

Project Title: Eye in the Sky

Company: Pow Wow Energy

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Team name: String Cheese;

Team members:

- Andrew Hascall – Scribe
- Alexander Huitric – Lead
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What the project is about

We aim to develop a system to help farmers take better care of their crops and help better manage their water supply. Water has become a big deal in California due to draughts. Our project will provide farmers with the tools needed to find water leaks, and to detect stress levels of crops to prevent them from dying - all in a manner much more efficient than can be done today.

Outcome of the project

Our end goal is to have a UAV programmed with the ability to detect anomalies in a given crop field in order to better detect problems such as water leaks. By catching this early, the farmer can save large amounts of water that otherwise would have gone to waste.

In addition, the same concept can be applied to finding crops that are under heavy strain. Finding these problems can give the farmer the upper hand in attempting to save the crops from dying.

Initial project milestones:

Milestone 1: Generalized Image Anomaly Detection (5Wks)

- This milestone encompasses having a generalized machine learning algorithm that can identify the pattern of the plant type of a contiguous field and detect any anomalies in the pattern.

Milestone 2a: UAV Flightplan & Data collection system (10Wks)

- This milestone encompasses creating a system to automatically upload flight plan data to the UAV, as well as to automatically download and combine the photographs it has taken based on GPS images which will be given to the image recognition system from Milestone

Milestone 2b: Specific Plant Detection Profiles (10Wks)

- This milestone encompasses collecting specific data as to how a specific species of plant will appear within the graphics, to provide specific feedback for a user growing that specific plant type. The image recognition system in Milestone 1 will analyze anomalies within the context of this data.

Milestone 3: Web interface & Database back end (15Wks)

- This milestone encompasses a creating a secure web-interface for a user to log into, and set flight plan data as well as retrieve personal data and alerts. This interface will also allow them to designate an area on a map that needs to be fully covered by the UAV.

How we plan to design and articulate a solution:

Data collection

- UAV with an API to automate flight
 - Unknown, most likely 3drobotics.com source modifications
- Camera with infrared sensor
 - Specific wavelengths will be decided after research on detecting plant stress with spectral imaging
- GPS for geolocation

Image processing

- Detect anomalies in water stress from infrared sensors
 - C++ with the open source computer vision library OpenCV

Data presentation

- Web interface
 - RubyonRails or Node.js for backend
 - MongoDB or MySQL for database