

Deliverable G: Prototype II and Customer Feedback.

Hassan Rehman

Antonios Sammour

Kailas Ratzel

Aryan Kumar

Kiefer Pomplun

March 9th, 2025

Abstract

This document presents all relevant updates on the tasks completed, additions to new prototypes, feedback from the third client meeting, and the test plan for the next prototype.

Table of Contents

1.0	Introduction.....	4
2.0	Feedback from Client Meeting III.....	4
3.0	Prototype 2	4
4.0	Test plan for Prototype 3.....	5
5.0	Analysis and feedback.....	6
6.0	Task planning and changes.....	6
7.0	Conclusion.....	8

1.0 Introduction

This document outlines the progress made in the development of Prototype II, including key updates, feedback from the third client meeting, and planned improvements for the next iteration. Based on last week's prototype, there are minimal changes required, as the overall design and functionality was well received and performed as intended. A few refinements have been planned to enhance user interaction and ensure a smoother experience. Additionally, this document details the test plans for Prototype III, ensuring that all necessary adjustments are incorporated while maintaining the core strengths of the previous prototype.

2.0 Feedback from Client Meeting III

The main components discussed during this meeting were the updates of our project, and especially prototype I. The client loved our progress, given the simple parts worked on. Additionally, questions about the video and manifesto were asked, and critical feedback was given. Here is some feedback given to the group based on the second client meeting:

- Client gave praise to our idea of using vision markers as a way of transmitting the plants status.
- Video should be like a trailer; this means audio will be needed over the recording showing the robot working, proper editing will be needed, and all the robot's capabilities will need to be shown.
- The video must be less than or equal to 90 seconds
- The manifesto will contain how the robot thinks and acts regarding its role in society.
- The video can contain some elements of the manifesto; however, it must showcase the robot's capabilities in an interactive and engaging way more than anything.
- The video should not be a read over of the manifesto.
- Concerns about the robot's interaction with the user were addressed; human should be in the loop and could maybe use some interaction between the Robomaster and user.

Taking this into consideration, the prototypes following the first one, will apply these ideas and this feedback in their design. All feedback about the video and manifesto will be applied in the final product as well.

As for the clients concerns about the robot's interactions with the user, measures have been taken in this prototype to demonstrate the robot interacting with the user.

3.0 Prototype 2

As seen above lots of important feedback was given on the overall design of the Robomaster. When considering and comparing this feedback with the previous prototype, many ideas were considered and will be trialed in this prototype.

Firstly to address the interaction between robot and user, a new step has been added to demonstrate communication between the Robomaster and the human. Essentially instead of the robot changing its lights colors and blurring out the status, the Robomaster will turn to identify the nearest human and then once identified, will notify them of the plants status. This should address the feedback given by the client and keep a human in the loop during the gardening process.

The second thing addressed was not a concern, but more of a task that needs to be completed which is implementing sound clips for the robot. The main goal would be to have the robot make noises when turning, scanning, successfully identifying a scanner and most importantly informing the user of the plants status. This task would be done with the goal of making the Robomaster be more engaging and fun for the user to use and have help with tasks.

The third bit of feedback this prototype will address is the praise given to the current design. This will be completed by adding more to what we already included. So, the robot will redo what it did initially, but this time give a different status for the plant. This should bring the team closer to the final product which will require the Robomaster to scan 3 plants, each with a different condition and giving its status.

Lastly, the first plant base will be 3D printed with this prototype. This will be done to verify the tasks difficulty in being conducted for when it comes time to reproduce the plants base. The goal of these bases will be to stick the vision markers on them for scanning by the Robomaster.

There are many tasks which are included in this plan, however, the group is certain this will be ideal in the design process in order to reach our desired final product.

4.0 Test plan for Prototype 3

The following table outlines the important tests planned for the functionality, efficiency, and user interaction of our Plant Keeper idea. Each test is designed to validate a specific aspect of the system.

Tests	Objective	Test method	Usage of Results	Test Length (hours)	Type	Fidelity
Interaction and Notification System	Ensure the robot can identify and turn toward the nearest human before notifying them of the plant status	Place a human in different positions, test robot's ability to identify and turn towards them	Refine interaction logic, ensure human-in-the-loop feature works effectively	2	Focused Physical	Medium
Sound Implementation	Ensure sound plays correctly when scanning, identifying a plant, and notifying users	Use the built-in sound feature to upload sounds and test these sounds in our real-world scenarios	Confirmation sounds for the plant's health status	2	Focused Physical	Medium
Path following	Test if the Robomaster S1 can be programmed to guide a certain path	Program a path for the robot to follow	Optimize movement control and path-following logic	4	Focused Physical	Medium
Final test/integration	Verify all features (movement, scanning, sound, light) work seamlessly	Conduct a full system test in a controlled scenario	Identify issues and finalize system adjustments	4	Comprehensive	High

5.0 Analysis and feedback

5.1 Strengths

- Improved interactions between human and robot; Robomaster identifies and turns toward user before telling the user the status.
- Added sound alerts for scanning, turning, and status updates.
- 3D printed plant bases improve marker scanning and system efficiency.
- Defined our objectives and criteria for Prototype III, we ensured improvements.

5.2 Areas for Improvement

- More testing needed for human recognition in different conditions.
- No data on usability, we need user testing to make sure it is effective.
- Lacking clear structure, we need a storyboard and a video production timeline.
- Overlapping assignments could cause inefficiencies.

5.3 Optional Actions

- Conduct more human recognition tests in different lighting and environments.
- Get some user feedback on the sound alerts to make sure it is effective.
- Make a plan for the video including a script, scenes, and schedule.
- Refine the tasks to make the work more efficient.

6.0 Task planning and changes

Here is an updated list of the tasks remaining in order to complete this project by our desired due date of design day on March 27th, 2025.

Task	Description	Desired Completion Date	Who will do it?
Creation of plant base	This will be 3D printing the rest of the bases for the plants to stand on and have the April tags on. It will take about 5 days.	Tuesday March 18 th , 2025.	Antonios and Aryan.
Creation of plants	This will be just creating the plants and their different conditions to prepare for prototype 3(the final prototype before design day).	Tuesday March 18 th , 2025	Kiefer

	This should take about 1 day to complete		
Creation of multiple Vision Markers	This will be creating 2 more Vision Markers for us to have 3 tags total and have a set list of things the robot does for each plant/tag. This will take 2 days.	Tuesday March 18 th , 2025	Hassan and Kailas.
Testing #3	This will be a test to see how well our message is conveyed and will be shown to a couple random people in different programs to see if the robot looks like it's fitting our desired message. Will take 3 hours	Thursday March 20 th , 2025	Entire Group
Testing #4	This will be done to test the final product and how it will function. Will take 2 hours	Friday March 21 st , 2025	Entire Group
Finalizing product	This will be bringing everything together and adding all the parts like the motion, lights, sound clips and scanning together. Will take 3 days.	Friday March 21 st , 2025.	Entire Group.
Creation of the video for the client	This will contain all the components of the video which will be discussed in prototype 2. It should be completed and edited by this date. Will take about a week to complete.	March 22 nd , 2025	Entire group
Completion of the manifesto	This will be the manifesto as requested by the client and should contain all the desired components which will be discussed in prototype 2. Should take 1 week.	March 22 nd , 2025	Entire group

Testing #5	This will be the final testing and simulation to ensure the robot is running for its desired use and programming in preparation for design day. There should be no issues that arise at this final testing.	Monday March 24 th , 2025	Entire group
------------	---	--------------------------------------	--------------

It is worth noting that this is a similar task list to that presented in deliverable F, since currently there have been no delays or changes to that original plan. Tasks may be changed between now and design day, and if this is the case, will be addressed in deliverable H when discussing the final prototype.

7.0 Conclusion

This document outlined the progress made in Prototype II, integrating valuable client feedback to refine the Robomaster's functionality. Key improvements include enhanced human-robot interaction, sound integration, and additional visual markers to optimize user experience. The test plan for Prototype III ensures a structured approach to validating these enhancements. With clear task planning and no major delays, the project remains on track for the final iteration and upcoming design day. Future deliverables will address the final refinements and changes made before the project's completion.