

Capstone 2015: Vision Statement

Team Name: Savvy-gnon

Project Name: VinePilot

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I) Background

As they have for thousands of years, vineyards analyze their crops' irrigation, ripeness, and disease by hiring people to walk the rows every day. VineRangers is committed to simplifying this process by using drones that capture near-infrared images of the canopy level as well as the ground level of the vineyard. These images can then be manually analyzed to make a report on the condition of the crops. This way, any problems can be caught quickly and fixed; for example, instead of spraying pesticides that kill honey-bees along the entire vineyard (as is done now), the spray can be localized.

The drones are used as a tool to collect data and simplify the process of managing the grapes, but there is currently no simple way for the farmers to access the images and data. The images must be manually analyzed and then a report on this data is drawn up.

II) Problem

This process does not allow for an internal feedback loop; the farmers want an accessible way to quantify the efforts made on each vineyard and tie them back to a particular action. As such, the farmers are interested in interacting with the data and being able to log their own actions. By scrolling through the images collected, they can view how these specific actions have had an effect on their crops over time.

The emergence of this technology for farmers is important due to the increasing world population coupled with the loss of farmland to urban development. By 2050, there will be approximately two billion more people in the world but, by 2030, farmland per capita will likely decrease by about 50%. This technology allows the loss of fewer crops by identifying problems quickly and containing them. An increase in crop retention will result in more crops during each harvest period, thus effectively feeding more people. The ability to monitor efforts and view the data in an application is meant to speed up this process and allow each farmer the ability to manipulate the data specific to their farm.

III) Solution

VinePilot is an application that will allow all of the data to be accessible to the farmer, giving them the ability to store information on particular blocks of their vineyards to facilitate the process of screening for ripeness, monitoring the spread of disease and viewing the amount of irrigation. Additionally, they will be able to add notes to any given block in order to further personalize the application and show them the effect of their proactive actions.

1. Implementation

Implementation of either an iOS application or a web application. Perform image analyzing on the server side. The server will be hosted here at UCSB.

- *iOS*: The IDE will be XCode, using either Obj-C or Swift as the frontend programming language.
- *Web*: Javascript as the front end language of choice. The IDE of choice will be WebStorm by JetBrains.
- *BackEnd*: This is common between both possible application implementations (which will be definitely chosen in the next few days). Ruby-on-rails for any backend needed, however this could possibly be replaced by BaaS (Backend as a Service).

2. Process Model

To complete this project, we will be using agile programming techniques including daily scrum meetings and weekly conferences with our company mentors. At the end of each bi-weekly sprint, we will demo the work that has been done in the past sprint and plan the next. In order to ensure that all communication is effective, clear and productive, we will use Google Groups, Google Drive, GitHub, and waffle.io. All additional communication will be conducted either over email or GoToMeeting, especially if it involves mentors, or over HipChat (among team members).

IV) Milestones

1. Create a backend (server) that stores the data safely and is capable of feeding the stitched together images as well as the log history to the frontend.
2. Create a segregated frontend GUI with a placeholder map that has the correct functionality available within the GUI
3. Before tying together the back and front ends of the application, make sure the front end works with a static map and retains the log history, dates, and other relevant information correctly
4. Tie the front and back ends together