EE/CprE/SE 491 - sddec23-10

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

Week 7 Report

03/13/2023 – 04/02/2023
Client: Professor. Santosh Pandey
Group number: 10

Team Members:

Katherine Moretina
Ethan Baranowski
Chris Cannon
Matthew Kim

- Continued Investigation of several Faster-R-CNN implementations to find a template for own implementation.
- Started discussing hardware designs.
- Continued labeling of plant root database
- Consulted with several machine learning experts on best way to implement Faster R-CNN algorithm.

Finding an Implementation- Everyone

- Katie
    - Tried to find one implementation of faster R-CNN that work in my environment
    - Found a way to work around cl.exe error and have it in personal notes
        - An error that has come up with multiple different algorithms
    - Currently trying to find how to change the import directory for a .pyx file
        - Currently have an error that directory doesn't exist
        - Correct syntax for .py file but might need to change for .pyx file
        - Once that is figured out, I think I might have a working algorithm
    - Link to Faster R-CNN Github
        - https://github.com/longcw/faster_rcnn_pytorch/blob/master/faster_rcnn/faster_rcnn.py
- Matthew

- https://github.com/herbwood/pytorch_faster_r_cnn
- https://herbwood.tistory.com/11
- Tried to follow step-by-step implementation of faster R-CNN.
  - This model uses pytorch
  - Explains step by step how faster R-CNN process
- Currently in the problem of implementing because of the errors.
- Also trying to find more implementation examples.

Labeling - Everyone

-Using new tool (Labelme)

For the last week, our group tried to start labeling using a labeling program called, “Labelme”

Each member has done labeling 5 different images.

-Making Labeling standards

Labeling software: Labelme

Standards:

Annotation Style: Label using squares, for ease of labeling and standardization

Obstructions: Label what is visible, do not predict the area of the cyst that is not visible.

Background: Label them even if they're not in focus.

Label name: “Cyst”

Individual Contributions

Member	Tasks Completed	Hours This Week	Total Hours

Katherine Moretina	Went to all required meetings. Compared different faster R-CNN implementations. Debugged faster R-CNN implentation	10	32
Matthew Kim	Attended regular meetings to check a phase, Also worked on the plan and design presentation. Did the insight talk with the group members in the class. Started Labeling and further research on faster R-CNN. Also tried to get hardware design.	4	23
Chris Cannon	Attended all meetings. Attempted to set up R-CNN implementation. Decided to look into Detectron2. Installed Labelme, started labelling images. Researched labelling formats & standards. Discussed hardware designs. Followed the tutorial for and successfully implemented Detectron2's Mask-RCNN algorithm. Took notes on the process.	6	20
Ethan	Continued task development and deployment for iterative progress on algorithm development. Helped draft Design documentation and presentation. Consulted with Prof. Forrest Bao about best way to implement Faster R-CNN continued labeling images in dataset.	6	39

Plans for Coming Week

- Investigate R-CNN implementations and create a baseline algorithm for us to modify for our purposes.
- Continue labeling data with Labelme software for training set. (149 images total).
    - Develop standards of labelling - file naming, polygon shapes, general guidelines
- Have Yunsoo Park walk us through coding on the lab computer.
- Setup Jupyter Notebooks server for student collaboration.
- Investigate SIFT machine learning algorithm for possible simplified object detector that will help simplify algorithm training and implementation.
- Start systems-level design of hardware.
- Discuss Faster R-CNN implementations and choose which implementation to use as template.