

## Goals for Week 1/22-1/29

This week I need to

- 1) Re-train our binary and multiclass classification models in two ways, then compare their results:
  - a. Only use the new 8000+ annotated data from Ecuador
  - b. Combine current data from Brazil with the new data from Ecuador
- 2) Decide which class/order/species needed extra image data to prioritize the video annotations
- 3) Explore AWS Deep Learning AMI resources and selections

These goals are all part of completing story 2.1.1 (Theme is Image Classification and Object Detection; story is Image Classification). I will work on (1) and (3) independently (JY will re-train the object detection model), but will work together with JY on (2).

Goal (1) and (2) are important steps for us to decide whether we need to create separate models for different locations or just make a general model for all locations. Goal (3) is crucial for developing and training our deep learning applications faster as more and more data being added to the training set. Since AWS AMI provides different GPU instance options and charges an hourly rate for the compute time used to train our deep learning models, I need to do some research on choosing the right instance type for our application.

The week is ambitious, and I expect it to take about 8-10 hours on working independently and 2 hours for meetings (1 hour for client meeting and 1 hour for internal meeting).

My plan is to finish (1) by Sunday (if JY could finish cleaning the new data before Saturday), (2) by next Monday after we meet internally and spend the rest of the week exploring the AWS AMI services.

## Report for Week 1/22-1/29

For Goal (1) and Goal (2), I was not able to complete them this week because the new data was not ready to be used for training the model as scheduled. We found there exists inconsistency in labeling the images, therefore, we had one internal meeting to discuss what are the problems with the current raw data:

- 1) Problem 1: When we evaluated the performance of our classification models, we found that some images in the training data set were labeled incorrectly, e.g., we can hardly see any animal in an image labeled as “Blur Leopards”, which means it should have been labeled as “Ghost” during the data cleaning process.
- 2) Problem 2: The rule for classifying the “Blur” images is not consistent for the old data from Brazil and the new 8000+ samples from Ecuador.

Then we had another urgent meeting with Ryan to decide how to solve the problems. We came into the final decision that for data from all locations, there will be three categories: Animal (animal species in the images can be easily identified by human), Unknown (human cannot tell which species the animals in the images belong to), and Ghost. Only the images labeled with “Animal” and “Unknown” will be generated with bounding box annotations. Ryan and the volunteers will review the old images’ labels and try to keep the labeling decision rule for new and old data as consistent as possible. We believe this step is very crucial for improving the performance of the models although is relatively time-consuming.

For Goal (3), after doing a lot of research and consulting with an expert in industry, I suggest we choose the “on-demand” way to pay for Amazon EC2 instances – we pay for compute capacity by the hour depending on which instances we run and there are no long-term commitments or upfront payments needed. In terms of the instances, I recommend choosing one of the Amazon EC2 P3 instances - p3.2xlarge which delivers high performance compute in the cloud with 1 NVIDIA® V100 Tensor Core GPU and up to 10 Gbps of networking throughput for deep learning applications. Regarding the free student credits, AWS says *“If the student is a member of an organization that has joined AWS Educate, they are eligible for a grant of \$100 in AWS credits.”*, so I need to confirm: first, whether MIDS has joined AWS Educate; second, whether the \$100 credits can be used for the Amazon EC2 instances.