**Team Charter**

**Purpose and goal**

In this project, we will utilize deep learning techniques in detecting and sorting different sets of animal species by using hundreds of camera trap images and videos provided by Saving Nature. We will assess the viability of several architectures including simple convolutional network (CNN), residual neural network (RNN), and transfer learning with SNIPER, Retinanet, Trident, Faster-RCNN, Mask-RCNN, etc. Besides, since the current dataset is not sufficient, we will apply different types of data augmentation to increase the size of the training set without acquiring new images.

**Time commitment**

The expectation for our time commitment is 8-10 hours per week on research, analysis, writing, product production and final presentation. There will be additional time (1-2 hours per week) for communicating with peers, advisors, and our clients.

**Team culture**

* Promote an open and inclusive working environment:
  + Make everyone part of the whole process and incorporate new ideas
  + Practice active listening to enhance productivity and improve team communication
  + Fully understand the goals of our team members
* Communicate team goals and roles clearly:
  + Set realistic, reasonable tasks and deadlines
  + Clearly explain priorities for different objectives or responsibilities and make sure our team can align with it
  + Have regular conversations to ensure everyone is on the same page
* Possess flexible and adaptable leadership styles:
  + Use appropriate leadership styles in response to uncertain or unpredictable circumstances
  + Revise our plans to incorporate new innovations and overcome challenges while still achieving our goals
  + Assess the current progress of our new behaviors, and re-evaluate or further modify behaviors that are unsuccessful

**Deliverables**  
The performance and progress for the project will be measured and tracked by how timely and completely we fulfill our weekly meeting goals. If and when we are unable to meet our weekly meeting goals for 3 weeks in a row, we would first meet with the team to identify root cause and readjust our approach and plans.

**Desired and result**

* Reachable Goals:  
  The students will determine if a machine learning algorithm or another image classification technique can sort and classify camera trap images as accurately as a human. At the very least, hopefully the students should be able to accurately sort the most common species.
* Tangible Product:  
  Both a machine learning image classification algorithm that accurately identifies species (or lack thereof) from images and their metadata in a specified region as well as a method to execute said algorithm on the data.
* Stretch Goals:  
  A software or web-based platform that allows users to upload the raw camera trap data and have the algorithm automatically sort images and flag others for human-review.

**Team members and roles**  
The team members of the team include Yingyu Fu, Melody Li, Jiayue Xu. All three of us are going to share the workload of both the technical and communication aspects of the projects. Each of us will be responsible for different algorithms, different aspects of the modeling process, as well as rotating to take lead on the progress update to our clients.

**Supporting resources**

Below are some of the resources that are available to us, and we believe when necessary in time, we will reach out to them for additional help.

* MIDS Faculty:

We will utilize these resources when we encounter technical issues and/or teamwork dynamics.

* MIDS peers:  
  This resource will be utilized anytime for any kind of question we are comfortable of asking to our peers.
* Saving Nature clients:   
  This resource will be utilized when we want to gain more knowledge on the project, managing expectations, and analyzing the results.
* Project manager Joao Morais Carreira Pereira:   
  This resource will be utilized for setting up project goals, making progress, manage expectations, and having effective communications between clients and us.
* Duke student counseling (help on time management, distress, etc):

This resource can be utilized when members of our team face emotional downtimes, or time management becomes an issue for the team.

**Reporting plan and meeting expectations**

For the weekly meeting with clients and managers, our team plans to have an agenda with a list of goals to accomplish during the meeting. Meeting goals will be specific each week regarding the work we have done. A tentative agenda for our weekly meeting might be the following:

* Results of the current progress
* Simply summarize the approaches we have tried and the reasoning behind
* Questions and concerns
* Specific plans for the upcoming 1-2 weeks when necessary, especially on technical sides, our team will use visual aids such as creating PowerPoint slides and construct demo to present to the clients for better understanding

**Links**

The most direct benefit upon completion of the project will help members of the Saving nature organization quickly gain access to the numbers and different types of animals that are been captured by the camera trap across different forest locations. Able to obtain data in this efficient manner would help Saving Nature further examine the effectiveness of restoring lands between forests on rescuing species. Automating the process of animal detection would greatly reduce the need for human labor. Our team believes that restoring lands back for natural habitats, rescuing endangered species, and saving communities from environmental destruction are all very important and necessary to do and be put into a high priority for our planet. Been a part of it gives us a chance to make commitments to this global issue.

*Signed on 8/25/2020:*

*Signature: Melody Li*

*Signature: Jiayue Xu*

*Signature: Yingyu Fu*