Individual Lab Report #6

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Wholesome Robotics (Team E)

Teammates: Aman Agarwal, Dung Han Lee, John MacDonald, Aaditya Saraiya

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Individual Progress

In the past few weeks I have worked primarily on the visualizer tool for the monitoring pipeline. We have rescoped our project to be focused on completing an MVP, and a key part of that is a tool for the farmers to understand the data that we collect and generate. The visualizer has to graphically display the farm's layout with some sort of heatmap for indicating the intensity of plant health (or lack thereof).

For simplicity, the initial version of the heatmap is built in matplotlib. It plots the geographical location tagged on each image, using the health value (currently a binary metric) reported by the classification network to chose the color of the point. The main feature of this plotter is an interactive gui, that allows the farmer to change the value of any image by clicking on it and classifying the image itself. This works via the picker event in matplotlib, which returns the plotted point's handle, and runs a tkinter gui that the pulls up the associated image and gives button options to change the value of that point. Upon closing the heatmap, the program will close and save any changes to the data, so that the farmer's changes will be retained.

Team Progress

We spent a lot of our first 2 weeks working on updating our systems engineering and project management. This was not exclusive to our development progress, however we felt it necessary to dedicate most of our time early on to regrouping and setting more reasonable goals for this semester. In addition to rescoping our project, we set up our project management tools and planned our schedule for the semester. We established reasonable work packages and proposed a few stretch goals.
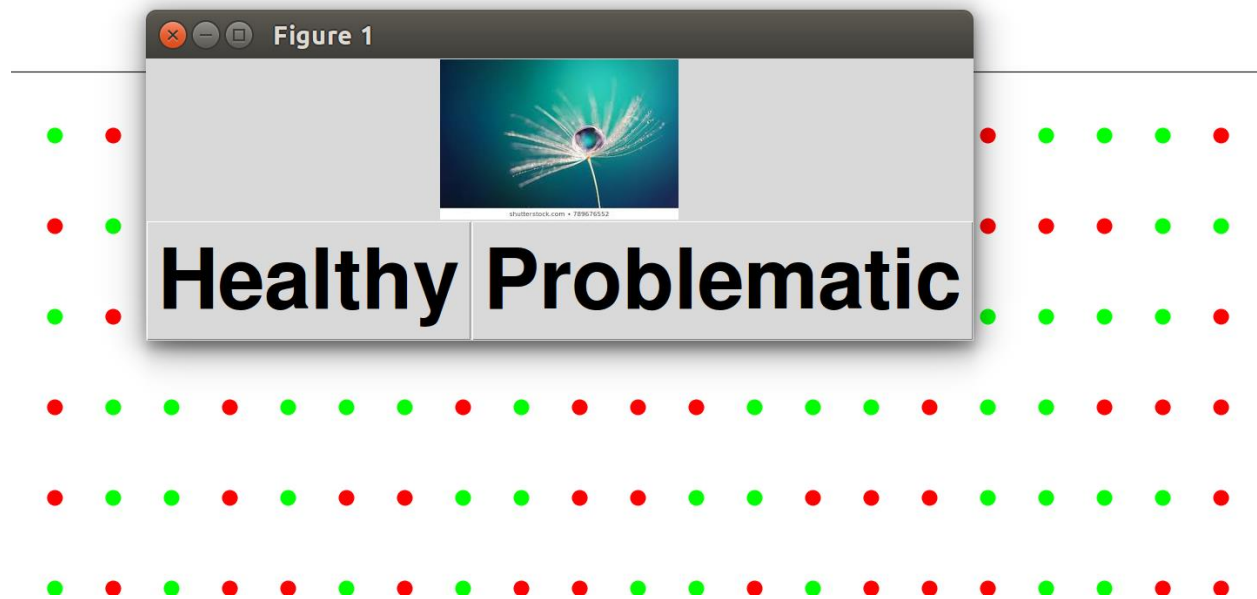
Figure 1 The Visualizer with a pop-up window to correct a single data point

Challenges

A major challenge I had in developing the gui was my inexperience with tkinter. I had trouble running certain features, since in my initial versions the gui was launched as a script as part of the picker event. Making the tkinter object into a class solved this problem, but created new problems, as tkinter is designed to be easy to use in script format and is less natural to use in a class. Neither of these problems represented an actual block, however both required serious research and debugging.

I also have limited experience with github, so saving and sharing my work took a bit of time and help from my teammates.

Teamwork

Aman has worked on cleaning and productizing the controller code for the robot's mobility system

Aaditya has been working

Dung Han has been working on code review and on labeling data to train a new binary classification network.

John has been working on code review, logistics for the robot and field visits, and preliminary research on the RTK package (what we have and what we still need).

Future Plans

Wholesome Robotics

In the coming weeks my plan is to integrate my visualizer with the main monitoring pipeline. This means creating a single bash file that loads whichever images the farmer wants, runs them through the classification network and puts them into the visualizer tool.

I will also begin to design plant guards to cover the robot's wheels. This will protect plant leaves from damage if the robot veers slightly off course.