Week 3 Report

Wen Han Chia
(Lizard Classification)

Time-Log

Additionally, the time-log should include any work you've done for your *role* work (e.g., meeting management, web management, programs management, etc.)

What did you do this week?

- Meeting Manager Role
    - Sent transcript and video recording of bi-weekly meeting with Computation Advisor to Slack channel and Planner app
- Drafted and resubmitted the Methods document
- Attended Bi-weekly meeting with Computational Advisor, Ilia Jahanshahi, and Breanna
    - Discussed the direction of the project
    - Agreed upon a set of deliverables by next meeting
- Setup project's python environment and consolidated a .yml file for future uses
- Downloaded a subset of the data on personal laptop for quick analysis

What are you going to do next week

- Organize and pose a list of questions to Dr Stroud to better understand Lizard's distinct features
- Annotate dataset with bounding boxes via Roboflow or manual annotation

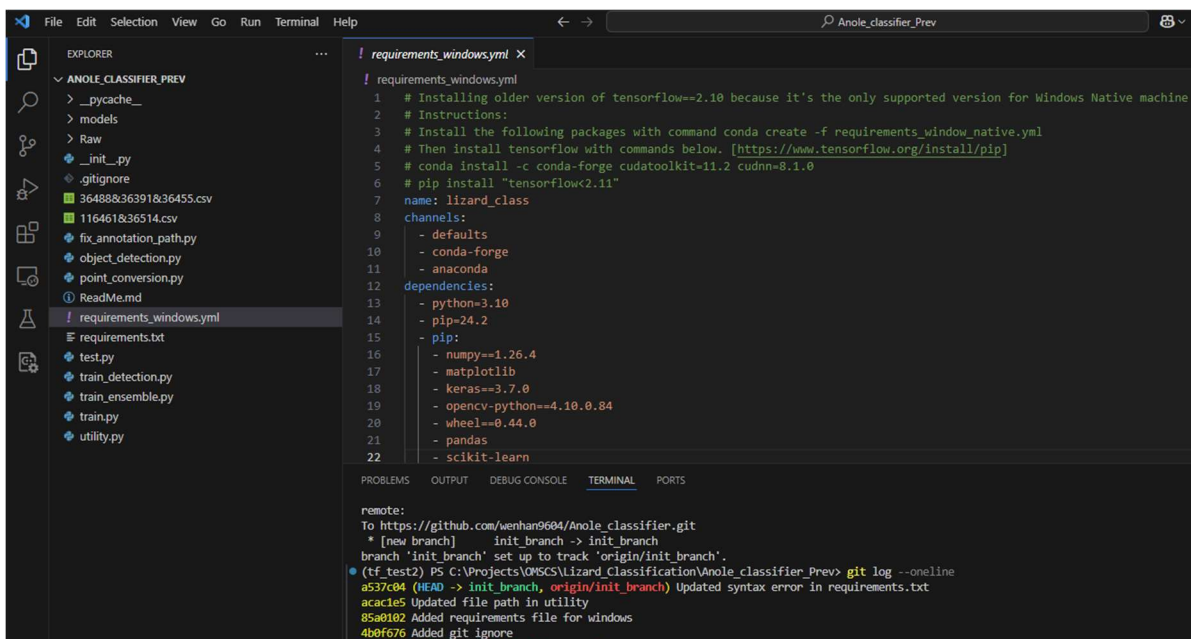## Blockers, things you want to flag, problems, etc.

- Approval for PACE access

Abstracts:

Wu, Yue, et al. 'Rethinking Classification and Localization for Object Detection'. *2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, IEEE, 2020, pp. 10183–92. *DOI.org (Crossref)*, https://doi.org/10.1109/CVPR42600.2020.01020.

Two head structures (i.e. fully connected head and convolution head) have been widely used in R-CNN based detectors for classification and localization tasks. However, there is a lack of understanding of how does these two head structures work for these two tasks. To address this issue, we perform a thorough analysis and find an interesting fact that the two head structures have opposite preferences towards the two tasks. Specifically, the fully connected head (fc-head) is more suitable for the classification task, while the convolution head (conv-head) is more suitable for the localization task. Furthermore, we examine the output feature maps of both heads and find that fc-head has more spatial sensitivity than conv-head. Thus, fc-head has more capability to distinguish a complete object from part of an object, but is not robust to regress the whole object. Based upon these findings, we propose a Double-Head method, which has a fully connected head focusing on classification and a convolution head for bounding box regression. Without bells and whistles, our method gains +3.5 and +2.8 AP on MS COCO dataset from Feature Pyramid Network (FPN) baselines with ResNet-50 and ResNet-101 backbones, respectively.

What did you do and prove it

1. Created a different requirements.yml file to setup python environment that consists of tensorflow package in a Windows Native device.
   - The reason for doing so, despite already having a requirements.txt file from the previous contributor, was because the existing requirements.txt file could not support the installation of tensorflow on a Windows Native device
   - The newly created .yml file also included steps to install tensorflow on Windows Native devices before installing the rest of the required package
   - Link to Github - https://github.com/wenhan9604/Anole_classifier.git
   - The screenshot below shows the .yml file as well as the git commit history

2. Downloaded >50% of the data for quick analysis
   a. I have downloaded close to ~100k of the ~170k images
   b. Reason for downloading dataset is for quick visual analysis and understanding of the dataset
   c. Screenshot below shows a screenshot of the downloaded images