

ILR 08

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Project : Autonomous System for Aerial Search and Rescue

Individual Progress

This review cycle was spent on building the backend pipeline for processing data from the sensors. Currently, all signature detection algorithms are run from matlab using the IDE. While this is helpful during development, this might be clumsy for the final version. In the final version of the product, there are multiple components that need to be integrated in order for the system to work. To this end, there needs to be a processing backend that implements some of the functionality mentioned in the subsequent paragraph.

For correlating data from various sensors and for pinpointing location of signatures, the autonomous flight system will be generating GPS coordinates for tracking the position of the drone at all times. This data needs to be logged somewhere so that it can be correlated with time and used for juxtaposing different signatures. The backend needs to support an API to log the GPS coordinates along with the time of the reading.

Once the signatures are collected, the backend needs to provide APIs to load the signature data and run the algorithms. Once results are available, the backend will have to fuse results from various types of signatures, integrate it with the GPS coordinates collected during flight and generate the most likely location for the rescue mission,

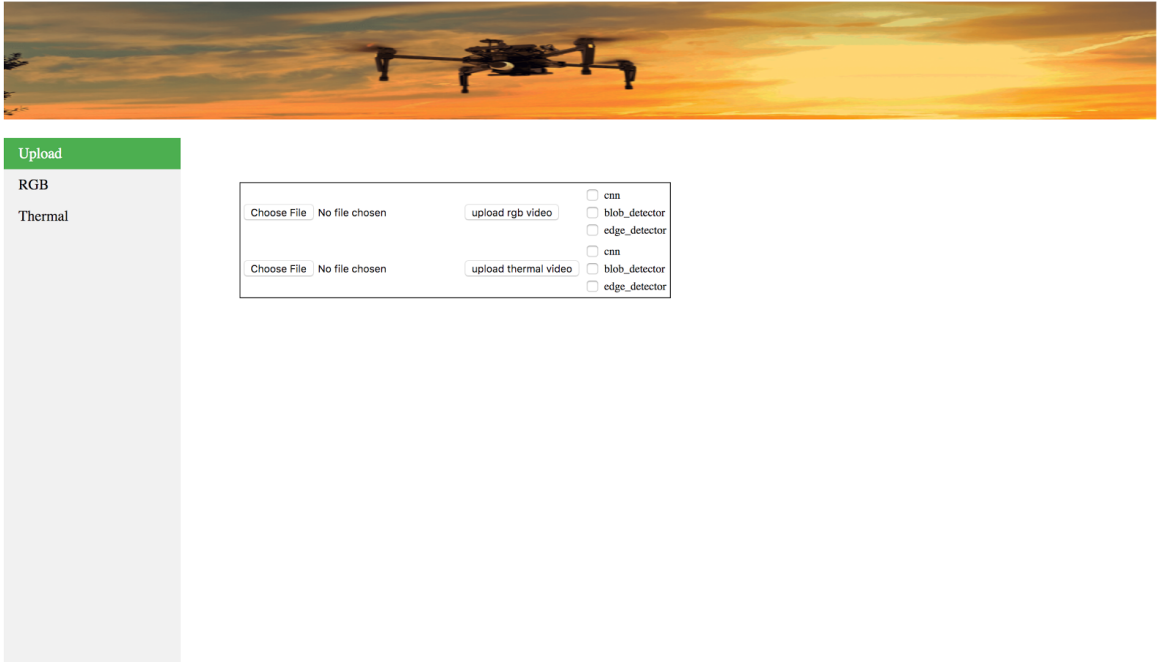


Figure 1. Upload page for backend

The backend was implemented as a Django server in python with a javascript frontend. Some prototype algorithms were implemented in python to validate and test the end to end system. The final version will have all the algorithms implemented in python. Below are some of the screen shots from the backend system. The three screenshots shown in Figures 1, 2 and 3 are for the main upload page, the RGB results page and the thermal results page. The goal for

the next ILR is to build additional functionality for sound data as well as the flight navigation system and rescue package system.

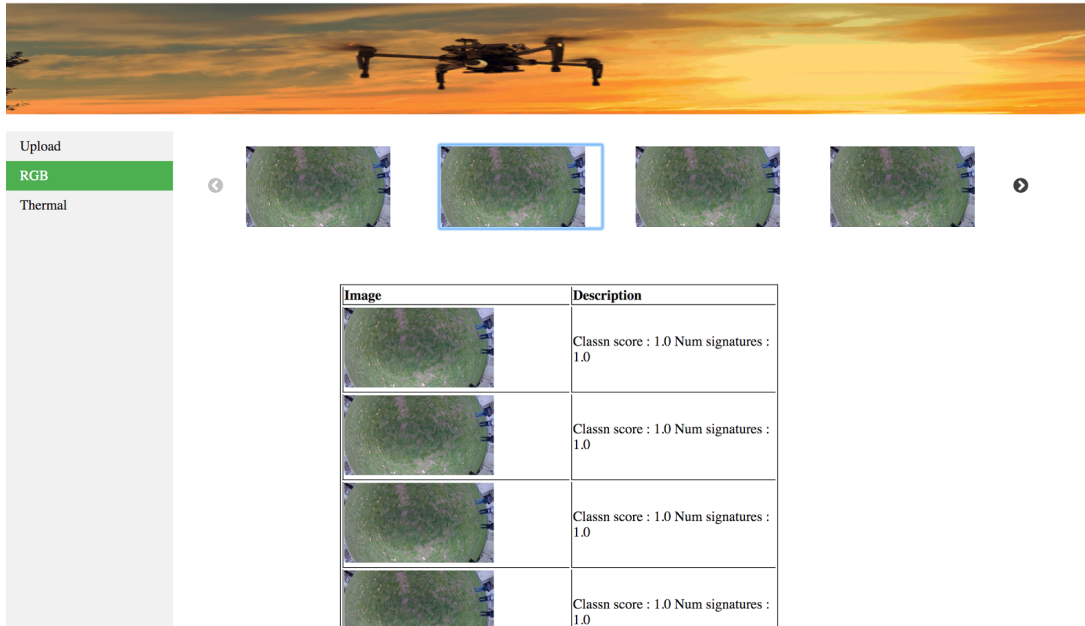


Figure 2. RGB detection page

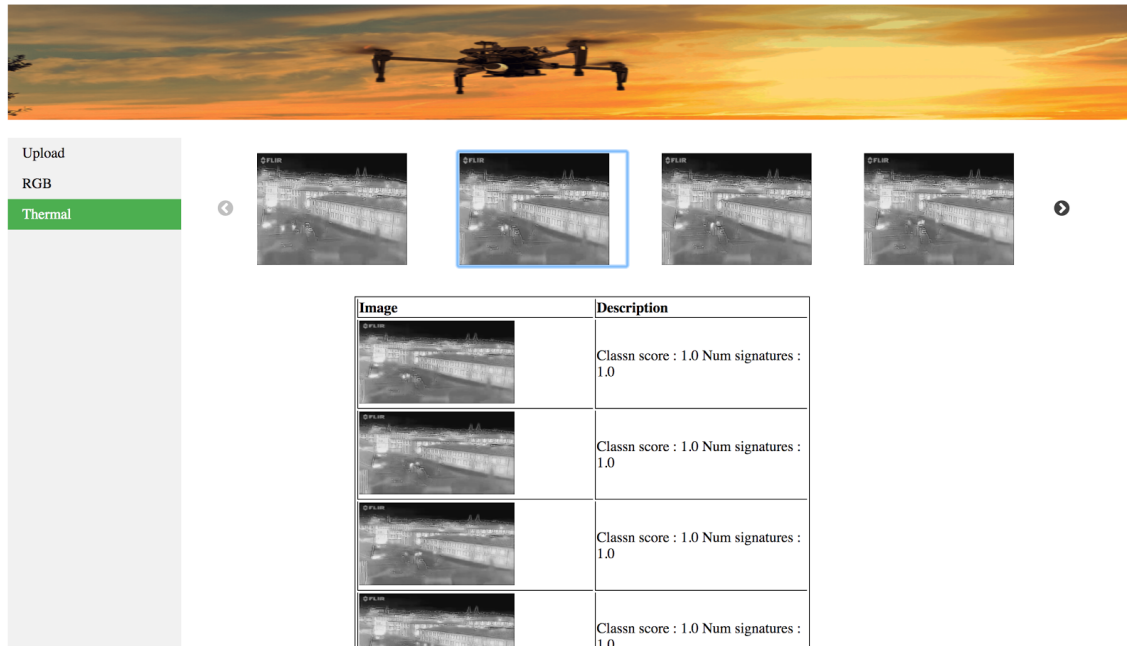


Figure 3. Thermal detection page

Team Progress

The team worked on various other pending tasks. Xiaoyang worked on devising a strategy to combine the RGB and thermal detection algorithms. Juncheng worked on exploring tracking as means to improve signature detection using two different tracking techniques, namely: Kalman Filters and Lucas Kanade algorithms. Sumit worked on a module to pinpoint the location of a signature from a given image which will be essential in dropping the rescue package accurately.

Challenges

There were no major challenges this week apart from the fact that, we received the Flir camera for thermal and rgb but the mount was missing and we had order the mount separately and it delayed our flight by a few days.

Goals for next ILR

The goal for the next ILR is to have a video demo of the entire system working as a whole. Though the accuracy constraints might not be met, the goal is to test the integration of all components.