

Grace Cheung

CPSC 490 Final Project Abstract

Title: Application for Manual Annotation of Camera Trap Images

Advisor: Professor Aaron Dollar

Ecological research, especially conservation research, depends heavily on image data gathered from “camera traps,” stationary cameras that collect sensor-activated image data of organisms for the purposes of calculating biodiversity, population etc. To this day, much of the work of processing this data is done manually and by hand by field researchers, with the data journeying from camera trap to handwritten field notebook to manually entered Excel spreadsheet. This is very inefficient, tedious, and prone to error. Current partial solutions being offered now focus on using AI or a volunteer workforce to annotate these images, but each presents various problems for the specific usability, flexibility, and data access needs of ecological researchers. Elizabeth Brooks and I worked in Professor Aaron Dollar’s lab this semester to create an application that addressed these needs and provided an adaptable and scalable framework for more researcher-friendly features, a solution that could save thousands of hours and errors, as well as provide researchers with easily manipulable and shareable data. My responsibility was primarily the backend. I planned, created, structured, and managed the non-relational, No-SQL MongoDB database, as well as optimized for latency of API calls and scalability of the data models. The current available workflow is user creation and authentication, project creation, image upload, admin researcher requests annotations, and field researchers can answer annotations. The major challenges of this project were fitting intuitively relational data into a non-relational framework. Future developments would include variations of integrating machine learning and AI to

preprocess the images, hardware integration into the camera traps including the use of computer vision, and various UI improvements.