
EE/CprE/SE 491 - sddec23-10

Developing a Deep Learning Model to Automatically Detect Microscale Objects in Images and Videos

Week 12-14 Report

10/25/2023 – 11/8/2023

Client: Professor. Santosh Pandey

Group number: 10

Team Members:

Katherine Moretina

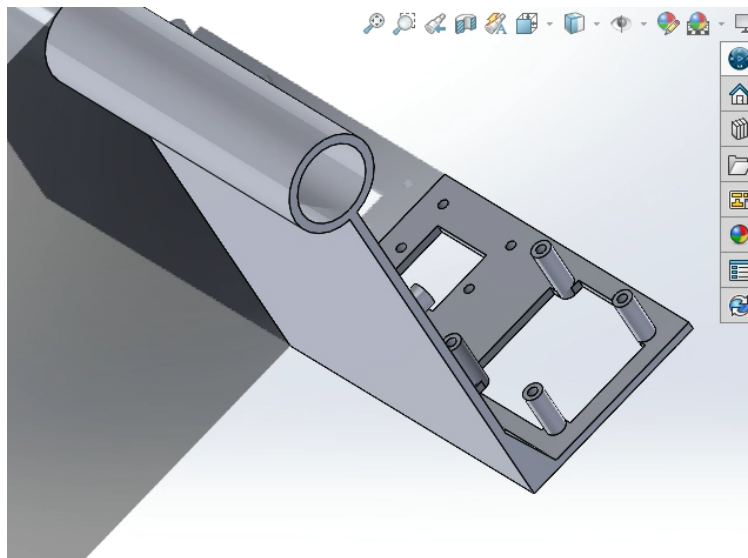
Ethan Baranowski

Chris Cannon

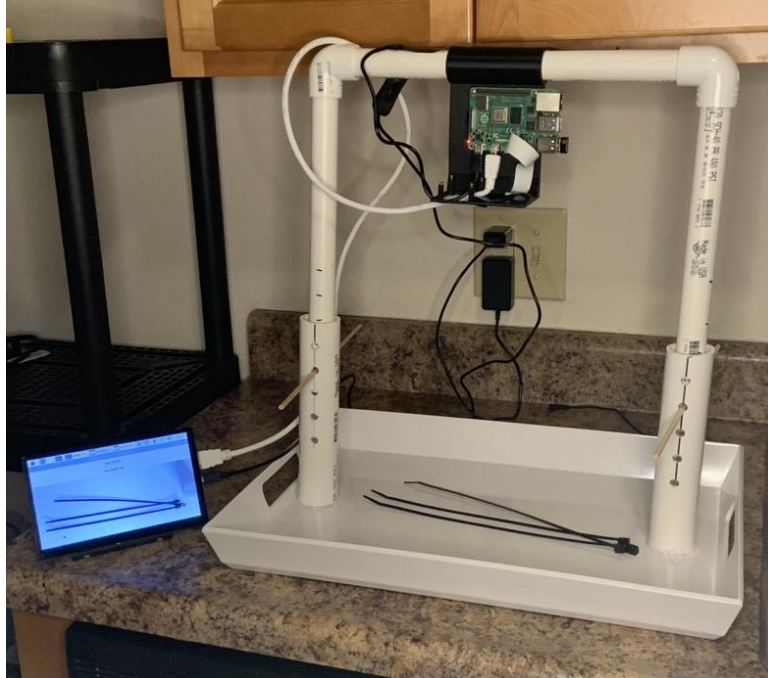
Matthew Kim

Hardware and GUI

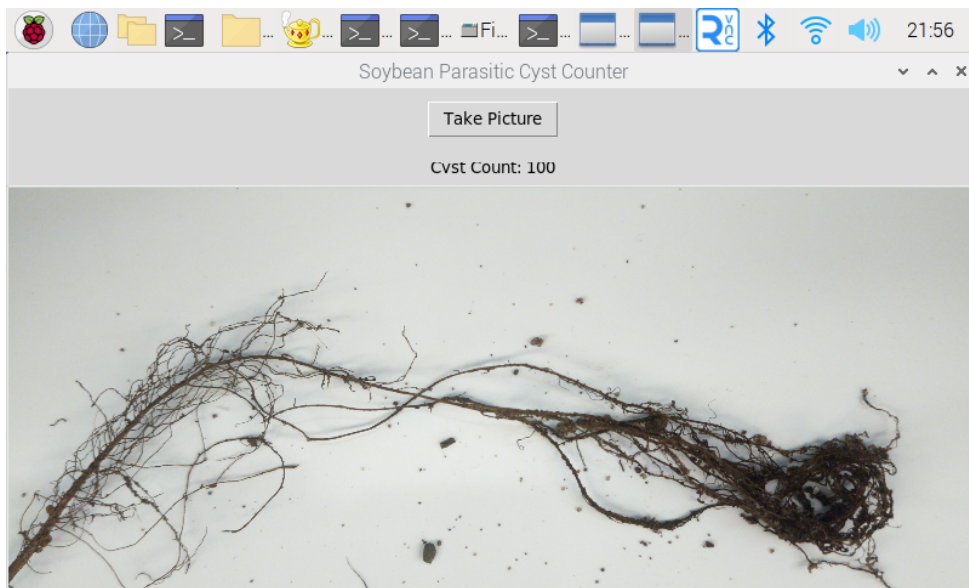
- 3d modeled and printed custom camera and Raspberry Pi mounted component



- Created prototype of hardware device



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- Created GUI that is compatible with Bullseye 64-bit OS



Training Faster-RCNN Model

- Fixed all errors with importing data to Google Colab

- Tested correct configuration values for a practical dataset
 - Overfitting occurs around 35k-40k iterations.
 - Optimal training appears to occur in the 15k-20k iterations.
 - Undertraining occurs before 5k iterations.
- Google Colab Pro used to conduct analysis while the new local machine was used to conduct faster training sessions.
- Additionally, the training sessions will be held on a lab computer to enable 24hr training sessions. The new lab computer was recently received.
- Tuning hyperparameters to determine which values result in highest accuracy.

Individual Contributions

Member	Tasks Completed	Hours This Week	Total Hours
Katherine Moretina	<ul style="list-style-type: none"> • 3d modeled camera mount • Printed 3d model • Created prototype of image capturing environment • Recreated GUI for new OS 	28	71
Matthew Kim	<ul style="list-style-type: none"> • Integrating our trained model (pth) file and yaml file on the raspberry pi. Tried to follow the detectron2 documentation to run a single image process, but ran into the segmentation fault. However, managed to figure it out with the help of teammates. (Version problem) 	15	52
Chris Cannon	<ul style="list-style-type: none"> • Trained and evaluated the model several times • Researched hyperparameters and the effect on training • Debugged Raspberry Pi predictor program • Analyzed output of training sessions 	20	58
Ethan Baranowski	<ul style="list-style-type: none"> • Optimized Training Configuration file to improve results. Ran several training sessions to identify points of underfitting and overfitting of the model. • Conducted analysis of training sessions to determine validity of 	15	71

	results and further optimize the training.		
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Plans for Coming Week

- Complete Documentation