Tracking Wildlife Counts Using the Internet Of Things: Project Plan

Supervisor: Dr Kevin Bryson

Matthew Bell

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Interim Report

Current Progress

- Designed architecture for project. The solution will consist of two 6LoWPAN "clicker" devices connected to a central base station. The base station will use a C program to control the connections to the clicker devices (receiving IR activation signal and camera information), and will execute a Python program that will take the image and classify the content of the image.
- Set up project toolchain. This took far longer than expected, because of the intricacies of the devices being used in the project. The base station has had a lot of trouble connecting to the Internet so development has been slow in that regard, and until very recently I had trouble programming the clicker devices. However, these issues have been fixed, and despite being a little behind on progress, I can now proceed to program these devices.
- Learning about convoluted neural networks and computer vision. The above roadblocks led me to start working on the image classification part of the project earlier than planned, and quickly decided upon using the Tensorflow library as the main way of classifying images from the camera. In the short term, I'm using Google's Inception model, which boasts a high accuracy rating on a generic image classification task (ImageNet). By the end of the project, if I have time, I'd still like to create my own classifier that is bespoke for this project, and trained on similar test data.
- Identified similar projects and how they approached their problems. During my research, I found the Snapshot Serengeti project and how they were using human volunteers to help classify their images and to train their own model for classifying images. This wasn't especially helpful on its own, however it did mean that I discovered a high quality training set of over three thousand labelled images, which classified 40 different types of animal, which I can use to train my own model.

Outstanding Tasks

- Program the camera and Infrared sensor boards. This should take less time now that I've passed one of the main roadblocks (setting up the tooling), however completing this is the highest priority. There might be some further issues with developing the camera shutter program, since prior work by other students has proven unsuccessful, so this is where I'll be dedicating a large amount of my time.

- Programming the base station's programs. I need to write three programs – a program to receive 6LoWPAN signals, a program to run the classifier, and a program to transmit the results of the data over a Lorawan connection. The classifier program is relatively low priority since I already have a boilerplate version running, but the 6LoWPAN controller is very important.
- Creating a simple web app for receiving and processing results. This is very low priority and will probably take the least amount of time to build. This will be completed as one of the final tasks of the project.