
EE/CprE/SE 491 - sddec23-10

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

Week 6-8 Report

10/11/2023 – 10/24/2023

Client: Professor. Santosh Pandey

Group number: 10

Team Members:

Katherine Moretina

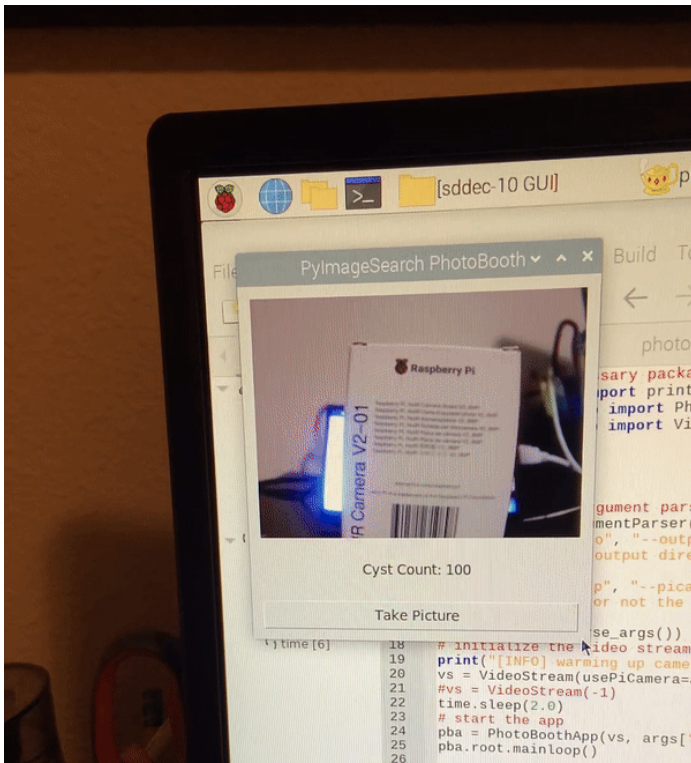
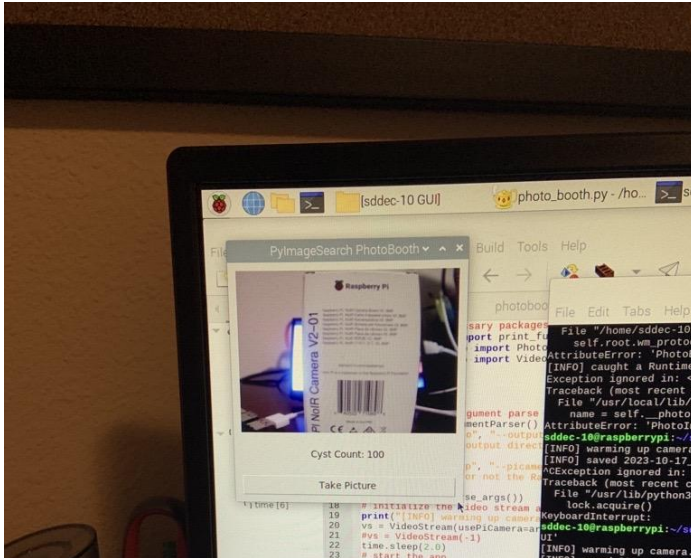
Ethan Baranowski

Chris Cannon

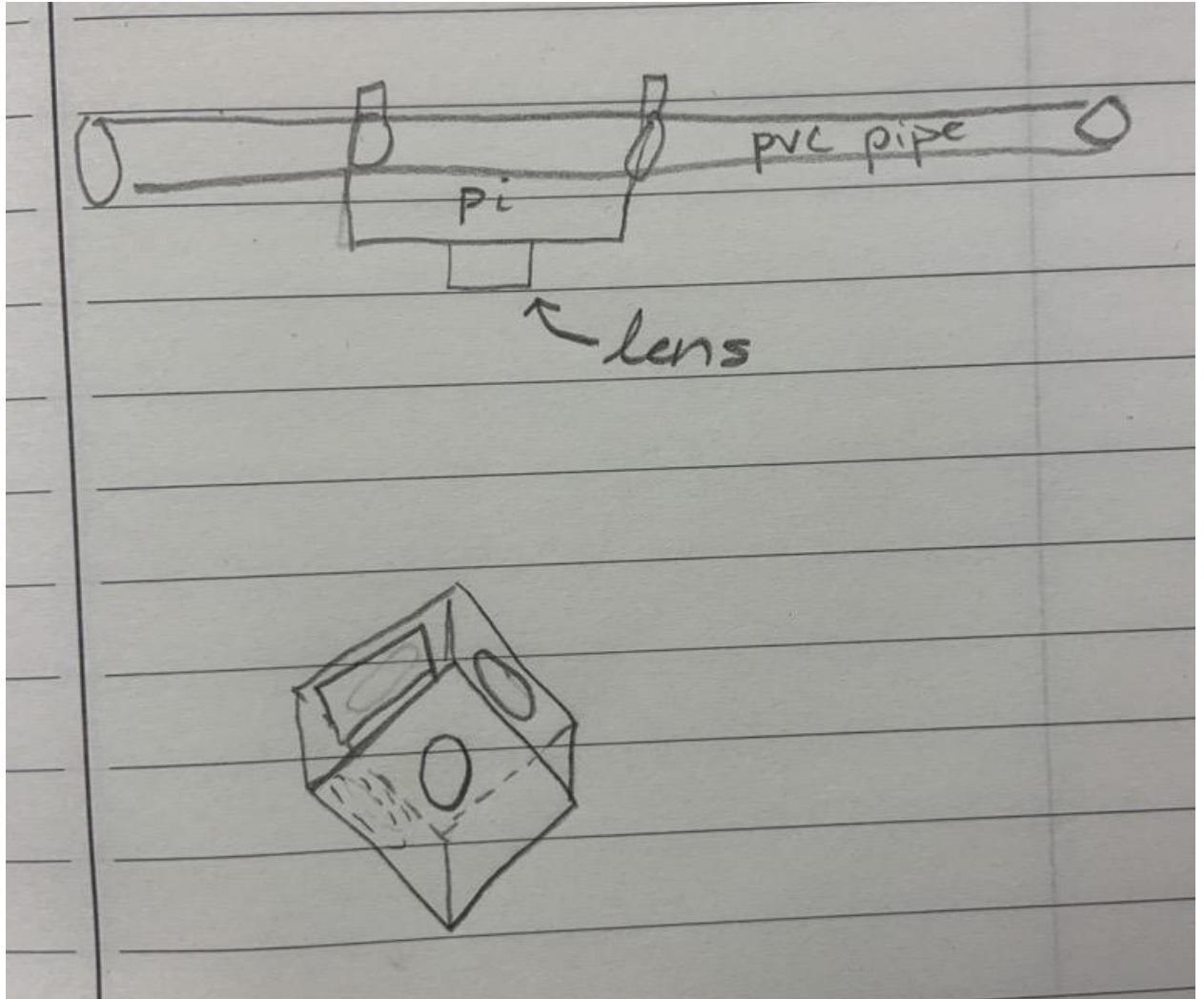
Matthew Kim

Hardware and GUI

- First iteration of GUI with a live video feed is completed
- Fixed file directory and name of saved file so machine learning model can easily access pictures



- Created first design of custom 3d printed parts- bed for the Raspberry Pi, Camera, and Monitor



Colab to Raspberry pi

- Tried to create a new environment to test tutorial's trained model with the raw images.
- Researched on ways of methods to deploy models to the raspberry pi.
 - <https://github.com/overclock98/Detectron2-on-Raspberry-Pi/blob/main/README.md>
- Extracting pth file and yaml file.
- Research on Tensolite.

Training Faster-RCNN Model

- Fixed all errors with importing data to Google Colab

- Researched and implemented correct configuration values for a practical dataset
 - 1000-10000 iterations (refers to how well the model is fitted to the dataset)
- Achieved a baseline trained model of 300 and 1000 iterations.
- Google Colab struggles due to runtime and usage limits prevent achievement of the 10K iteration model desired. Thus, both increasing Google Colab Access and using a local runtime will be used to address the issues.
- Additionally, the training sessions will be held on a lab computer to enable 24hr training sessions.

Individual Contributions

Member	Tasks Completed	Hours This Week	Total Hours
Katherine Moretina	<ul style="list-style-type: none"> ● Completed a working GUI with a working live video feed ● Ensured GUI had the correct file structure to be integrated with the machine learning model ● Fixed any directory issues with the current GUI ● Designed a first iteration of custom 3d printed parts 	8	34
Matthew Kim	<ul style="list-style-type: none"> ● Discussed with our graduate advisor, about the issue of converting our trained model into another format. ● Researched on installing detectron2 onto the raspberry pi. ● Tested and ran into different errors trying to run trained model on different environments ● Figured out the ways to extract pth file from the colab. ● Somehow figured out the ways to get yaml file. 	7	25
Chris Cannon	<ul style="list-style-type: none"> ● Researched implementation of trained models in custom applications ● Collaborated with Ethan to get a model trained from our custom data ● Read through Detectron2 documentation to prepare for integration tasks. 	8	28
Ethan Baranowski	<ul style="list-style-type: none"> ● Fully implemented training algorithm 	15	41

	<p>to take in the dataset (broken into training and validation) and fit a model to it.</p> <ul style="list-style-type: none">• Then, the model is applied to the validation set to verify the accuracy of the model.• This means that to optimize the model, we need only to increase the number of iterations for a better fit and the results are easily observable.		
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Plans for Coming Week

- Download SolidWorks or start 3d modeling on SolidWorks on Iowa State Computers
- Download code onto Raspberry Pi to explore more capabilities
- Finish script to transform LabelMe data into the correct format for Detectron
- Import Detectron 2 to the Raspberry Pi
- Gain access to Google Colab Pro and optimize the training of the model.
- Integrate the baseline model into the Raspberry Pi.