the Farmbot remotely to manage and monitor their crops.	Engage with a user-friendly interface for efficient and effortless interaction.	Experience Farmbot as a valuable and reliable tool for improving agricultural productivity and crop management.
Agricultural Researcher	Utilize Farmbot to detect temperature anomalies for better understanding of plant health and growth conditions.	Farmbot should be precise in data collection, providing accurate and reliable information for research purposes.	Experience Farmbot as an efficient resource for advancing agricultural research and supporting data-driven insights.
Teacher	Allow teacher to demonstrate the functions and capabilities of Farmbot to students, enhancing their learning experience in agricultural science.	Farmbot is ought to be easy for teachers to teach and students to understand, providing effective and accessible education in agriculture.	Experience Farmbot as a helpful teaching tool for agricultural science, making student engaged and interested in the subject.
Student	Use Farmbot to take thermal photos for data analysis assignments, enhancing their practical skills in agricultural studies.	The thermal camera is well-integrated with a good feedback of data from Farmbot for data analysis.	Experience Farmbot as a useful tool for students, providing help within their agricultural studies.
Farmbot Team Member	Develop Farmbot using a high-quality coding style to ensure efficient performance and maintainability.	Achieve seamless software and hardware integration within Farmbot, delivering a robust and reliable system.	Create a Farmbot that is truly efficient and helpful for customers, contributing to their needs and satisfaction.

Motivational Model



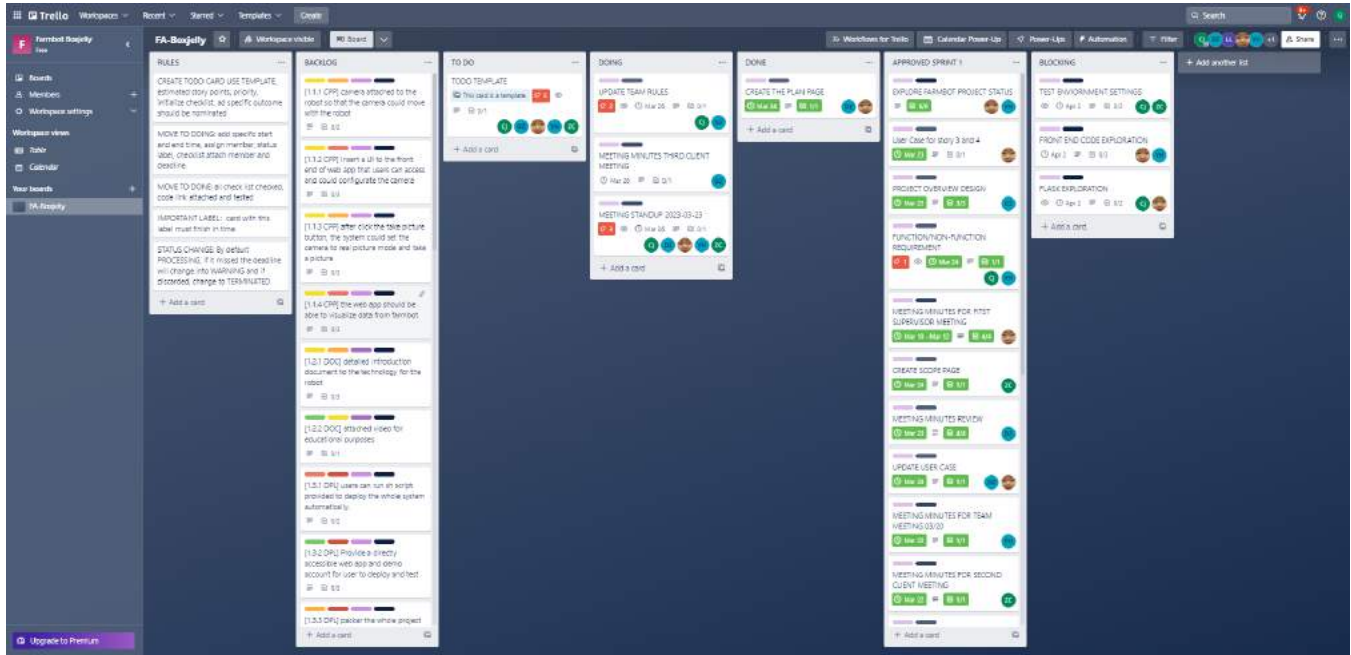
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PROJECT PLANNING

Introduction

- Our goal is to finalize the project development during Sprint 2 and Sprint 3. To achieve that, we have reorganized the user stories into user cases, meanwhile taking into account their priorities of the user cases. Our team has created a well-defined development plan, which can be viewed on Trello: [FA-Boxjelly development plan](#).



Sprints

- Sprint 2:

Time Period	Plans	Reasons
week 5	<ol style="list-style-type: none">1. Familiar with the source code from web-app and find a way to test the web-app without compose2. Control the camera with python script on PC3. Design and purchase tools to attach camera to the robot4. Find a way to register farmbot to self-host web-app	<ol style="list-style-type: none">1. Divide the entire project into two parts, software and hardware, to facilitate division of labor and initiation.2. Testing the deploy of web application would take a lot of time for compilation and different environment settings may lead to different issues.3. As our project is related to thermal imaging cameras, installing and controlling the cameras is something we must do.
week 6	<ol style="list-style-type: none">1. Insert code into web-app to create our own UI on the web-app2. Design and set up database for the thermal data and connect the database to web-app3. Find a way to attach the camera to the farmbot4. Find a way to connect the camera to the raspberry pi and control it with python code	<ol style="list-style-type: none">1. We need a front-end page to control and communicate with our thermal imaging camera.2. When using the camera, we also want to save the data for later viewing or processing.3. Everything relies on an installed, functional, and controllable thermal imaging camera.
week 7	<ol style="list-style-type: none">1. By clicking the UI on the frontend, run python code implemented inside the webapp to control camera2. Set up python code to fully control the camera (set up configuration, caputring and real-time data streaming)3. Try save thermal data to database	<ol style="list-style-type: none">1. After the front-end page is completed, we need it to send requests to the back-end and display the data provided by the back-end on the front-end page.2. The data is stored in a database so that the back-end can provide it to the front-end.

week 8	<ol style="list-style-type: none"> 1. Test deployment and transfer data into shell and pack in docker. 2. Write and test the system with designed test cases 3. Documentation review 4. Release the product version 1.0. 	<ol style="list-style-type: none"> 1. After the back-end is completed, we need to test the program to ensure smooth operation. 2. After the program testing is completed, we need to test the deployment to ensure that it can be deployed on different machines. 3. Reviewing our documentation, and once completed, we can release the first version of our program.
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- Sprint 3:

Time Period	Plans	Reasons
week 9	<ol style="list-style-type: none"> 1. Bug fix for previous release 2. Preprocess thermal image data 3. Familiar with computer vision algorithms 	<ol style="list-style-type: none"> 1. Fix the bugs that occurred in the previous version. 2. To expand the use of other technologies, we may need to start from the aspect of computer vision.
week 10	<ol style="list-style-type: none"> 1. Set up controls for auto-picture taking 2. Set up auto picture process and save analyzed data to database 3. Distinguish each plants on the picture with computer vision algorithms 	<ol style="list-style-type: none"> 1. We want to free up productivity through automated processing, and scheduled automatic acquisition of photos and plant status is essential data for subsequent processing. 2. By using computer vision to recognize plants, we can independently monitor and record different plants.
week 11	<ol style="list-style-type: none"> 1. Set up dry soil definition according to thermal data and set up alarms 2. Set up plant stress definition 3. Set up movement mode to auto-water dried plants 	After obtaining information about different plants, we need to continuously monitor and set thresholds to ensure that the plants can continue to grow.
week 12	<ol style="list-style-type: none"> 1. Test deployment and transfer data into shell and pack in docker. 2. Write and test the system with designed test cases 3. Documentations review 4. Release the product version 2.0. 	After adding new features, continue testing the overall code, and then test the deployment to ensure that the new features are fully and correctly integrated into our system. Then, review the documents and publish our new version.

Infrastructure to deploy the project

Deployment plan process

Scope	4 days	Reason
Establishing project's scope	1 day	A quick overview of the project's overall goals and functions should not take too much time.
Identifying main resources	3 days	Establishing the main direction and conducting preliminary code learning would require a moderate amount of time.

Scope	4 days	Reasons
Camera check and review	1 day	Installing and checking the camera should not take too much time.

Web-app check and review	2 days	Reviewing and inspecting the front-end and back-end code would require a reasonable amount of time.
Deployment check and review	1 day	Checking the project deployment should not take too much time.

Scope	5 days	Reason
Camera evaluation and improvement	2 days	Evaluating the camera and checking for areas of improvement would require a reasonable amount of time.
Web-app evaluation and improvement	2 days	Evaluating the web application and checking for areas of improvement would require a reasonable amount of time.
Deployment evaluation and improvement	1 day	Evaluating the project deployment and checking for areas of improvement should not take too much time.

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SCOPE AND REQUIREMENTS

- [FUNCTIONAL REQUIREMENTS](#)
- [NONFUNCTIONAL REQUIREMENTS](#)
- [SCOPE](#)

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FUNCTIONAL REQUIREMENTS

Version1

Epic	Functions	User stories	Story Points
Integration of Thermal Camera in Farmbot	The user should be able to control the thermal on the web app with interface operations	1.3 As a teacher, I want to deploy the Farmbot in class so that students can gain hands-on experience in high-tech farming.	16
	The photos taken by the thermal camera should be able to transmit to the web app	1.1 As a teacher/researcher/farmer, I want to use the camera to capture pictures of different stages of crops, so that the students can learn the lifecycle of crops.	21
	The web app should have a user interface for camera data visualization	2.4 As a farmer/researcher, I want to use the infrared imaging function to detect the temperature of the environment including the plant and the soil so that I can improve the quality and nutritional value of crops through precision agriculture techniques	17
Camera Monitoring	The web app should have an interface for plant monitor and can control the movement accordingly	2.3 As a sustainable farm owner, I want to use thermal cameras to help me accurately control the irrigation water quantity so that I can accurately control irrigation volume, thereby improving crop growth efficiency.	20
	The web app should be able to control the farmbot by sending instructions remotely	1.4 As a farmer/researcher/teacher, I want to farm remotely so that I can reduce costs and get more time.	20
	An alarm should be able to send from farmbot to the web app if an emergency show up	2.1 As a teacher/researcher, I want to receive alarms when crops are dry, so that I can remind students that they forgot to water the plants.	8
Data Management	The data collected from farmbot should be able to transmit to the database	3.1 As a teacher/researcher, I want to collect thermal data through farmbot so that it could be used for further study.	12
	The users should have an interface to search for the data stored	3.2 As an agricultural researcher, I want to manage my database related to the plants so that I have a clean and reliable dataset for my study.	10
	The web app should have an interface for data processing or data visualization	2.2 As a sustainable farm owner, I want to use the thermal camera to detect whether the crops are infected with pests and diseases so that I can timely detect and treatment of pests and diseases.	20
	The web app should have a module to display a detailed introduction document of the technology for the robot and an educational video	1.2 As a teacher, I want to show the students the automated process of planting, watering, and harvesting crops, so that they can understand how technology works in agricultural production.	5

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NONFUNCTIONAL REQUIREMENTS

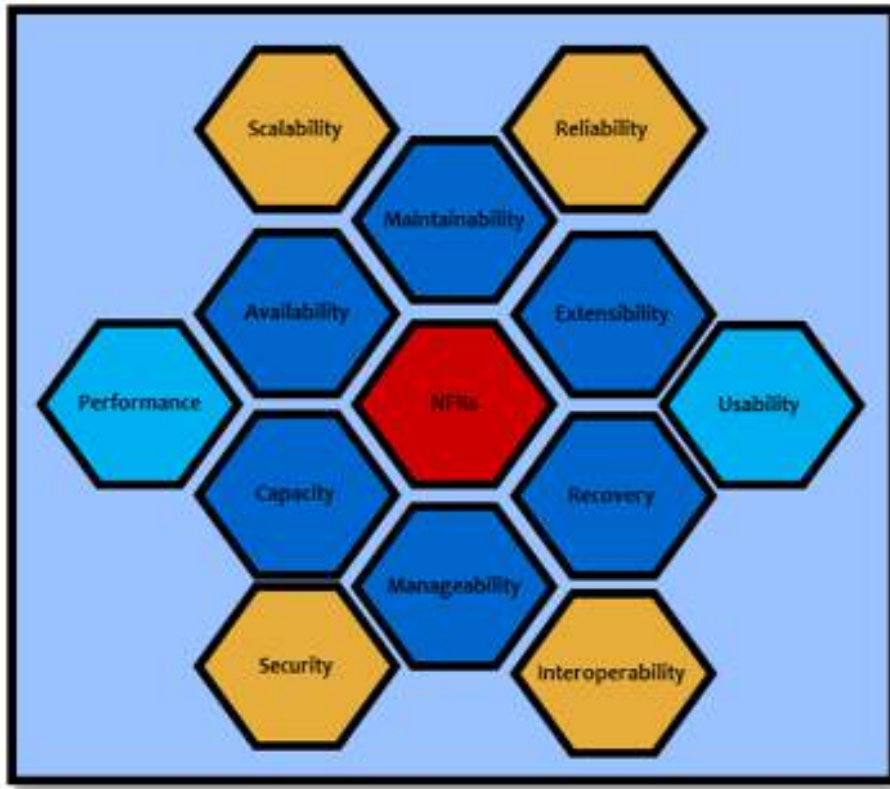


Figure 1: Key non-functional requirements (Paradkar. 2017)

For non-functional requirements, we referenced the book *Mastering Non-Functional Requirements*:

Performance

- The data obtained by the thermal camera should be clear, accurate, and credible.
- Farmbot's remote access should be accurate.

Scalability

- The thermal camera should be able to monitor data from multiple plants at the same time.

Availability

- The farmbot web app should be able to be used by users at any time.

Security

- Users' private data should be protected by encryption.
- Regulate the use mechanism of the farmbot to avoid unnecessary loss of personnel and property.

Maintainability

- Thermal imaging cameras must be regularly tuned and maintained to ensure their stability and accuracy.

Manageability

- The web app interface should be able to manage the farmbot, including actions control, camera monitoring, data analysis, and so on.

- The database is supposed to be managed by the users for data management.
- Users should have access to download any data from the database.

Reliability

- The operating system and interface of the web app should be reliable for farmbot control
- The database should be reliable for data storage and operations

Extensibility

- The web app structure should be flexible for extensions in the future
- The database should be scalable for future usage.

Recovery

- The database should have the ability to recover after crashes
- The web app should be able to recover from network interruption

Interoperability

- The thermal camera should be able to seamlessly integrate with the Farmbot web app, ensuring a seamless and efficient experience for users.

Usability

- Instead of a complex command terminal, the web app should feature a user-friendly and intuitive interface to enhance users' clarity and ease of use.

References:

- Paradkar, S. (2017). Mastering Non-Functional Requirements [electronic resource] / Paradkar, Sameer. Packt Publishing.

SCOPE

Requirements in scope

Function	Description
Camera management	<ul style="list-style-type: none">• Users can access and could configure the camera• The system could set the camera to real picture mode and take a picture when the user clicks the "take a picture" button
Data management	<ul style="list-style-type: none">• Data are visible on the web app for users• Users can access to select, create, update, and delete any data that has been stored. interconnected.
Plant drying detection	<ul style="list-style-type: none">• Users will hear an alarm if the plant drying data is lower than the threshold.
Receiving email	<ul style="list-style-type: none">• If dry plants or pests and diseases are detected, an alert is immediately sent to the user in charge by email
pests and diseases detection	<ul style="list-style-type: none">• If any pests and diseases are detected, an alert is immediately sent to the user by email
irrigation program	<ul style="list-style-type: none">• Users can set up irrigation time• Users can set up irrigation volume

Requirements not in scope

Function	Description
Multiple users operate a component at the same time	<ul style="list-style-type: none">• Concurrency issues are addressed in future development
Uploading customized avatar	<ul style="list-style-type: none">• we do not develop customized uploaded avatars.
Fix the previous team's bug	<ul style="list-style-type: none">• The current step sometimes cannot work as expected in the create task which is designed by the previous team. We have not fixed this bug.

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USER STORIES

latest version for user stories

- [USER STORIES VERSION 2](#)

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USER STORIES VERSION 2

Versions

2.3	Added documents for what user story is generated with chatGPT	2023-02-24
2.2	Reset story points according to the product backlog and story themes	2023-02-24
2.1	Reset Priorities and the color of priority and status	2023-02-23
2.0	Merge user stories according to guidance from the client, rewrite some user stories, reorder the IDs	2023-03-22
1.0	Initialize a user story table based on the current understanding of requirements, goal model, and persona.	2023-03-21

- The user stories were first created in March 2023 after the meeting with the client. As the team got started on coding partial functions and we followed the agile developing approach, some user stories were updated and optimized. Also, new user stories were created after a discussion with the client.

Feature	Global ID	Local ID	User Stories	User Story Themes	Priority	Story Points	Remarks	Update	Version	Status	Generated With ChatGPT?
Control	1	1.1	As a teacher/researcher /farmer, I want to use the camera to capture pictures of different stages of crops, so that the students can learn the lifecycle of crops.	Capture pictures, CPP	MEDIUM	21		2023.03.22	2.1	TO DO	YES
	2	1.2	As a teacher, I want to show the students the automated process of planting, watering, and harvesting crops, so that they can understand how technology works in agricultural production.	Documentations, DOC	MEDIUM	5		2023.03.22	2.1	TO DO	YES
	3	1.3	As a teacher, I want to deploy the Farmbot in class so that students can gain hands-on experience in high-tech farming.	Deployment, DPL	HIGH	16		2023.03.22	2.1	TO DO	YES
	4	1.4	As a farmer/researcher /teacher, I want to farm remotely so that I can reduce costs and get more time.	Remote Access, RMA	HIGH	20		2023.03.22	2.1	TO DO	NO
Monitor	5	2.1	As a teacher/researcher, I want to receive alarms when the crops are dry so that I can remind students that they forgot to water the plants.	Alarms, ALM	LOW	8		2023.03.22	2.1	TO DO	NO
	6	2.2	As a sustainable farm owner, I want to use the thermal camera to detect whether the crops are infected with pests and diseases so that I can timely detect and treatment of pests and diseases.	Disease Detection, DTC	LOW	20		2023.03.22	2.1	TO DO	NO
	7	2.3	As a sustainable farm owner, I want to use thermal cameras to help me accurately control the irrigation water quantity so that I can accurately control irrigation volume, thereby improving crop growth efficiency.	Thermal Based Controls, TBC	MEDIUM	20		2023.03.22	2.1	TO DO	NO
	8	2.4	As a farmer/researcher, I want to use the infrared imaging function to detect the temperature of the environment including the plant and the soil so that I can improve the quality and nutritional value of crops through precision agriculture techniques	Thermal Picture Analysis, TPA	HIGH	17		2023.03.22	2.1	TO DO	NO
Data	9	3.1	As a teacher/researcher, I want to collect thermal data through farmbot so that it could be used for further study.	Data Auto Collection, DAC	HIGH	12		2023.3.22	2.1	TO DO	NO

	10	3.2	As an agricultural researcher, I want to manage my database related to the plants so that I have a clean and reliable dataset for my study.	Database Management, DBM	HIGH	10		2023.3.22	2.1	TO DO	NO
--	----	-----	---	--------------------------	------	----	--	-----------	-----	-------	----

Farmbot Project Home

Development

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Attach Thermal Camera in Web App

Introduction

- To implement the functionality of our thermal camera, we have decided to add a new button in the navigation bar that will direct users to our temperature camera feature.
- After successfully connecting to the FarmBot, the thermal camera page will display a default image or video.

Step 1: Simply insert a button in the navigation bar.

- Firstly, we should insert a button into the navigation bar as the entry point for our page.

- **Insert button**

```
...
export enum Panel {
  ...
  Sensors = "Sensors",
  Photos = "Photos",
  Camera = "Camera",
  Farmware = "Farmware",
  Tools = "Tools",
  Messages = "Messages",
  ...
}
...
export const PANEL_SLUG: Record<Panel, string> = {
  ...
  [Panel.Logs]: "logs",
  [Panel.Help]: "help",
  [Panel.Camera]: "camera",
  [Panel.Settings]: "settings",
  [Panel.Shop]: "shop",
}
...
export const getLinks = (): Panel[] => [
  ...
  Panel.Photos,
  ...(showFarmware() ? [Panel.Farmware] : []),
  Panel.Tools,
  Panel.Messages,
  Panel.Help,
  Panel.Camera,
  Panel.Settings,
]
...
```

Please note that the above code is not in the same file and consists of multiple code blocks from different files, mainly to demonstrate the link of the button code.

Step 2: Implementing the camera page.

- After the entry button is clicked, we want to display our camera page.

- **Main camera page**

```
import React from "react";
...

export class RawDesignerPhotos
  extends React.Component<DesignerPhotosProps> {

  componentDidMount = () => this.props.dispatch(maybeOpenPanel("photos"));

  toggle = (key: keyof PhotosPanelState) => () =>
```

```

    this.props.dispatch({ type: Actions.TOGGLE_PHOTOS_PANEL_OPTION, payload: key });

get imageShowFlags(): ImageShowFlags {
  return getImageShownStatusFlags({
    getConfigValue: this.props.getConfigValue,
    env: this.props.env,
    image: this.props.currentImage,
    designer: this.props.designer,
    size: this.props.currentImageSize,
  });
}

render() {
  const wDenvGet = (key: WDENVKey) => envGet(key, this.props.wDenv);
  const { syncStatus, botToMqttStatus, photosPanelState } = this.props;
  const botOnline = isBotOnline(syncStatus, botToMqttStatus);
  const common = {
    syncStatus,
    botToMqttStatus,
    timeSettings: this.props.timeSettings,
    dispatch: this.props.dispatch,
    images: this.props.images,
    env: this.props.env,
    currentImage: this.props.currentImage,
  };
  const imageCommon = {
    flags: this.imageShowFlags,
    designer: this.props.designer,
    getConfigValue: this.props.getConfigValue,
  };
  const firmwareNames = Object.keys(this.props.farmwares);
  return <DesignerPanel panelName={"camera"} panel={Panel.Camera}>
    <DesignerNavTabs />
    <DesignerPanelContent panelName={"camera"}>
      <label>{t("Camera")}</label>
      <button>Click</button>
      <Photos {...common} {...imageCommon}
        currentBotLocation={this.props.currentBotLocation}
        movementState={this.props.movementState}
        arduinoBusy={this.props.arduinoBusy}
        currentImageSize={this.props.currentImageSize}
        imageJobs={this.props.imageJobs} />

    </DesignerPanelContent>
  </DesignerPanel>
}
}

export const DesignerPhotos = connect(mapStateToProps)(RawDesignerPhotos);

export interface UpdateImagingPackageProps {
  firmwareName: string;
  version: string | undefined;
  botOnline: boolean;
}

export const UpdateImagingPackage = (props: UpdateImagingPackageProps) =>
  props.version
    ? <div className={"update"}>
      <p>v{props.version}</p>
      <i className={"fa fa-refresh"}
        onClick={requestFirmwareUpdate(props.firmwareName, props.botOnline)} />
    </div>
    : <div className={"update"} />;

```

Step 3: Creating link paths.

- When we have finished creating the button and designing the main page, the final step is to connect them together.

- **Route link**

```
...  
route({  
  children: true,  
  $: Path.route(Path.camera()),  
  getModule,  
  key,  
  getChild: () => import("../camera/photos"),  
  childKey: "DesignerPhotos"  
})  
...
```

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Attach the Thermal Camera to Farmbot

Introduction

- To ensure that the camera moves in sync with the robot arm, it is necessary to find a way to attach it to the arm. This can be achieved by using a mount or bracket that is designed to hold the camera securely in place while the arm is in motion. By attaching the camera to the arm in this way, you can capture footage or images of the area where the arm is working, allowing you to monitor the progress of the robot's activities and make any necessary adjustments in real-time.

Step 1

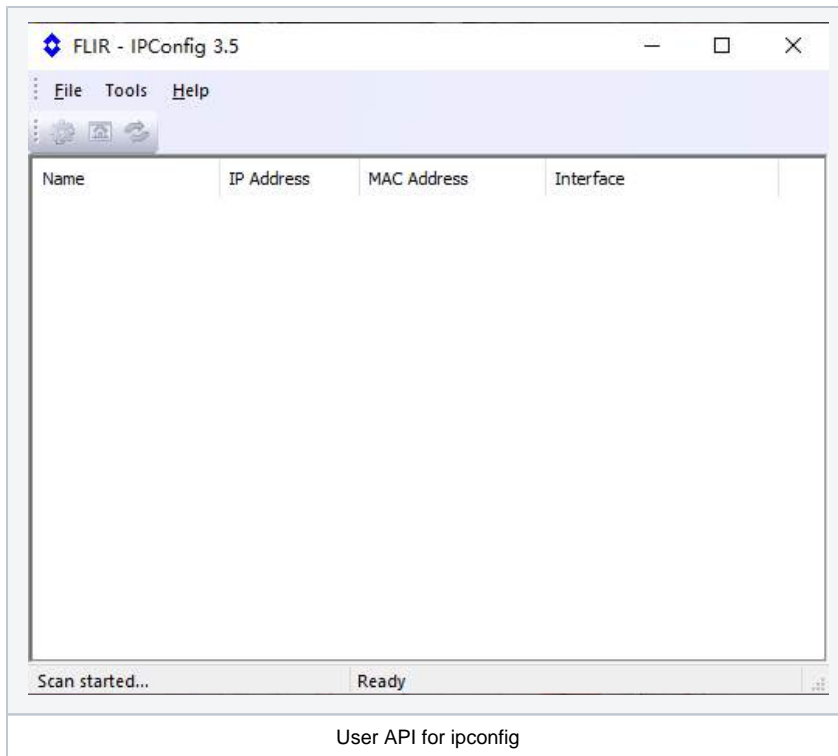
- We make use of a mobile phone holder with a sucker to attach the camera to the robot



Physical attach the camera to the arm

Step 2

- To enable the camera to connect to the robot via Ethernet, it is necessary to use a cable to connect the Ethernet ports on both devices. However, changing the camera's default IP is also required to ensure that it can communicate with the robot on the same subnet and subnet mask.
- FLIR provides an ipconfig tool that can be used to change the camera's default IP address. This tool allows you to set the camera's IP address, subnet mask, and gateway so that it can communicate with the robot on the same network. By using this tool, you can configure the camera to operate within the same network as the robot and ensure that they can communicate with each other effectively.
- ipconfig download: https://support.flir.com/SwDownload/Assets/FLIR%20IP%20Config/FLIR_IP_Config_3_0.zip



Step 3: Ping the camera from the robot

- Since we still not find a way to send commands from the robot, this test was done with a Raspberry Pi 3, and it was successful.

Control of Thermal Camera

Introduction

- Since the FLIR-Ax8 camera only supports Ethernet connections and requires configuration and capture through an Ethernet website, it is not feasible for the camera to be directly controlled by a robot. Additional software may be required for the robot to interface with the camera.
- The objective of this development is to produce a software solution that enables the FLIR-Ax8 camera to be controlled automatically, without the need for manual capture via the Ethernet website. The goal is to streamline the capture process and enable the camera to be integrated into automated systems.

Solution Version 1: (Deprecated)

- After capturing all the packets sent from the local browser to the Ethernet website, we were able to identify key packets that send commands to the FLIR-Ax8 camera. Using Java, we were able to reproduce these packets under our control and send them to the camera through Farmbot, allowing us to manage the camera automatically. This solution streamlines the capture process and enables the camera to be integrated into automated systems.
- source code path: https://github.com/COMP90082-2023-SM1/FA-Boxjelly/blob/thermal_control/src/Java_script/captureAndDownload

Solution Version 2:

- The initial version of our solution involved sending requests through a Servlet to the Ethernet website's front end, but this approach was slow and did not leverage the capabilities of the Raspberry Pi system. To address this issue, we collaborated with Bryce from the Engineer Department at the university to develop a new Python script. This script accesses the backend via SSH and sends commands more efficiently, improving the overall performance of our solution.
- The script used Popen to connect to the Ethernet website, we can directly connect using the 'sshpass' command. This allows us to force-execute PHP scripts that are hard-coded inside the website. In this way, we can create a script that captures and configures everything automatically.
- This version of code is tested on a Raspberry Pi and passed.
- source code path: https://github.com/COMP90082-2023-SM1/FA-Boxjelly/blob/thermal_control/src/python_script/thermal_control.py

Solution Version 3: (To Be Done)

- Unfortunately, there is some bad news. The Farmbot OS only accepts Lua as a valid programming language, which means we'll have to rewrite our Solution Version 2 using Lua. We'll need to ensure that our code can run on the Lua sandbox included in the Farmbot OS.
- source code path: TO BE DONE

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Convert Customized Source Code to Nerves Image

Introduction

- Farmbot is a software system that controls farming machines, consisting of a Raspberry Pi and an Arduino board called Farmduino. The system runs on Farmbot OS, which is made up of three different parts (Linux core, compiled Elixir scripts, Erlang OTP) and requires burning a Nerves image file onto an SD card for installation. However, it's worth noting that Farmbot OS doesn't support HDMI or SSH connections, making it difficult to modify the running OS directly. Additionally, the nerves image file only contains compiled scripts and configuration files, making it impossible to directly insert code into the image file to customize the system. To customize the system and integrate a script, one needs to update the source code and create a modified version of the Nerves Image File that can be run through the web app. While Farmbot is an open-source project, it doesn't provide an SDK for developers, as the primary aim of the project is to simplify farming rather than support further development.
- Note: Unfortunately, the official website provides very few tutorials and instructional resources.

Step 1: Dependency preparation

- The developer should first prepare a virtual machine server to run the project, ubuntu is recommended.

Dependency Required for Nerves Project

```
sudo apt-get update
sudo apt-get install -y ncurses-dev
sudo apt-get install -y gcc
sudo apt-get install -y openssl-dev
sudo apt-get install -y erlang-ssl
sudo apt-get install -y unixodbc unixodbc-dev
sudo apt-get install -y xsltproc
sudo apt-get install -y aop
sudo apt-get install -y libxml2-utils
sudo apt-get install -y libwxgtk3.0-webview-dev
sudo apt-get install -y libssl-dev
sudo apt-get install -y libncurses5-dev
sudo apt-get install -y autoconf
sudo apt-get install -y automake
sudo apt-get install -y openjdk-8-jdk
sudo apt-get install -y fop
sudo apt-get install -y rebar3
rebar3 deps update inets
sudo apt-get install -y libwxgtk-webview3.0-gtk3-dev
sudo apt install -y libgtk-3-dev
sudo apt-get install -y libusb-1.0-0-dev
sudo apt-get install -y libcurl4-openssl-dev
sudo apt-get install -y libarchive-dev
wget https://github.com/fhunleth/fwup/releases/download/v1.9.1/fwup_1.9.1_amd64.deb
sudo dpkg -i fwup_1.9.1_amd64.deb
```

Step 2: Install asdf package manager

- asdf is used as the manager for the Nerves Project.

Install asdf Package Manager

```
git clone https://github.com/asdf-vm/asdf.git ~/.asdf --branch v0.11.3
echo '. $HOME/.asdf/asdf.sh' >> ~/.bashrc
echo '. $HOME/.asdf/completions/asdf.bash' >> ~/.bashrc
```

Step 3: Install the specific version of Erlang and Elixir through the asdf package manager

- The Nerves Project specifies particular versions of Erlang and Elixir in its config file. This means that the versions of these languages must match the hard-coded versions specified in both the Farmbot OS **'*tool-versions*'** file and **'*mix.exs*'** file. In addition, the corresponding RPi branch also specifies the versions of the language used, which means that a specific version of Farmbot OS will only support certain types of RPi, depending on the specified language versions.
- Farmbot OS version is farmbot os 15.4
- RPi versions are releases v.18.1
- Erlang version is erlang 24.2
- Elixir version is elixir 1.13.2-otp-24

Install Erlang and Elixir though asdf

```
asdf plugin-add erlang
asdf install erlang 24.2
asdf global erlang 24.2
asdf plugin-add elixir
asdf install elixir 1.13.2-otp-24
asdf global elixir 1.13.2-otp-24
```

Step 4: Install Nerves Framework

- Nerves Framework will convert the source code into nerves image files,
- It is important to note that the version of the Nerves Project must correspond to the version of Elixir being used

Install Nerves Framework

```
sudo apt install build-essential automake autoconf git squashfs-tools ssh-askpass pkg-config curl
libmnl-dev
mix local.hex -y
mix local.rebar -y
mix archive.install hex nerves_bootstrap
```

Step 5: Clone source code and apply Nerves Framework

- To customize the source code, a developer must clone the three RPi branches and make a release of them. Additionally, the developer must modify the source code inside the **'*mix.exs*'** file.
- Note: root access is needed to start a Nerves Project

Clone source code and start Nerves Project

```
git clone https://CloneRepoToken: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@github.com/COMP90082-2023-SM1/FA-Boxjelly --depth=1 --branch=farmbot-os
cd FA-BOXJELLY
mix archive.install github hexpm/hex branch latest
```

Step 6: Conduct the conversion

- The default script includes many tests, and it consumes lots of time. if the developer only wants a Nerves image file for RPi3, he can execute **'*run_rpi3.sh*'** instead.
- The exported information is used for test on a real web app we deployed.

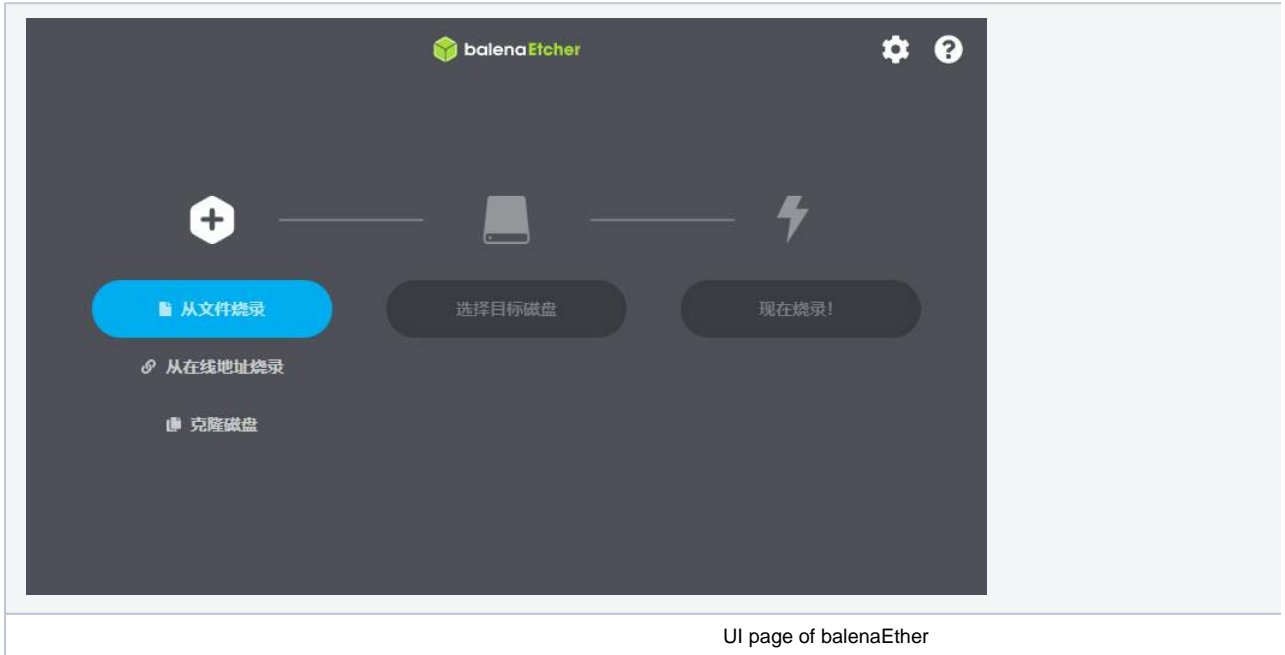
Conduct Conversion

```
export FARMBOT_EMAIL=dikaiz@student.unimelb.edu.au
export FARMBOT_PASSWORD=12345678
export FARMBOT_SERVER=http://20.213.164.146:3000/
chmod +x run_all.sh
./run_all.sh
```

- When the script above finished executing, a new folder named _build would appear and the updated version of the system is inside.

Step 7: Install your OS to SD card:

- Farmbot support nerves image file and fw files, any image file reader can burn the file to SD card.
- We used balenaEtcher as an example:
- download link of balenaEtcher: <https://www.balena.io/etcher>



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Customized Web App Deployment

Introduction

- Since the official web app cannot be modified, the only option for adding a new page to thermal camera management is to create a self-hosted web app.
- Our steps represent a modified version of the instructions provided on the official GitHub page for self-hosting: <https://github.com/FarmBot/FarmBot-Web-App/blob/staging/README.md>

Step 1: Prepare the environment

- To prepare for self-hosting, you will need to set up a server and enable the following ports: 8883, 8080, 80, and 443.
- Install docker inside your server.

• install docker

```
# Remove old (possibly broke) docker versions
sudo apt remove docker-engine
sudo apt remove docker docker.io containerd runc

# Install docker
sudo apt update
sudo apt install ca-certificates curl gnupg lsb-release -y
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
echo "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt update
sudo apt install docker-ce docker-ce-cli containerd.io docker-compose-plugin -y
sudo docker run hello-world # Should run!
# Install docker-compose
sudo mkdir -p /usr/local/lib/docker/cli-plugins
sudo curl -SL "https://github.com/docker/compose/releases/download/v2.15.1/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/lib/docker/cli-plugins/docker-compose
sudo chmod +x /usr/local/lib/docker/cli-plugins/docker-compose
sudo docker compose version # test installation
```

Step 2: clone the web app source code

- the code should be cloned from a self-hosted GitHub repository, not an official one.

• clone github

```
git clone https://CloneRepoToken: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@github.com/COMP90082-2023-SM1/FA-Boxjelly --depth=1 --branch=web_app_front
cd FA-Boxjelly
```

Step 3: Configure Web App

- we prepared a tom.env file for all the self-hosted configurations, client could use this file or change some information inside the file.

• configure web app

```
cp tom.env .env #change our prepared file into the default configure file.
# nano .env # client can change code inside if he wants.
```

Step 4: Compose and Initialize the Web App

- **compose and execute web app**

```
# Install the correct version of bundler for the project
sudo docker compose run web gem install bundler
# Install application specific Ruby dependencies
sudo docker compose run web bundle install
# Install application specific Javascript deps
sudo docker compose run web npm install
# Create a database in PostgreSQL
sudo docker compose run web bundle exec rails db:create db:migrate
# Generate a set of *.pem files for data encryption
sudo docker compose run web rake keys:generate # SKIP THIS STEP IF UPGRADING!
# Build the UI assets via ParcelJS
sudo docker compose run web rake assets:precompile
# Run the server! (^)
# NOTE: DONT TRY TO LOGIN until you see a message similar to this:
#   " Built in 44.92s"
# THIS MAY TAKE A VERY LONG TIME ON SLOW MACHINES (~3 minutes on DigitalOcean)
# You will just get an empty screen otherwise.
# This only happens during initialization
# configurator -d is added to official code to backup the web app
sudo docker compose up -d

# Create the database for the app to use:
sudo docker compose run -e RAILS_ENV=test web bundle exec rails db:setup
```

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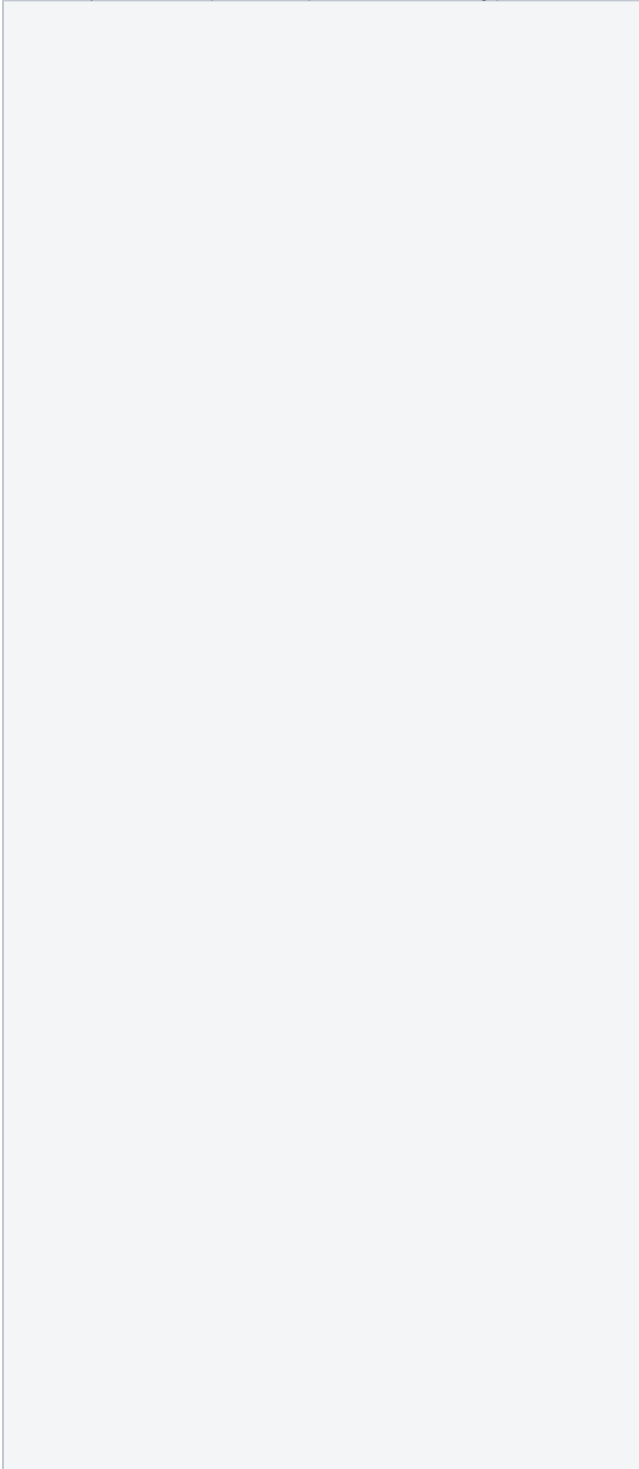
Farmbot Connection to Customized Web App

Introduction

- To personalize the FarmBot interface, it's necessary to link it to your own web application because the official web app is not modifiable.
- There is a detailed tutorial on the official website of the Farmbot: <http://software.farm.bot/v15/app/intro>

Step 1:

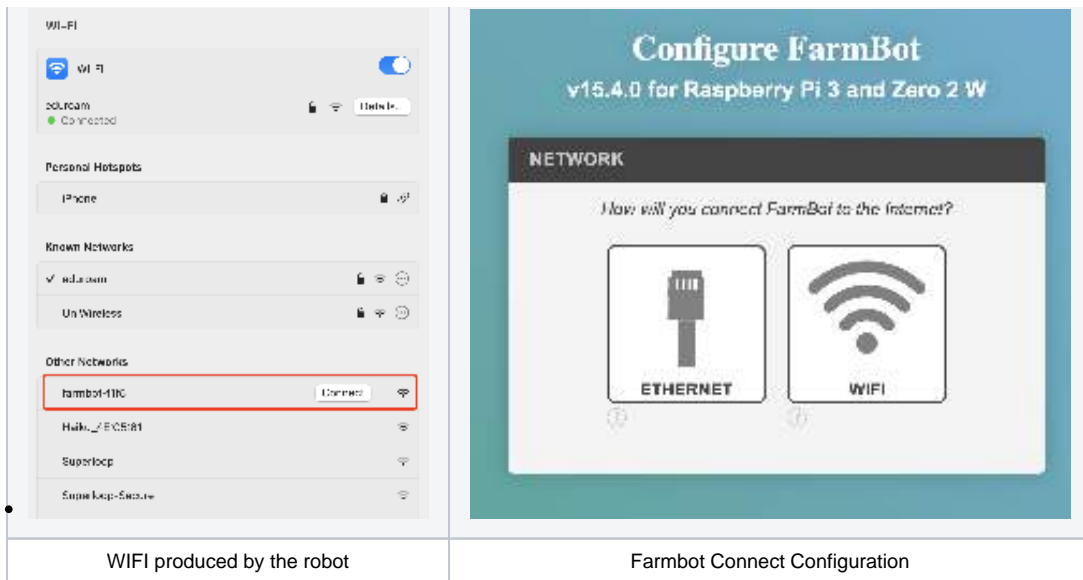
- Initially, the developer must have a self-hosted Farmbot web application (click [here](#) for how to deploy a Farmbot web app), and ensure that the correct version of Farmbot OS is produced and installed onto the SD card. (click [here](#) for how to produce customized Farmbot OS)
- Note that you have to open all the ports in the following picture to make the robot work properly



Port
22
443
3000
80
4000
8080
8883
3002
5672
1883
All ports needed

Step 2:

- Connect to the WiFi produced by the robot (ensuring that ports 80, 443, 8883, and 3000 of the server are accessible), and the robot will direct you to the connection configuration page.



Step 3:

- Next, you'll need to enter your registered account information. The advanced server refers to the public address of your deployed web app.

Configure FarmBot
v15.4.0 for Raspberry Pi 3 and Zero 2 W

FARMBOT WEB APP ACCOUNT

EMAIL

tingzhengr@student.unimelb.edu.au

PASSWORD

.....

ADVANCED ▲

SERVER

http://20.85.227.222:3000

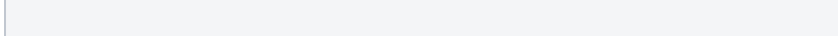
⚠ Double check your email and password
Entering incorrect information at this step will result in a CODE 24 error, the FarmBot will not come online, and you will need to redo configuration.

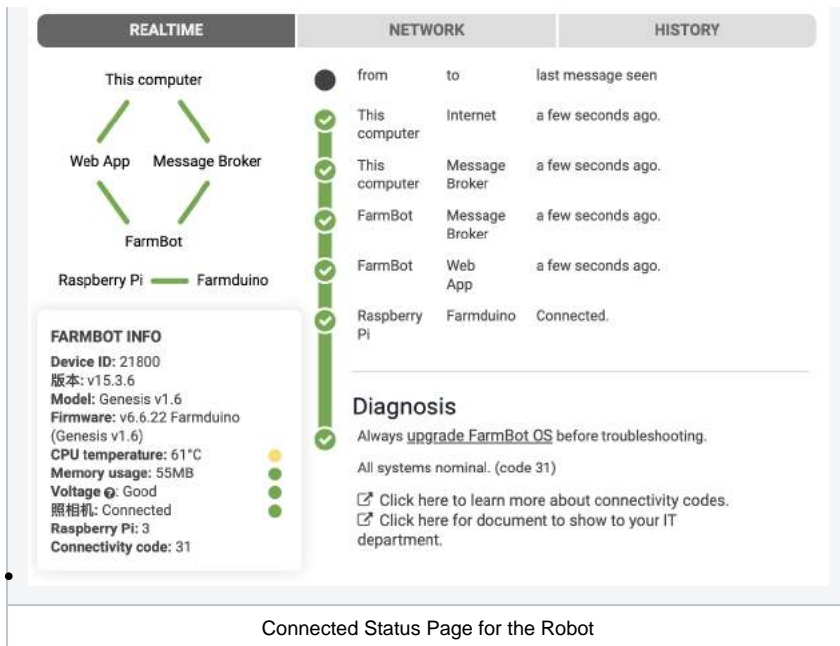
FINISH

Type in your account information and server address

Step 4:

- After the robot establishes the connection, you can view the status of the robot on the web app.





Farmbot Project Home

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Project Timeline

Sprint 1 Planning

Team

Name	Role
Yuxi He	Product Owner
Dikai Zhu	Scrum Master
Tingzheng Ren	Testing leader
Zhiyu Chen	Software Developer
Chengtian Jiang	Software Developer

Capacity planning

	Current sprint
Total days	18 days
Total hours fully working on the projects	48 hours/ppl 240 hours for whole team
Team capacity	0%
Total story points capacity	153
Total story points planned to complete	0

Sprint Planning

Goal	Plan
<ul style="list-style-type: none">Complete project designComplete physical	<ul style="list-style-type: none">Complete design and planning for each sprints

Sprint 1 Feedback and Review

Feedback from Nir:

- Happy with the progress and understand there are so many challenges.
- Have a short discussion with professors from Agriculture department to learn the user stories.
- The integration failed in this meeting because the SD card is not working for the farmbot and we failed to build a connection
- Discussed how to power the camera with Arduino board, the voltage the camera needs is 1030 v
- Discussed how to control the camera with python code, how to get the IP of the camera

Completion review:

User stories points: - 153 DESIGN

Sprint 1 Retro

Date

2023-3-23

Team members

- [Dikai ZHU](#)
- [Zhiyu Chen](#)
- @Chengtian Jiang
- @Yuxi He
- @Tingzheng Ren

Goals

- *Sprint 1 review*
- *Sprint 1 retrospective*
- *Sprint 2 planning*

Sprint 1 Review

Item	Discussion
Review the design	<ul style="list-style-type: none">• All team members do the design review for the project
Review the sprint 1 assignment docs	<ul style="list-style-type: none">• All team members take participate in the review of documents on the Confluence and make the final updates: Architecture Design, user story
Review the architecture	<ul style="list-style-type: none">▪ Update diagrams in Architecture Design

Sprint 1 Retro

What we did well	What we didn't do well
Good communication and teamwork based on the agile process	We can not compete all tasks we planned
Good Confluence structure.	Trello daily update not in time
We are clear about what other team members have done in this sprint.	We cost more time learning the code language of the existing system
We got feedback from the client and we organized what need to be done in the next sprint.	
Every team member complete their tasks on time	

Sprint 2 Planning

Epic	Rank (Timeline)
Complete Physical connection	1
Deployed the custom web app	2
Complete a front page for the thermal cameral	3
Complete a script that controls the camera	4

Sprint 2 Planning

Team

Name	Role
Yuxi He	Product Owner
Dikai Zhu	Scrum Master
Tingzheng Ren	Testing leader
Zhiyu Chen	Software Developer
Chengtian Jiang	Software Developer

Capacity planning

	Current sprint
Total days	35 days
Total hours fully working on the projects	48 hours/ppl 240 hours for whole team
Team capacity	60%
Total story points capacity	153
Total story points planned to complete	59

Sprint Planning

Goal	Plan
<ul style="list-style-type: none">• Complete Physical connection• Successfully deployed the custom web app• Complete a front page for the thermal cameral• Complete a script that controls the camera	<ul style="list-style-type: none">• Continue developing• Testing developing

Sprint 2 Feedback and Review

Feedback from Nir:

- Happy with the progress and understand there are so many challenges.
- It would be great to have an architectural image. You can do it by hand, similar to the the page where the whole system is explained.
- Try to finish integration in the next sprint because then we'll make sure that you have a final product, so that you will have Demo and I feel that it has more value to have a final project.

Completion review:

User stories points: -59 TOTAL - 30 DONE

Sprint 2 Retro

Date

2023-4-30

Team members

- [Dikai ZHU](#)
- [Zhiyu Chen](#)
- @Chengtian Jiang
- @Yuxi He
- @Tingzheng Ren

Goals

- *Sprint 2 review*
- *Sprint 2 retrospective*
- *Sprint 3 planning*

Sprint 2 Review

Item	Discussion
Review the code	<ul style="list-style-type: none">• All team members do the final code review for others' code
Review the sprint 2 assignment docs	<ul style="list-style-type: none">• All team members take participate in the review of documents on the Confluence and make the final updates: Testing, Architecture Design, user story• Merge codes (dev and others) into the main branch
Review the architecture	<ul style="list-style-type: none">▪ Update diagrams in Architecture Design
Review the testing	<ul style="list-style-type: none">• All team members do the testing on the features developed by others

Sprint 2 Retro

What we did well	What we didn't do well
Good communication and teamwork based on the agile process	We can not compete all tasks we planned
Good code quality: produce reusable function components.	We cost more time learning the code language of the existing system
Good Confluence structure.	We face challenges on insert UI to the frontend and visualize data.
We are clear about what other team members have done in this sprint.	Trello daily update not in time
We release a product that is of a standard and form demonstratable to the client.	
We got feedback from the client and we organized what need to be done in the next sprint.	
Every team member complete their tasks on time	

Sprint 3 Planning

Epic	Rank (Timeline)
------	-----------------

Integration	1
Existing feature maintenance	2

Products

Sprint 2 Demo

Farmbot Project Home

Sprint 2 Demo

This page shows the functionality we have implemented in sprint 2.

Thermal Camera Connection

We connected the thermal camera to the farmbot robot with data cables. On the top left of the picture below, there is the Raspberry Pi, whereas there are two splitters in the middle and a thermal imaging camera at the bottom right of the picture.



By testing the connection offline, we found that the thermal imaging camera could be used successfully and take pictures of the specified plants.



After our adjustments, the farmbot robot can successfully connect to various important modules such as web app and computer.

REALTIME

FARMBOT INFO
Device ID: 21800
版本: v15.3.6 version
Model: Genesis v1.6
Firmware: v6.22 Farmduino (Genesis v1.6)
CPU temperature: 61°C
Memory usage: 55MB
Voltage: Good
摄像头: Connected camera
Raspberry Pi: 3
Connectivity code: 31

NETWORK

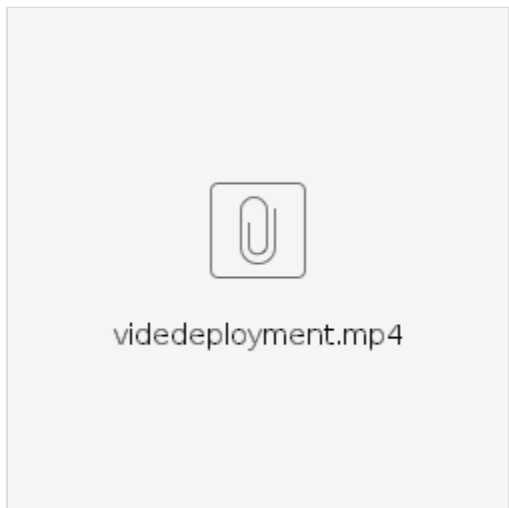
from	to	last message seen
This computer	Internet	a few seconds ago.
This computer	Message Broker	a few seconds ago.
FarmBot	Message Broker	a few seconds ago.
FarmBot	Web App	a few seconds ago.
Raspberry Pi	Farmduino	Connected.

Diagnosis
Always [upgrade FarmBot OS](#) before troubleshooting.
All systems nominal. (code 31)
[Click here to learn more about connectivity codes.](#)
[Click here for document to show to your IT department.](#)

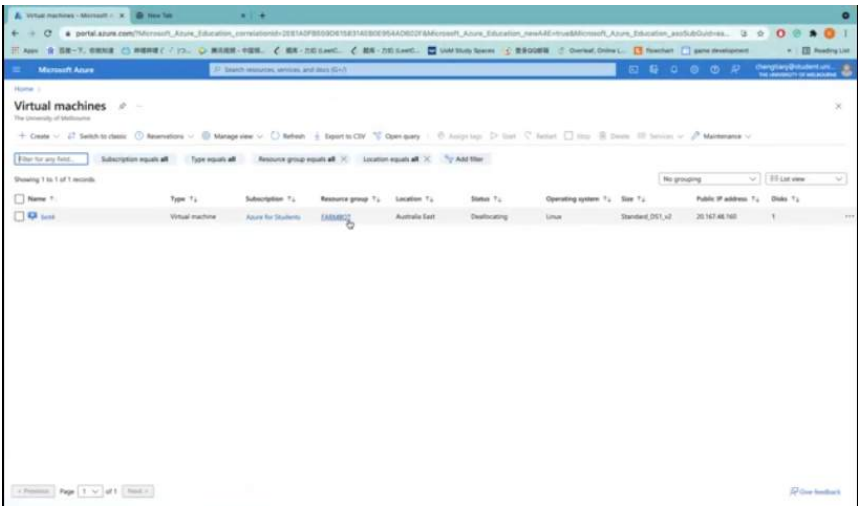
HISTORY

Web app deployment

The video below shows the process of how we deploy the web app and successfully access the login page.



We rent a cloud server of Azure to deploy the web app of farmbot.



We connected the virtue machine on Azure to deploy the web app.

```
(base) jianghengtian@localhost ~ % ssh -i ~/.ssh/farmbot.pem farmbot@20.167.48.160
Warning: Identity file ~/.ssh/farmbot.pem not accessible: no such file or directory.
farmbot@20.167.48.160:~$ cat /etc/ssh/ssh_host_rsa_key.pub
ssh-rsa-2048-167.48.160 farmbot
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1030-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information disabled due to load higher than 1.0

 * Statistically confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

 * Introducing Expanded Security Maintenance for Applications.
   Receive updates to over 25,000 software packages with your
   Ubuntu Pro subscription. Free for personal use.

   https://ubuntu.com/subscribe

Expanded Security Maintenance for Applications is not enabled.

21 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

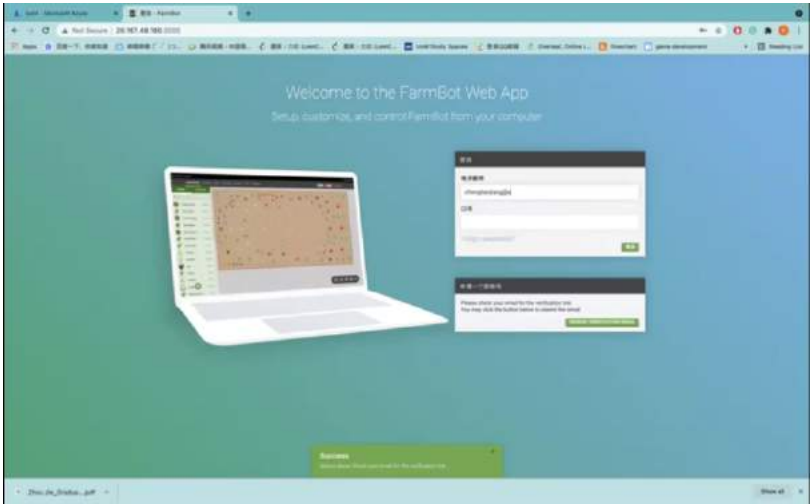
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Tue Apr 25 05:04:10 2023 from 125.63.58.79
farmbot@20.167.48.160:~$ cd FA-BotUI/
farmbot@20.167.48.160:~/FA-BotUI$ ls
CONTRIBUTING.md  LICENSE      ml_docs.md  venv        frontend      log          public          tsconfig.dev.json
DEPLOYMENT.md   README.md   bin         docker-compose.yml  jest.config.js  net_production.pem  package-lock.json  spec            ubuntu_example.sh
Dockerfile       README.md   bin         docker-compose.yml  jest.config.js  net_production.pem  package-lock.json  spec            ubuntu_example.sh
ISSUE_TEMPLATE  SECURITY.md  config.ru   example.env       lsh             passenger.S000.pid.lock  tom.env

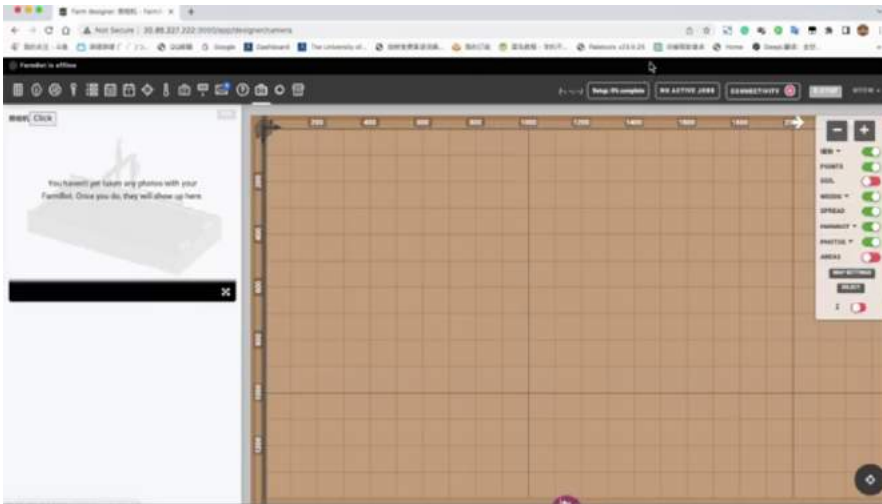
farmbot@20.167.48.160:~/FA-BotUI$
```

We logged in the web app.

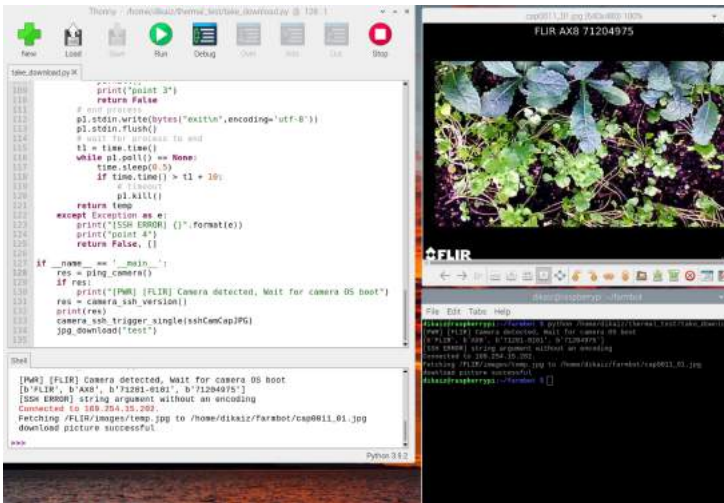


Thermal camera Module

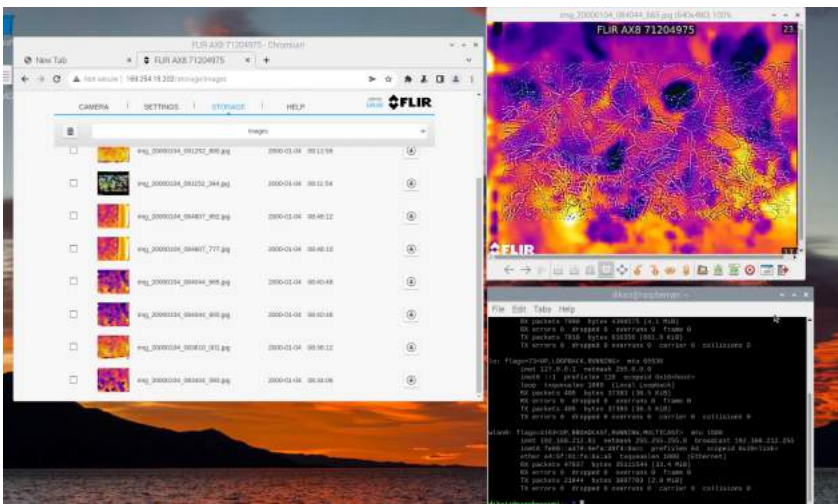
We created a new module to implement the operations related to the thermal camera. For instance, we can choose a specific plant to take a picture of and display the picture on the left side of the module. Then we can get the temperature data of this plant after analysis. For sprint 2, we can display the images taken by the thermal camera.



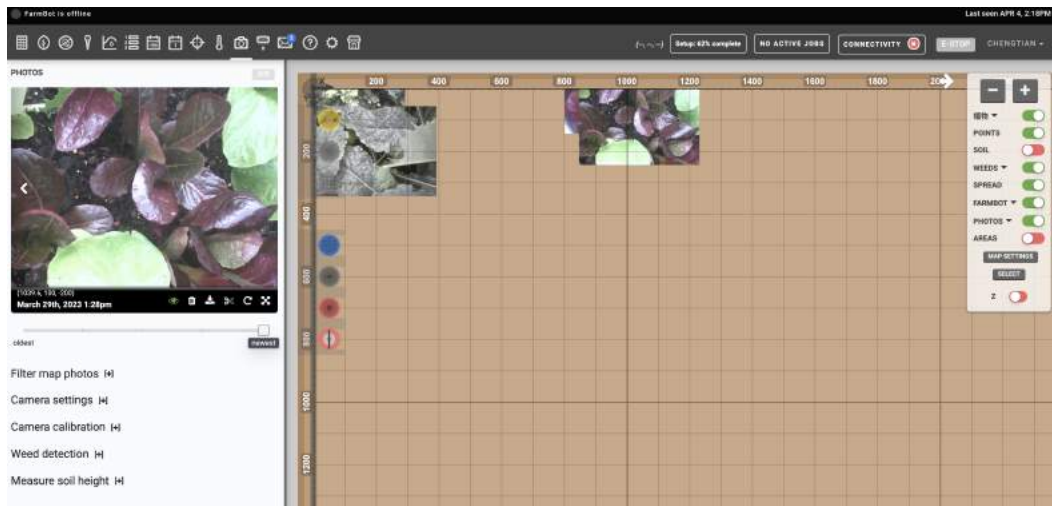
We wrote a python script to download the pictures taken by the thermal camera.



Also the thermal radiation images.



Then we can upload these images to display them on the module.



MEETING MINUTES

Meeting Types

MEETINGS FOR SPRINTS

MEETINGS STANDUP

MEETINGS WITH CLIENT

MEETINGS WITH SUPERVISOR

TEMPLATES

[Farmbot Project Home](#)

MEETINGS FOR SPRINTS

- [\[IS\] 2023-03-13 Team Construction](#)
- [\[IS\] 2023-03-15 Plans for Week 3](#)
- [\[IS\] 2023-03-20 Reviews for Week3](#)
- [\[IS\] 2023-03-21 Plans for Week 4](#)
- [\[S2\] 2023-03-28 Plans for Week 5](#)
- [\[S2\] 2023-04-03 Plans for Week 6](#)
- [\[S2\] 2023-04-17 Plans for Week 7](#)
- [\[S2\] 2023-04-23 Reviews for Week7](#)
- [\[S2\] 2023-04-24 Plans for Week 8](#)

[Farmbot Project Home](#)
[Parent Page: MEETING MINUTES](#)

[IS] 2023-03-13 Team Construction

DATE

2023-3-13

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Roles and responsibilities for each team member.
- Make weekly scrum meeting rules and agenda.
- Discussion about current and future project code.

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	10 minutes	Discussion of Roles and Responsibilities	Dikai ZHU
2	15 minutes	Meeting Schedules and Rules	Chengtian JIANG
3	25 minutes	Framework Report Tingzheng Ren YUXI HE	Tingzheng Ren YUXI HE
4	10 minutes	Supervisor Meeting Preparation: <ul style="list-style-type: none">• Preparation for questions next week• Progress check in Trello and Confluence	Chengtian JIANG

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	10 minutes	Roles and Responsibilities	Dikai ZHU	<ul style="list-style-type: none">• After a thorough discussion, Dikai ZHU was selected as the team leader based on his qualifications, leadership skills and experience. It was agreed that Daikai would be responsible for overseeing the team's activities and ensuring that all members were meeting their responsibilities.• YUXI HE is the product owner. She will be responsible for our product.• Chengtian JIANG and Zhiyu Chen are the software engineers. They will focus on the software development.• Tingzheng Ren is the test engineer. He will do the testing of our codes.
2	15 minutes	Meeting Schedules and Rules	Chengtian JIANG	<ul style="list-style-type: none">• We set up weekly online scrum meeting on Monday from 2 PM - 3 PM• We set up weekly code & document discussion on Tuesday 11 AM - 2 PM• We set up standups twice a week• We set up Trello rules for task management and status report
3	15 minutes	Framework Report	Tingzheng Ren YUXI HE	Framework Report by Tingzheng Ren YUXI HE <ul style="list-style-type: none">• Introduction about backend and frontend of project web app• Introduction about code used by previous developers

4	20 minutes	Supervisor Meeting Preparation	Chengtian JIANG	We checked the current progress of our project and made a schedule for this week. A question list was made for supervisor meeting on this Friday
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Team Recoding Links and other resources:

Meeting slice:



[IS] Scrum Meeti...nstruction .pptx

[IS] 2023-03-15 Plans for Week 3

DATE

2023-3-15

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Discussion of this week's task objectives
- Prioritization of this week's tasks
- Assessment and assignment of task workload

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	20 minutes	Discussion of this week's task objectives: <ul style="list-style-type: none">• Review the tasks that need to be completed this week.• Discuss any potential roadblocks or issues that may arise.• Brainstorm potential solutions to overcome any obstacles.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	20 minutes	Prioritization of this week's tasks: <ul style="list-style-type: none">• Identify which tasks are the most important to complete first.• Assign priorities to each task, based on their level of importance.• Determine which tasks can be delegated to specific team members.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
3	20 minutes	Assessment and assignment of task workload: <ul style="list-style-type: none">• Estimate the time required to complete each task.• Assign tasks to team members based on their availability and skill set.• Ensure that each team member has a manageable workload for the week.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	20 minutes	Thermal camera	Dikai ZHU	We had a discussion last meeting that the main topic of our project is about integrating thermal camera in the web app. Dikai ZHU as the team leader, has decided to move thermal camera related research to our highest priority. We are supposed to know at least how the camera interact with the farmbot and how can we integrate it.
2	10 minutes	Front-end research	Tingzheng Ren YUXI HE	Front-end research about the web app so that we can extract the data from web app and analyze in the web page. The expectation of this task is to figure out how to develop web app with the code given.
3	15 minutes	Docker composati	Chengtian JIANG	

		on research	Zhiyu Chen	Because the composition of web app with docker is time-consuming and hard, we are planning to explore a better way to test our web app in a more efficient way. The expectation of this object is to find a more convenient way for testing.
4	15 minutes	Research about Flask structure	Chengtian JIANG Tingzheng Ren	In this case, we are supposed to figure out how can we use it in this project.

Team Recoding Links and other resources:

[IS] 2023-03-20 Reviews for Week3

DATE

2023-3-20

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Report what we have achieved last week
- Report obstacles

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	10 minutes	Status Report for FLIR	Dikai ZHU
2	10 minutes	Progress Report for farmbot connection: <ul style="list-style-type: none">• Successful connection to farmbot web app• Successful remote control of farmbot	Chengtian JIANG
3	40 minutes	Obstacle reporting and trouble shooting	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	10 minutes	Progress Report for FLIR	Dikai ZHU	<ul style="list-style-type: none">• The FLIR has successfully connected to the PC, and we can control it though a script in java• We should investigate methods to establish a connection between the thermal camera and either the Raspberry Pi or Arduino board on the robot
2	10 minutes	Progress Report for farmbot connection	Chengtian JIANG	<ul style="list-style-type: none">• We successfully connect farmbot to the official web app and tried remote control with perfect feedbacks.• To connect the FarmBot to our deployed web app, we will need to modify the data within the SD card. This will require assistance from the client.
3	40 minutes	Obstacle reporting and trouble shooting	Dikai ZHU Chengtian JIANG	We faced some obstacles and failed to deploy web app on our platform so we had a review of our failure: <ul style="list-style-type: none">• Front-end research was delayed since we failed to deploy our web app.• Docker compose research has been stalled due to the same reason.

		Tingzheng Ren YUXI HE Zhiyu Chen	<ul style="list-style-type: none">• It is hard to locate the bug during the meeting and it is agreed that we shall solve this problem before the next meeting. <p>Solution: Ask for help from client and read more documents.</p>
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[IS] 2023-03-21 Plans for Week 4

DATE

2023-3-21

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Discussion of this week's task objectives
- Discussion of code
- Documentation management

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	20 minutes	Discussion of this week's task objectives: <ul style="list-style-type: none">• Review the tasks that need to be completed this week.• Discuss any potential roadblocks or issues that may arise.• Brainstorm potential solutions to overcome any obstacles.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	20 minutes	Discussion of code: <ul style="list-style-type: none">• Identify errors that occur.• Try to solve problem.• Ensure that everyone has completed the code deployment.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
3	20 minutes	Documentation management : <ul style="list-style-type: none">• Estimate the time required to complete each task.• Assign tasks to team members based on their availability and skill set.• Ensure that each team member has a manageable workload for the week.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	20 minutes	Install error on Azure	Chengtian JIANG	<ul style="list-style-type: none">• We have found through discussion that some team members have encountered issues with code deployment, and some errors have recurred multiple times.

			Tingzheng Ren YUXI HE	<ul style="list-style-type: none"> Due to the time constraint, we decided to postpone the resolution of the code deployment issues to next week.
2	10 minutes	Sprint 1 discussion	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE	We discussed what needs to be accomplished under Sprint 1 and have categorized the tasks according to priority.
3	30 minutes	Personas	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE	<ul style="list-style-type: none"> We have delegated the tasks for writing the Personas information: <ul style="list-style-type: none"> agricultural researcher: Chengtian JIANG farmer: Tingzheng Ren high school teacher: Dikai ZHU Personas generating: YUXI HE
4	30 minutes	User story	Tingzheng Ren YUXI HE Zhiyu Chen	<p>In this case, we have delegated the tasks for writing the user story:</p> <ul style="list-style-type: none"> high school teacher: Tingzheng Ren agricultural researcher: YUXI HE famer: Zhiyu Chen

[S2] 2023-03-28 Plans for Week 5

DATE

2023-3-28

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Discussion of this week's task objectives
- Discussion of web app composition
- Documentation management

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	20 minutes	Discussion of this week's task objectives: <ul style="list-style-type: none">• Review the tasks that need to be completed this week.• Discuss about docker composition in remote server• Test Web app frontend without duplicate composition	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	20 minutes	Discussion about web app composition: <ul style="list-style-type: none">• Remote virtual machine server setup• Docker composition on remote server• Fix the bugs of web app composition	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
3	10 minutes	Frontend exploration: <ul style="list-style-type: none">• Frontend testing without duplicate composition• Github codes setting for local environment	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
4	10 minutes	Local composition for farmbot web app: <ul style="list-style-type: none">• Explore farmbot os documents• Try to modify the operation system on raspberry pi.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	10 minutes	Discussion of this week's task objectives:	Chengtian JIANG Tingzheng Ren YUXI HE	We checked the progress for now and then made a schedule for this week. Though we have already made a remote server last week by Dikai ZHU , the left four members are still struggling with it. Another point is about efficient testing for frontend design. The last thing is about the connection between farmbot and web app. Since it is based on the official server, we have to build the connection on our server to customize the functions.
2	30 minutes	Discussion about web app composition	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE	We discussed the setup of a remote virtual machine and Docker composition on the remote server. There were some issues with the setup, and the team discussed ways to fix the bugs of web app composition.
3	20 minutes	Frontend exploration	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE	Testing without duplicate composition is very important for development. Tingzheng Ren and YUXI HE reviewed Github codes for the local environment. After some discussion, it was decided that they will explore more options for frontend testing without duplicating the composition process.
4	10 minutes	Local composition for Farmbot web app	Tingzheng Ren YUXI HE Zhiyu Chen	Chengtian JIANG and Zhiyu Chen discussed the need to explore Farmbot OS documents and try to modify the operating system on Raspberry Pi. The team agreed to explore the Farmbot OS documents and look into the process of modifying the operating system on Raspberry Pi.

[S2] 2023-04-03 Plans for Week 6

DATE

2023-4-3

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Discussion of this week's task objectives
- Discussion of Web code implementation of the thermal imaging camera function

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	10 minutes	Discussion of this week's task objectives: <ul style="list-style-type: none">• Review the tasks that need to be completed this week.• Discuss about how to deploy the web app• Introduce the framework for the entire web app code	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	10 minutes	Discussion some problems about the deployment of the web app: <ul style="list-style-type: none">• How to Cloud Servers like Azure• How to run configuration files which end with .env and .sh• How to set up the development environment	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
3	20 minutes	Frontend exploration: <ul style="list-style-type: none">• Discuss about the structure of front-end code• Assign research tasks for front-end code	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
4	20 minutes	Backend exploration: <ul style="list-style-type: none">• Discuss about the structure of back-end code• Assign research tasks for back-end code	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	10 minutes	Discussion of this week's task objectives:	Chengtian JIANG Tingzheng Ren YUXI HE Dikai ZHU	We checked the progress for now and then made a schedule for this week. YUXI HE , Tingzheng Ren and Chengtian JIANG raised questions about deploying the web app. We reviewed the framework for the entire web app code.
2	20 minutes	Discussion some problems about the deployment of the web app	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen	Since everyone except Dikai ZHU still had questions about the web app deployment, Dikai ZHU guided everyone to deploy it uniformly and answer questions in time.
3	15 minutes	Frontend exploration	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE	Tingzheng Ren and YUXI HE reviewed the code structure for the front-end. After some discussion about the thermal imaging camera function, it was decided that they will create a new module to display the pictures and showing the analyzed data.
4	15 minutes	Backend exploration	Tingzheng Ren YUXI HE Chengtian JIANG Dikai ZHU Zhiyu Chen	Chengtian JIANG and Dikai ZHU discussed the code structure for the back-end. Chengtian JIANG planned to explore Flask with codes and programs. Dikai ZHU planned to study the Python code sample and connect the camera to Raspberry Pi.

[S2] 2023-04-17 Plans for Week 7

DATE

2023-4-17

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Discussion of this week's task objectives
- Prioritization of this week's tasks
- Assessment and assignment of task workload

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	20 minutes	Review the tasks for last week	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	20 minutes	Prioritization of this week's tasks	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5 minutes	Thermal camera and Farmbot OS	Dikai ZHU	We attempted to develop a Python script to manage the camera, it runs well on a Raspberry Pi. We also subsequently tried to transform the source code into a nerves image file. Unfortunately, our efforts were unsuccessful. We will persist with our efforts next week.
2	10 minutes	Web app page	Tingzheng Ren	We have successfully established our own webpage on the web application. However, we are currently exploring options to integrate additional elements into it. We will persist with our efforts next week.
3	5 minutes	Physical attach the camera	Zhiyu Chen	We have developed a technique to attach the camera to the Farmbot arm, but this causes the camera to be askew. To rectify this issue, we need to add an additional holder.
4	20 minutes	Revised feedback for the first sprint	YUXI HE	After assessing the strengths and weaknesses of the first sprint, we allocated tasks to each team member to revise and enhance our document.

Team Recoding Links and other resources:

[S2] 2023-04-23 Reviews for Week7

DATE

2023-4-23

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Report what we have achieved last week
- Report obstacles
- Assign tasks for the next week

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	30 minutes	<ul style="list-style-type: none">• Report on the progress of the files changed according to sprint1's feedback.• Help solving the problems rasied by members.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	30 minutes	<ul style="list-style-type: none">• Based on the checklist of sprint 2, we organize the documents we need to complete.• Zhiyu Chen assign tasks to each person.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	20 minutes	Assign tasks for the next week	Zhiyu Chen	<ul style="list-style-type: none">• Zhiyu Chen made a list of tasks for the next week, according to the checklist of sprint 2.• Zhiyu Chen assigned tasks to group members, and each person confirms his or her task.• Dikai ZHU will create architecture pages to show the project structure and design.• YUXI HE will create a product page to display development details and descriptions.• Zhiyu Chen will write relevant documents for Sprint 2 timeline.• Tingzheng Ren will deploy the product and provide the URL in the Github README so that clients can access the current version of the software.• Chengtian JIANG will define the acceptance criteria for Sprint 2.
2		Report on the progress of the files changed according to sprint1's feedback.	Dikai ZHU	

	30 minutes		Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen	<ul style="list-style-type: none"> Each group member reported on the progress of the changes to the documents that were problematic for sprint1.
3	10 minutes	Help solving the problems raised by members.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen	<ul style="list-style-type: none"> YUXI HE and Dikai ZHU discussed a question about the structure of the motivation model. YUXI HE decided to make a hierarchical structure based on the do-be-feel list. Chengtian JIANG mentioned that the key words need to be highlighted in the do-be-feel list.

[S2] 2023-04-24 Plans for Week 8

DATE

2023-4-24

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Discussion of this week's task objectives
- Prioritization of this week's tasks
- Mainly introduces the code portion for Sprint 2 phase.

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	20 minutes	Review the tasks for last week <ul style="list-style-type: none">• Everyone needs to introduce the progress of their responsible part from last week.• Introduce any problems or reasons for project delays you may have encountered.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen
2	20 minutes	Prioritization of this week's tasks <ul style="list-style-type: none">• Briefly describe the part you will be working on this week.• Each member of the team takes their assigned tasks.	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	10 minutes	Thermal camera and Farmbot OS	Dikai ZHU Chengtian JIANG	We can now obtain camera images using a Python script, and the next step is to explore more about the Camera command and how to integrate it with the Raspberry Pi. At the same time, we also need to further communicate with the client about some of the issues we have encountered, such as the SDK.
2	20 minutes	Web app page	Tingzheng Ren	We have successfully created a display page for our camera, which includes a default image display box and a button that currently has no added functionality. Next, we need to discuss what features should be added to the page and how to implement them. In addition, Tingzheng Ren mentioned some frontend, backend, and deployment issues encountered, which we need to address in the coming weeks.
3	10 minutes	Sprint documen	YUXI HE	

		tation	Now that we have a fairly complete development record, it is important to update our development documents in a timely manner as the project progresses. At the same time, we need to review the grammar errors in the documentation for the first phase.
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MEETINGS STANDUP

- [\[IS\] 2023-03-16](#)
- [\[IS\] 2023-03-19](#)
- [\[IS\] 2023-03-30](#)
- [\[S2\] 2023-04-02](#)
- [\[S2\] 2023-04-20](#)
- [\[S2\] 2023-04-23](#)

[Farmbot Project Home](#)
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[IS] 2023-03-16

Who	What have you done?	What do you plan to do next?
Dikai ZHU	<ul style="list-style-type: none">• I've read the project desc and related documents• I've broken the ice- met clients, supervisors, and teammates	<ul style="list-style-type: none">• Trying to connect the camera to my own PC• Design the confluence board and Trello board
Chengtian JIANG	<ul style="list-style-type: none">• I've read the relative documents• I've chosen a role as a software engineer	<ul style="list-style-type: none">• Flask framework exploration with Tingzheng Ren• Find a way to avoid Docker composition with Zhiyu Chen
YUXI HE	<ul style="list-style-type: none">• I've read the relative documents• I've chosen a role as a product owner	<ul style="list-style-type: none">• Front-end code exploration with Tingzheng Ren• Read the project designs and clients' requirements in detail.
Tingzheng Ren	<ul style="list-style-type: none">• I have read the documentation and code of the project• Had a meeting with the group, supervisor, and client to get to know them	<ul style="list-style-type: none">• Flask framework exploration with Chengtian JIANG• Front-end code exploration with YUXI HE
Zhiyu Chen	<ul style="list-style-type: none">• Read the relative documents• Have chosen a role as a Software Engineer	<ul style="list-style-type: none">• Find a way to avoid Docker composition with Chengtian JIANG

[IS] 2023-03-19

Who	What have you done?	What do you plan to do next?
Dikai ZHU	<ul style="list-style-type: none">• I have a meeting with the client• I finished the confluence and Trello page structures• I successfully connect the camera to my PC	<ul style="list-style-type: none">• Write the project and client goals.• Meet with the client and supervisor to find a way to• Write user case for user story 1 and story 2
Chengtian JIANG	<ul style="list-style-type: none">• Flask framework report and problem statement with Tingzheng Ren• Docker composition experience sharing and troubleshooting	<ul style="list-style-type: none">• Write user case for user story 9 and story 10• Explore Flask framework with Tingzheng Ren• Find a way to connect the web app to the farmbot
YUXI HE	<ul style="list-style-type: none">• Front-end code exploration with Tingzheng Ren• Read the project designs and clients' requirements in detail.	<ul style="list-style-type: none">• Generate Pictures for Personas• User cases for story 5 and story 6• Non-function Requirements for the project
Tingzheng Ren	<ul style="list-style-type: none">• Flask framework exploration with Chengtian JIANG• Front-end code exploration with YUXI HE	<ul style="list-style-type: none">• Explore Farmbot project status with YUXI HE• User cases for story 3 and story 4• Update user stories• Update user Personas
Zhiyu Chen	<ul style="list-style-type: none">• Have a meeting with the client• Find a way to avoid Docker composition with Chengtian JIANG	<ul style="list-style-type: none">• User case for story 7 and story 8• Write Project Scope

[IS] 2023-03-30

Who	What have you done?	What do you plan to do next?
Dikai ZHU	<ul style="list-style-type: none">• Write the project and client goals.• Meet with the client and supervisor to find a way to• Write user case for user story 1 and story 2	<ul style="list-style-type: none">• I taught my team members a way to deploy web-app• I discovered a way to update the web app without recomposing• I read the python code sample for the control camera• I set up a Raspberry Pi for future use
Chengtian JIANG	<ul style="list-style-type: none">• Write user case for user story 9 and story 10• Explore Flask framework with Tingzheng Ren• Find a way to connect the web app to the farmbot	<ul style="list-style-type: none">• Local composition of farmbot web app• Explore integration between camera and raspberry with Dikai ZHU
YUXI HE	<ul style="list-style-type: none">• Generate Pictures for Personas• User cases for story 5 and story 6• Non-function Requirements for the project• Explore Farmbot project status with Tingzheng Ren	<ul style="list-style-type: none">• Local composition of farmbot web app• Explore the front end code for farmbot
Tingzheng Ren	<ul style="list-style-type: none">• Explore Farmbot project status with YUXI HE• User cases for story 3 and story 4• Update user stories• Update user Personas	<ul style="list-style-type: none">• Local composition of farmbot web app• Explore the front end code for farmbot
Zhiyu Chen	<ul style="list-style-type: none">• User case for story 7 and story 8• Write Project Scope	<ul style="list-style-type: none">• Local composition of farmbot web app

[S2] 2023-04-02

Who	What have you done?	What do you plan to do next?
Dikai ZHU	<ul style="list-style-type: none">• I taught my team members a way to deploy web-app• I discovered a way to update the web app without recomposing• I read the Python code sample for the control camera• I set up a Raspberry Pi for future use	<ul style="list-style-type: none">• I studied the Python code sample• I tried to connect the camera to Raspberry Pi
Chengtian JIANG	<ul style="list-style-type: none">• Local composition of farmbot web app• Exploration of integration between farmbot and local web app	<ul style="list-style-type: none">• Flask Exploration with codes and programs• Code review of meeting minutes
YUXI HE	<ul style="list-style-type: none">• Local composition of farmbot web app• Documented the meeting minutes	<ul style="list-style-type: none">• Exploration of the front end code
Tingzheng Ren	<ul style="list-style-type: none">• Local composition of farmbot web app• Explore the front end code for farmbot	<ul style="list-style-type: none">• Insert a button on panel• Edit content in the sidebar
Zhiyu Chen	<ul style="list-style-type: none">• Deploy the web app	<ul style="list-style-type: none">• Go to the farmbot machine to mount support with Dikai ZHU

[S2] 2023-04-20

Who	What have you done?	What do you plan to do next?
Dikai ZHU	<ul style="list-style-type: none">• I wrote a Python script that enables the auto-capture of our thermal camera.• I tried to convert the source code of Farmbos OS into a nerves image file however without success	<ul style="list-style-type: none">• I will rewrite the project description and background information• I will organize the team to prepare for the document of sprint 2.• I will continue trying to reproduce the nerves image file for Farmbot OS.
Chengtian JIANG	<ul style="list-style-type: none">• I improved the technical details of the project• Learned the basic knowledge of integration with Dikai ZHU	<ul style="list-style-type: none">• I will try to integrate the thermal camera into the web app• Explore the web app back-end
YUXI HE	<ul style="list-style-type: none">• According to sprint1's feedback, I sorted out the demerit points and the things to pay attention to afterward• I assigned each group member to the documents that need to be modified	<ul style="list-style-type: none">• I will rewrite the client goals and motivation model
Tingzheng Ren	<ul style="list-style-type: none">• Already insert a button in the panel called Camera• Give basic content on the page	<ul style="list-style-type: none">• Review the frontend code• Test for deploying the web
Zhiyu Chen	<ul style="list-style-type: none">• Complete install thermal camera on the Farmbot machine	<ul style="list-style-type: none">• Review the frontend code• Writing sprint review document

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[S2] 2023-04-23

Who	What have you done?	What do you plan to do next?
Dikai ZHU	<ul style="list-style-type: none">• I tried to convert the source code of Farmbos OS into a nerves image file however without success• I rewrite the project description and background information• I got advice from Farmbot Forum that integrated scripts have to be in Lua, I handed over my code to Chengtian JIANG to reproduce the scripts.	<ul style="list-style-type: none">• I will create an Architecture page on confluence.• I will organize the team to prepare for the document of sprint 2.• I will continue trying to reproduce the nerves image file for Farmbot OS.
Chengtian JIANG	<ul style="list-style-type: none">• Finished the sprint 2 documentation in terms of acceptance criteria• Check progress of project development	<ul style="list-style-type: none">• I will explore the integration script given by Dikai ZHU• Write assigned documents in terms of sprint 2
YUXI HE	<ul style="list-style-type: none">• I rewrote the project description and background information.• I wrote this week's meeting minutes.	<ul style="list-style-type: none">• I will create a Product page on Confluence.• I will write the meeting minutes.
Tingzheng Ren	<ul style="list-style-type: none">• Review the frontend code• Test deploy the web	<ul style="list-style-type: none">• Write development document• Keep testing the web page
Zhiyu Chen	<ul style="list-style-type: none">• Finish some sprint review documents (sprint planning)• Add sprint review for sprint 1	<ul style="list-style-type: none">• Continue to finish the sprint review for sprint 2• I will write the supervisor meeting minutes

MEETINGS WITH CLIENT

- [\[IS\] 2023-03-10 First Meeting](#)
- [\[IS\] 2023-03-17 Second Meeting](#)
- [\[IS\] 2023-03-23 Third Meeting](#)
- [\[S2\] 2023-04-28 Fourth Meeting](#)

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[IS] 2023-03-10 First Meeting

DATE

2023-3-10

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input checked="" type="checkbox"/> Nir Lipovetzky

GOALS

- Brief introduction to the project.
- Talking about the project goal
- Team topic selection

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	10 Mins	Background introduction about the project	Nir Lipovetzky
2	10 Mins	Introducing about work the project team need to do	Nir Lipovetzky
3	20 Mins	Answering questions from three teams	Nir Lipovetzky

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	10 Mins	Background introduction about the project	Nir Lipovetzky	<ul style="list-style-type: none">• Introducing backgrounds and why the project is important. FarmBot is an open-source, robotic farming machine designed for small-scale, sustainable agriculture. It uses computer vision, artificial intelligence, and precision farming technology to automate the process of planting, watering, and weeding crops. FarmBot includes a modular hardware platform, a Web-based software platform, and a community to share knowledge and participate in project development. The hardware platform consists of a gantry robot that can move along a track above a field bed, while the software platform allows users to plan and execute agricultural production processes and monitor the performance of the system.
2	10 Mins	Introducing about work the project team need to do	Nir Lipovetzky	<ul style="list-style-type: none">• Based on the previous project, improve the integration of the written code (Emails and AI solver).• Three teams working on same codes but different directions (Three direction: E-nose (sensor), AI and thermal camera)
3	20 Mins	Answering questions from three teams	Nir Lipovetzky	<ul style="list-style-type: none">• The outcome of the project is to improve the integration of the written code (Emails and AI solver).• Each team need to made selection on their topic before next Friday.

Team Recoding Links:

[IS] 2023-03-17 Second Meeting

DATE

2023-3-17

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input type="checkbox"/> Chengtian JIANG <input type="checkbox"/> Tingzheng Ren <input type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input checked="" type="checkbox"/> Nir Lipovetzky

GOALS

- Try to connect the farmbot with the web app and our computer.
- Test thermal camera for farmbot integration
- Know about the physical Farmbot and its functionalities (especially Thermal Camera)to the team.

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	10 Mins	Farmbot Setup with SD card Integration	Nir Lipovetzky
2	10 Mins	Thermal camera testing with own computer	Nir Lipovetzky
3	20 Mins	Farmbot control with remote instructions	Nir Lipovetzky
4	10 Mins	Client Nir presenting the physical Farmbot and its functionalities to the team.	Nir Lipovetzky
5	20 Mins	Another professor explains the project we choose (Thermal camera).	

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	20 Mins	Farmbot Setup with SD card Integration	Nir Lipovetzky	<ul style="list-style-type: none">• Nir Lipovetzky installed the SD card with operating system on farmbot
2	10 Mins	Thermal camera testing with own computer	Nir Lipovetzky	<ul style="list-style-type: none">• A thermal camera was given to us and we tried to test it on our computer• Failed for testing because the lack of proper cables
3	20 Mins	Farmbot control with remote instructions	Nir Lipovetzky	<ul style="list-style-type: none">• The integration failed in this meeting because the SD card is not work for the farmbot and we failed to build a connection• We knew the standard procedure for farmbot connection
4	10 Mins	Client Nir presenting the physical Farmbot and its functionalities to the team.	Nir Lipovetzky	<ul style="list-style-type: none">• The FarmBot system includes a modular hardware platform, a web-based software platform, and a community of users and developers who share knowledge and contribute to the project. The hardware platform consists of a gantry-style robot that can move along a track above the crop beds, while the software platform allows users to plan and execute farming sequences, monitor

5	20 Mins	Another professor explains the project we choose (Thermal camera).	<ul style="list-style-type: none"> • FarmBot can use a thermal camera for crop detection and analysis. Thermal cameras can detect the surface temperature of plants, which can help farmers understand the health and growth of the plants. During crop growth, thermal cameras can help farmers identify issues such as water stress, pest infestations, and disease • To use a thermal camera with FarmBot, it can be connected to the system and relevant software can be programmed. Once the thermal camera is installed on FarmBot, it can be directed to move to different positions and capture images. The image data can then be transferred to FarmBot's computer vision software for analysis. The data obtained from the thermal camera can help FarmBot make informed decisions about plant health and management
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Team Recoding Links:

[IS] 2023-03-23 Third Meeting

DATE

2023-3-17

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input type="checkbox"/> Chengtian JIANG <input type="checkbox"/> Tingzheng Ren <input type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input checked="" type="checkbox"/> Nir Lipovetzky

GOALS

- Introduce the robot to interviewer
- Meet with engineer and learn how to control the camera with python code
- Trouble shooting for last week
- User story collection

PLANNED MEETING AGENDA

No Agenda for this meeting

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	40 Mins	Participate the Interview	Nir Lipovetzky	<ul style="list-style-type: none">• Nir Lipovetzky introduced the farmbot project to the interviewer and• Dikai ZHU showed the functions of the farmbot
2	40 Mins	Seeking technical help from engineer	Nir Lipovetzky @Bryce	<ul style="list-style-type: none">• Discussed how to power the camera with Arduino board, the voltage the camera needs is 1030 v• Discussed how to control the camera with python code, how to get the IP of the camera
3	20 Mins	Troouble shooting for last week	Nir Lipovetzky	<ul style="list-style-type: none">• The integration failed in this meeting because the SD card is not work for the farmbot and we failed to build a connection• We knew the standard procedure for farmbot connection
4	20 Mins	User story collection from end user	Dikai ZHU Sigfredo Feutens	<ul style="list-style-type: none">• Have a short dicussion with professors from Agriculture depentment to learn the user stories.

Team Recoding Links:

[S2] 2023-04-28 Fourth Meeting

DATE

2023-4-28

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input type="checkbox"/> Chengtian JIANG <input type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input checked="" type="checkbox"/> Nir Lipovetzky

GOALS

- Report progress for sprint 2 to the client
- Collect feedback from client
- Discuss new scope for sprint 3

PLANNED MEETING AGENDA

No Agenda for this meeting

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	20 Mins	Report progress for sprint 2 to the client	Dikai ZHU	<ul style="list-style-type: none">• Based on the confluence pages we have, we introduced all our progress for sprint 2 to our client.
2	20 Mins	Collect feedback from client	Nir Lipovetzky Zhiyu Chen	<ul style="list-style-type: none">• Ask our client for the feedback for sprint2 and recorded the feedback with the permission from the client.
3	20 Mins	Discuss new scope for sprint 3	Nir Lipovetzky Dikai ZHU YUXI HE	<ul style="list-style-type: none">• The scope of Sprint 3 includes integrating a thermal camera into the farmbot and extracting data from the resulting thermal images. Although we requested data mocks or data analysis work for the project, the client declined our request. Nevertheless, we will focus on fulfilling their request for the thermal camera integration.

Team Recoding Links:

MEETINGS WITH SUPERVISOR

- [\[IS\] 2023-03-08 First Meeting At Week 2](#)
- [\[IS\] 2023-03-13 Update For Week3](#)
- [\[IS\] 2023-03-20 Update For Week4](#)
- [\[IS\] 2023-03-27 Update For Week5](#)
- [\[S2\] 2023-04-03 Update For Week6](#)
- [\[S2\] 2023-04-17 Update For Week7](#)
- [\[S2\] 2023-04-24 Update For Week8](#)

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[IS] 2023-03-08 First Meeting At Week 2

DATE

2023-3-8 14:15-15:15

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Self introduction and get to know each group and members
- Confirm group leaders
- Confirm meeting time between each group and supervisor every week

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Welcome and Introductions	Lin Li
2	10 minutes	Self Introduction	Dikai ZHU Tingzheng Ren YUXI HE Chengtian JIANG Zhiyu Chen
3	10 minutes	Select team leader for each group	Dikai ZHU
4	15 minutes	Brief look at the project	Lin Li
5	10 minutes	Q&A	Chengtian JIANG Dikai ZHU

ACTUAL DISCUSSION TOPICS

Time	TOPIC	MEMBER	DESCRIPTION
5 Mins	Introduction	Lin Li	<ul style="list-style-type: none">• Lin Li gave a brief self-introduction• An overview of this subject
5 Mins	Basic informations about meeting with supervisor every week.	Lin Li	<ul style="list-style-type: none">• Weekly meeting with supervisor is scheduled for Monday from 3:30 PM to 4:00 PM• Also use Slack and WeChat to communicate with supervisor in real-time

10 Mins	A brief self-introduction.	Dikai ZHU Tingzheng Ren YUXI HE Chengtian JIANG Zhiyu Chen	Each person gave a brief self-introduction.
5 Mins	Team leader selection.	Dikai ZHU	The team leader for BoxJelly is Dikai ZHU
10 Mins	Some informations about first meeting with client and communication	Lin Li	<ul style="list-style-type: none"> • The first meeting with client is scheduled on Friday from 1:00 PM to 2:00 PM • Some templates to help us communicate with clients • Before meeting with client, prepare a list of questions about this project
5 Mins	More informations about tools and subject	Lin Li	<ul style="list-style-type: none"> • Use Trello to track progress • Use Confluence to record details • Use Slack to communicate with client and supervisor • Use Github to manage code and version control
5 Mins	Q&A	Lin Li	Communication with customers requires attention to working hours

[IS] 2023-03-13 Update For Week3

DATE

2023-3-13

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Update recent progress to the supervisor
- Collect information for the project details
- Collect information for next client meeting

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Review Trello Status	Dikai ZHU
2	10 minutes	Team Construction Report	Dikai ZHU
3	10 minutes	Project Progress Report	YUXI HE Tingzheng Ren
4	15 minutes	Project Information Collection	Lin Li
5	10 minutes	Client Meeting Schedule	Chengtian JIANG Lin Li

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5 minutes	Review Trello Status	Dikai ZHU	<ul style="list-style-type: none">• Introduce our Trello rules on our board.• Describe the current status of our board.
2	5 minutes	Team Construction Report	Dikai ZHU	Introduce our team construction and newly assigned roles and responsibilities.
3	10 minutes	Project Progress Q&A	YUXI HE Tingzheng Ren	<ul style="list-style-type: none">• What is the background of the project• What is our code base
4	5 minutes	Project Information Collection	YUXI HE Tingzheng Ren	Report some problems when trying to install the Farmbot Web App. (which should be solved by ourselves)
4	10 minutes	Client Meeting Schedule	Chengtian JIANG	<ul style="list-style-type: none">• We decided to connect to the other farmbot teams to decide the next client meeting.

			Lin Li	<ul style="list-style-type: none">• Collected the contact details of other team leaders from supervisor
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Team Recoding Links:

[IS] 2023-03-20 Update For Week4

DATE

2023-3-20

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Update recent progress to the supervisor
- Collect information for the project details
- Discuss this week's project todos

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Review Trello Status	Dikai ZHU
2	20 minutes	Project Progress Report	YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen
3	15 minutes	Project Information Collection	Lin Li
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5 minutes	Review Trello Status	Dikai ZHU	Check for the current status of our board.
3	20 minutes	Project Progress Report	YUXI HE Tingzheng Ren Chengtian JIANG Zhiyu Chen	<ul style="list-style-type: none">• Discuss farmbot's Wi-Fi connectivity issues• Report the port connection problem with farmbot• According to the Sprint 1 checklist, discuss what we have done.
4	5 minutes	Project information Collection	Lin Li	Emphasize the importance of the format and content relevance of user stories and personas.

			Chengtian JIANG	
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU Lin Li	<ul style="list-style-type: none"> • This week we plan to complete all relevant documents in the sprint 1 checklist. • Team members have to work in pairs to complete their tasks: <ul style="list-style-type: none"> • YUXI HEZhiyu Chen will be in charge of the personas • YUXI HEDikai ZHU Tingzheng Ren Zhiyu Chen will collect the user stories • Dikai ZHU will write the project information • Dikai ZHU Tingzheng Ren Chengtian JIANG Zhiyu Chen will update the user case • Chengtian JIANG will update the confluence writing rules and check documents

Team Recoding Links

[IS] 2023-03-27 Update For Week5

DATE

2023-3-20

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Update recent progress to the supervisor
- Collect information for the project details
- Discuss this week's project todos

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Review Trello Status	Dikai ZHU
2	20 minutes	Project Progress Report	YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen
3	15 minutes	Project Information Collection	Lin Li
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5 minutes	Review Trello Status	Dikai ZHU	Check for the current status of our board.
3	20 minutes	Project Progress Report	YUXI HE Tingzheng Ren Chengtian JIANG Zhiyu Chen	<ul style="list-style-type: none">• Discuss farmbot's Wi-Fi connectivity issues• Report the port connection problem with farmbot• According to the Sprint 1 checklist, discuss what we have done.
4	5 minutes	Project information Collection	Lin Li	Emphasize the importance of the format and content relevance of user stories and personas.

			Chengtian JIANG	
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU Lin Li	<ul style="list-style-type: none"> • This week we plan to complete all relevant documents in the sprint 1 checklist. • Team members have to work in pairs to complete their tasks: <ul style="list-style-type: none"> • YUXI HEZhiyu Chen will be in charge of the personas • YUXI HEDikai ZHU Tingzheng Ren Zhiyu Chen will collect the user stories • Dikai ZHU will write the project information • Dikai ZHU Tingzheng Ren Chengtian JIANG Zhiyu Chen will update the user case • Chengtian JIANG will update the confluence writing rules and check documents

Team Recoding Links

[S2] 2023-04-03 Update For Week6

DATE

2023-4-3

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Update recent progress to the supervisor
- Discuss both technical and non-technical problems
- Discuss this week's project todos

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Review Trello Status	Dikai ZHU
2	10 minutes	Project Progress Report	Dikai ZHU YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen
3	25 minutes	Discuss both technical and non-technical problems	Lin Li Dikai ZHU YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5		Dikai ZHU	Check for the current status of our board.

	minutes	Review Trello Status	Chengtian JIANG	
2	25minutes	Project Progress Report	YUXI HE Tingzheng Ren Chengtian JIANG Zhiyu Chen Dikai ZHU Lin Li	<ul style="list-style-type: none"> • YUXI HE and Tingzheng Ren report the code progress of front-end pages • Chengtian JIANG and Zhiyu Chen report the progress of research on back-end interfaces • Chengtian JIANG and Dikai ZHU report the availability of thermal imaging camera
3	10 minutes	Project information Collection	Lin Li Chengtian JIANG Dikai ZHU	<ul style="list-style-type: none"> • Chengtian JIANG and Dikai ZHU ask some issues regarding the connection of the thermal imaging camera and the Farmbot • Dikai ZHU ask about the code submission process on Github
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU Lin Li	<ul style="list-style-type: none"> • This week we plan to work on front-end and back-end code and research the use of thermal imaging camera • Team members have to work in pairs to complete their tasks: <ul style="list-style-type: none"> • YUXI HE and Tingzheng Ren will be in charge of the front-end code • Zhiyu Chen and Chengtian JIANG will be in charge of the back-end interfaces • Dikai ZHU and Chengtian JIANG will research the use of thermal imaging camera • Chengtian JIANG and Dikai ZHU will check documents • YUXI HE will update this meeting minutes

Team Recoding Links

[S2] 2023-04-17 Update For Week7

DATE

2023-4-17

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Update recent progress to the supervisor
- Discuss both technical and non-technical problems
- Discuss this week's project todos

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Review Trello Status	Dikai ZHU
2	10 minutes	Project Progress Report	Dikai ZHU YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen
3	25 minutes	Discuss both technical and non-technical problems	Lin Li Dikai ZHU YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen
4	10 minutes	Discuss this week's project todos	Chengtian JIANG Dikai ZHU

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5	Review Trello Status	Dikai ZHU	Report current progress to supervisor by showing our trello board.

	minutes			
2	25minutes	Project Progress Report	YUXI HE Tingzheng Ren Chengtian JIANG Zhiyu Chen Dikai ZHU Lin Li	<ul style="list-style-type: none"> • YUXI HE and Tingzheng Ren reported a break-through in front-end development that they can add new pages according to the previous code • Dikai ZHU report current obstacles about customizing operating system. • Chengtian JIANG and Zhiyu Chen share the experience of codes in Farmbot
3	10 minutes	Sprint 1 review and feedback	YUXI HE	<ul style="list-style-type: none"> • YUXI HE as the product owner lead us to review our sprint 1 and discuss the shortage of our previous work.
4	10 minutes	Discuss this week's project todos	YUXI HE Dikai ZHU	<ul style="list-style-type: none"> • This week we plan to continue work on front-end and back-end code and explore the integration of thermal camera • Team members have to work individually to complete their tasks: <ul style="list-style-type: none"> • YUXI HE add more information including project details and outcome • Dikai ZHU should improve the background description • Dikai ZHU will continue explore the integration of thermal camera • Tingzheng Ren will arrange the priority queue of our tasks with specific reasons • Zhiyu Chen will improve our user story according to the feedbacks. • Chengtian JIANG will explain the technique details of this project and add more details to the Do-Be-Feel table

Team Recoding Links

[S2] 2023-04-24 Update For Week8

DATE

2023-4-24

PARTICIPANTS

MEMBER GROUP	MEMBER
Supervisor	<input checked="" type="checkbox"/> Lin Li
Team Members	<input checked="" type="checkbox"/> Dikai ZHU <input checked="" type="checkbox"/> Chengtian JIANG <input checked="" type="checkbox"/> Tingzheng Ren <input checked="" type="checkbox"/> YUXI HE <input checked="" type="checkbox"/> Zhiyu Chen
Client	<input type="checkbox"/> Nir Lipovetzky

GOALS

- Update recent progress to the supervisor
- Check documents for sprint 2 submission

PLANNED MEETING AGENDA

ID	PLANNED TIME	TOPIC	MEMBER
1	5 minutes	Review Trello Status	Dikai ZHU
5	30 minutes	Check documents for sprint 2 submission	Lin Li Dikai ZHU YUXI HE Chengtian JIANG Tingzheng Ren Zhiyu Chen

ACTUAL DISCUSSION TOPICS

ID	TIME	TOPIC	MEMBER	DESCRIPTION
1	5 minutes	Review Trello Status	Dikai ZHU	Report current progress to supervisor by showing our trello board.
4	30 minutes	Discuss this week's project todos	Dikai ZHU Chengtian JIANG Tingzheng Ren YUXI HE Zhiyu Chen Lin Li	<ul style="list-style-type: none">• This week we plan to continue work on documents we need to submit for sprint 2• Team members have to work individually to complete their tasks:<ul style="list-style-type: none">• YUXI HE will work on all of the meeting minutes• Dikai ZHU will finish Architecture document and git file update• Tingzheng Ren will work on Readme file update• Zhiyu Chen will work on the sprint planning and sprint review document• Chengtian JIANG will work on the acceptance criteria• Each team member works on code review on other's code

Team Recoding Links

