Robotic Mining Competition – Milestone 5
Liam Sapper (lsapper2020@my.fit.edu)

Faculty Advisor: Dr. Marius Silaghi (msilaghi@fit.edu)
Client: Robotic Drilling team (Previously the Robotic Mining Competition team), NASA
Meeting Times: Wednesdays, 4:30pm - 5:30pm; Fridays, 4:00pm - 5:00pm

Milestone 2 Progress:

Task	Completion %	To Do
1. Implement, test, and demo current simulated software	80%	Test GUI while connected properly to nav software
2. Work on translating code from simulation to hardware	40%	Fix waypoint list, set up manual controls with logitech controller, properly implement nav package with raspberry pi
3. Develop navigation GUI	50%	Implement GUI with current nav simulation
4. Create poster and ebook page for Senior Design Showcase	5%	Pretty much everything.
5. Research on image processing	50%	Configuring marked regions as danger zones, implementation w/ current code

Task 1 + 2:
        Progress on the translation has been slow due to difficulties getting the raspberry pi properly set up. Fortunately, the raspberry pi comes with its own classes for managing motor control from the built in gpiozero library, which we will utilize. However we still do not have the controller and the details about the actual model controller being used have been inconsistent, so the decision for what library to implement for manual control has been in limbo. As of March 18, 2024, the consensus is on using a Dual Shock 4 controller.

Task 1 + 3:
        Admittedly, progress on the GUI has been slow. I have not been able to manage my time as well as I'd like, and due to numerous health troubles I have hit a bit of burnout.
        Outside of personal struggles, while a general map has been created, and the GUI is able to show an object moving around on a map. Unfortunately the waypoint list is not showing up properly. This will have to be adjusted along with testing the GUI out in tandem with the nav software itself. I also need to make proper adjustments for the robot's speed and the actual size of the arena.

Task 4:
                The ebook page has been partially created. The outlines for both the ebook page and the poster are being taken care of by team lead Sidney Causey, they would like me to keep my focus on the actual software.

Task 5:

Currently, the image processing is at a point where we can give it a map of our simulated arena and it can section out spaces where obstacles are in the environment. The head of electrical on the project, Izaya Farrar, has done most of the work, with me helping out with basic coding for it. It cannot currently tell the difference between obstacle and safe space, so we are working on programming it to mark those zones as danger zones to avoid. There is a way to measure out luminosity to determine differences in the landscape, which should help out greatly. However, we are uncertain how successful this will be in practical tests..

Milestone 6 Plan:

Task
1. Implement, test, and demo full system on built robot
2. Work on translating code from simulation to hardware
3. Complete Nav GUI
4. Create poster and ebook page for Senior Design Showcase
5. Create user/developer manual
6. Create demo video

Task 1: When the GUI is in a more complete state we will test it with the simulated code before transferring it to the raspberry pi. Hopefully this should be done within only a week or two. Full testing of the system cannot be done until the robot is completely assembled anyhow, which will likely be early April.

Task 2: Continuing the code translation of the navigation package to the raspberry pi, both the navigation module and the GUI. A new controller has been selected, the Dual Shock 4 for the PS4, which has libraries available to pair with the raspberry pi. Unfortunately it may rely on using bluetooth, which is not incredibly reliable, unless we can mod the controller to take other signals. This will be work for electrical.

Task 3: There are several additions and adjustments that still need to be made to the navigation GUI. First is adjusting the map and robot marker sizes so they are accurate to the arena. Then there is fixing the issue with the waypoint list not displaying correctly. Finally it needs to be tested along with the navigation module before being implemented together with it in the raspberry pi.

Task 4: While our team lead will be doing most of the work for this, I will be providing information and data to use in both the ebook and the poster.

Task 5: I will create the user manual and developer manual following the guidelines on the senior design website.

Task 6: A full demo video featuring a completed navigation ui, as well as a working GUI along with it, will be created. This can be done as soon as the GUI is finalized, unless we have issues with our simulated robot model. Another team member Shelsy Toppenberg is helping rebuild the model within Webots, as the previous one was not working correctly.

Meetings with Client:
- 2/16/2024
- 2/21/2024
- 2/28/2024
- 3/1/2024
- 3/6/2024

- 3/13/2024
- 3/15/2024

Feedback – Milestone 5

     Progress has slowed a little bit, but it has for the whole team as we wait on more parts. Liam continues to contribute and we're happy to have the controls looking set for use.

Meetings with Faculty Advisor:
- 3/1/2024

Feedback – Milestone 5

- Faculty Advisor Signature: _____ Date: _____

Faculty Advisor Evaluation

Liam	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

- Faculty Advisor Signature: _____ Date: _____