Dwight Look College of
ENGINEERING
TEXAS A&M UNIVERSITY

Team 5: 3D Occluded Object Detection System

Bi-Weekly Update 1

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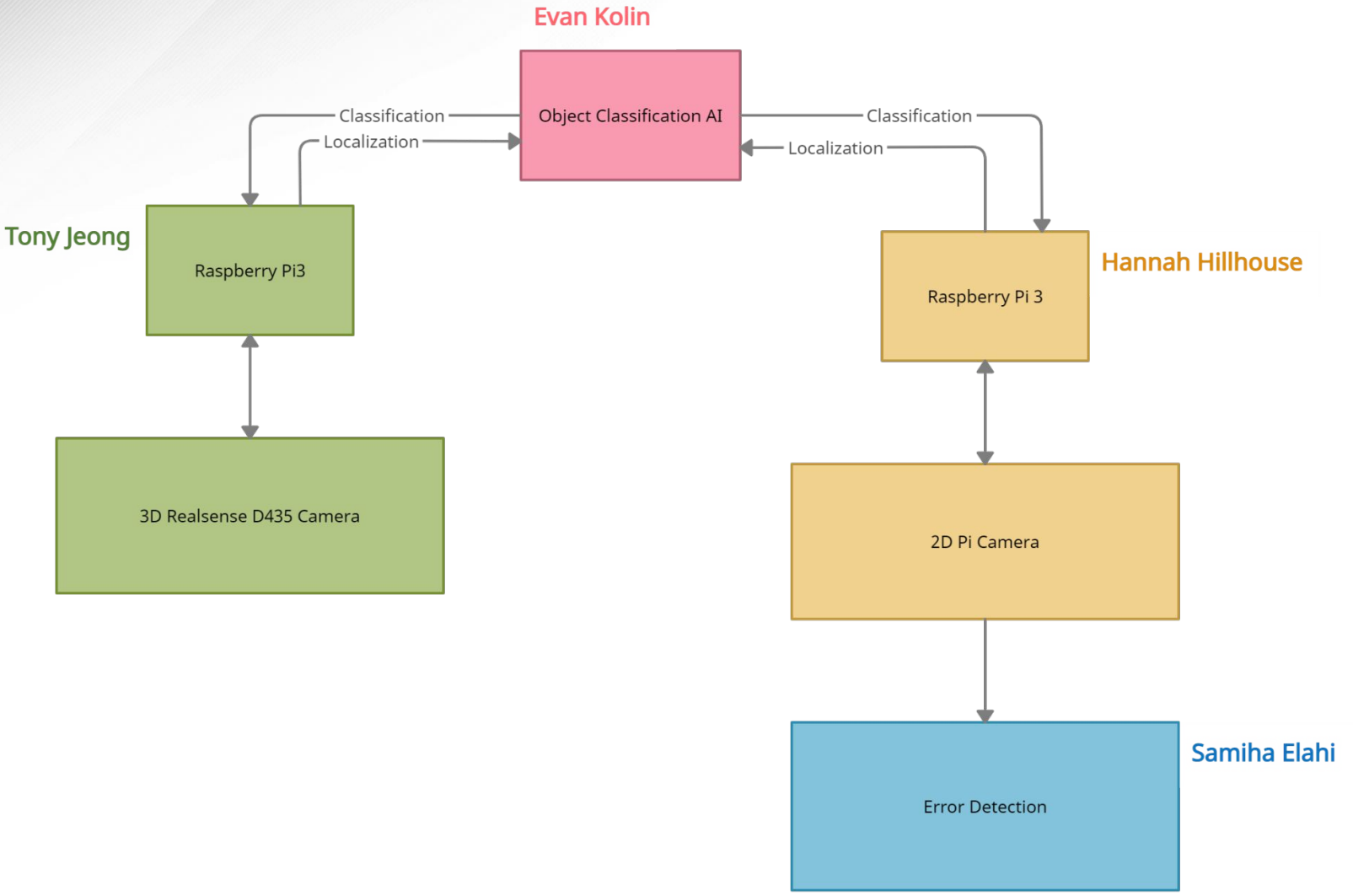
Project Summary

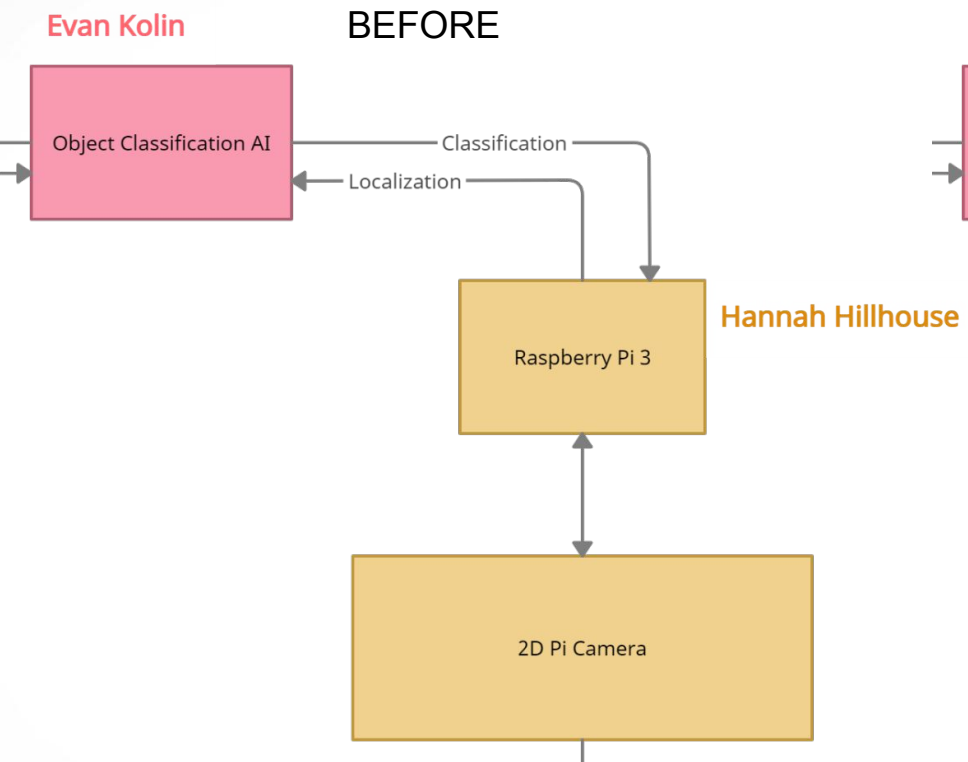
- In an assembly line for a factory or manufacturer, there is a robotic arm that is tasked with finding and moving selected pieces. We must build a vision system that recognizes the needed items even if they are occluded, or covered, by other objects and inform the arm of their locations.

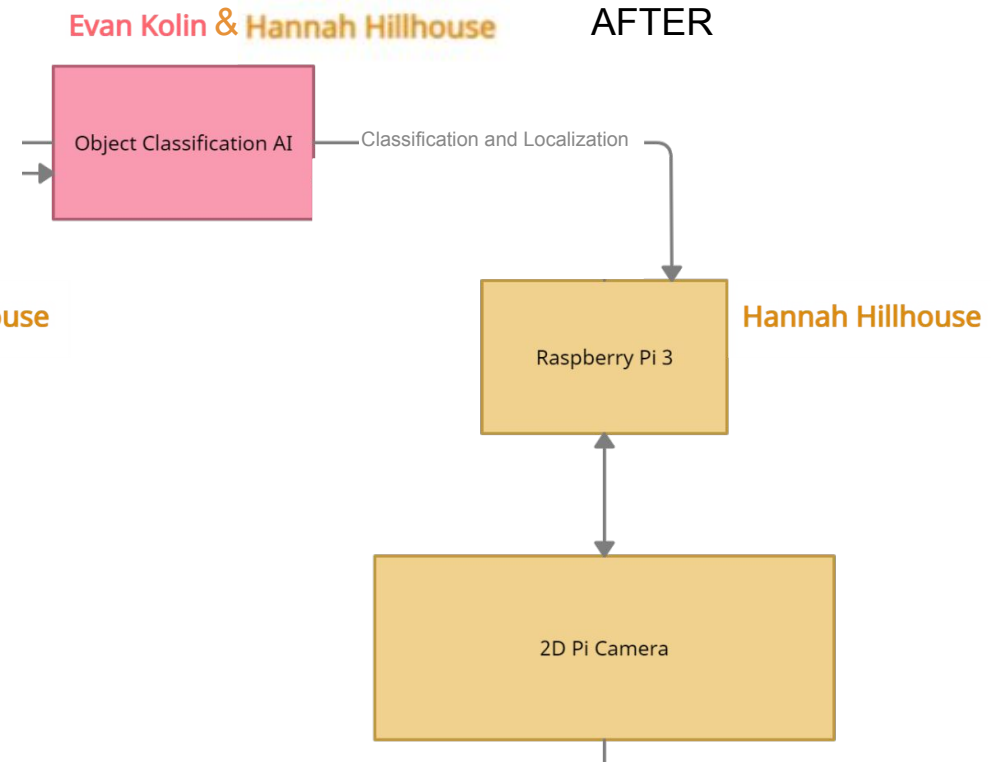
Project/Subsystem Overview



Major Project Changes for 404

- Remaking dataset with new parts
- Reconstructing 2D Camera Subsystem





Project Timeline

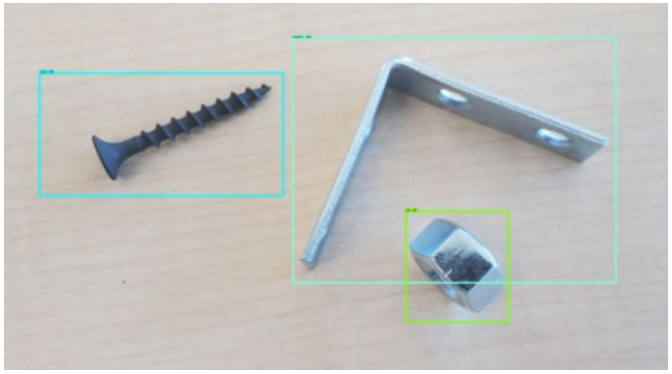
	Sept 22	Oct 6	Oct 20	Nov 3	Nov 8	Nov 15
New parts ordered /received						
New dataset finished						
Error Detection / 2D Camera integration						
AI / 2D Camera integration						
AI / 3D Camera integration						
Total Project Integration						

2D Camera Subsystem

Accomplished since 403	Ongoing progress/problems
	- convert working python code to working google collab code - Setup raspberry pi camera and incorporate into code - rework dataset with new parts

2D Camera Subsystem

- I have to transfer from code in pycharm to google collab
- I have to train a new data set with new parts
- I have to connect the raspberry pi camera into the working google collab code
- Validate that trained dataset is 70% passing when tested on new dataset



3D Camera Subsystem

Accomplished since 403	Ongoing progress/problems
	- Rework the dataset with new parts. - get camera code to raspberry pi. - Get a overhead tripod for the camera.

3D Camera Subsystem

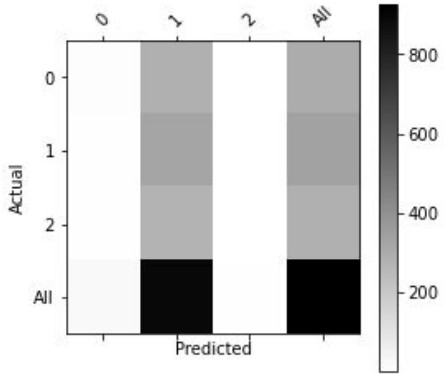
- I'll have to move all my work from 403 to raspberry pi.
- I'll have to work with new parts that will make better results compare to the previous parts(bolts, nuts, screws) because of their size.

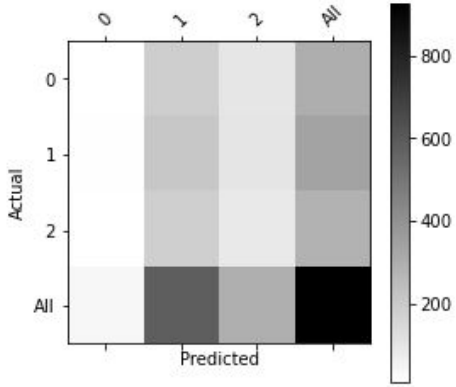
Object Classification Subsystem

Accomplished since 403	Ongoing progress/problems
	• Fix prediction errors • Export trained dataset to google colab, expect memory issues • connect ai to the localization camera subsystem

Machine Learning Subsystem

- After training subsystem, there is a good chance that every prediction will be the same result, such as 100% of guesses being “screw”
- Some trainings result in perfect predictions, having changed no parameters or dataset information.





Error Detection & Handling Subsystem

Accomplished since 403	Ongoing progress/problems
	- Implement a more efficient method to handle the errors - Integrate this subsystem with the 2D camera subsystem to take live pictures and detect the errors

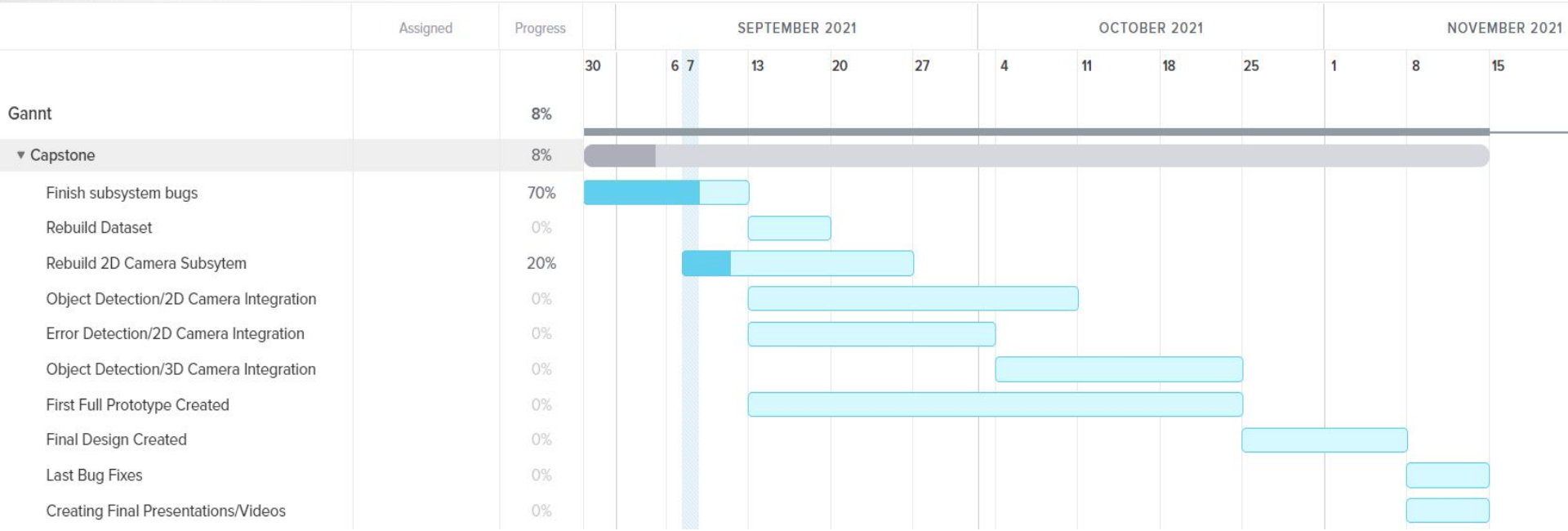
Error Detection & Handling Subsystem

- I have to come up with a way to better handle the parts/objects that are occluded
- Need to implement some sort of a csv file or a different method to log the errors
- Run the code with the new dataset to check if we run into a new type of error

Parts Ordering Status

- New PVC Parts (already acquired one of each, waiting on multiple of each)
- TriPods for 2D and 3D camera

Execution Plan



Thank You

Questions?