Worldwide crops lost to disease: 40%

World food supply: 2X by 2050

Farmland per capita will decrease by more than 50% by 2030
Drones & NDVI: Normalized Difference Vegetation Index

Drone takes visual and infrared images

Convert to NDVI

Now we can see
- Water saturation
- Ripeness
- Vigor
- Disease
SPECIFIC PROBLEMS

What are we solving?
Problem 1:
Lack of Geographical Context

Existing tools not really designed for farming

These tools lack geographical context

Results in unhappy farmer
Problem 2:
Comparing Farm Conditions on Different Dates

No way to compare the farm in the past with the farm today

June 2013

June 2015

Farmer is still sad
Proposed Solution

Map-Based Application  Persistent Data Storage  Interactive Platform
What is VinePilot

Application that allows vineyard owners to monitor their fields remotely using NDVI imagery, notes and user-specific data.
System Overview

WEB

iOS

JavaScript
HTML
CSS

SERVER

Apache/PHP/MySQL

Objective-C

HTTP Request

JSON Response

PHP Scripts listen for HTTP Requests

Result

Query

MySQL

HTTP Request

JSON Response

JavaScript

HTML

CSS
VINEPILOT

Web Demo
**Challenge 1**
Track arbitrary number of points and maintain the structure persistently

**Solution 1**
Flexible database and encode geometry of polygon (list of GPS) to JSON string

**Challenge 2**
Google Maps does not have built-in infoWindows for polygon overlays

**Solution 2**
Manual calculation for center of polygons and custom on-drag event
Custom InfoWindow: Web

- Designed with JavaScript, HTML and Bootstrap
- Once it’s saved, HTTP request will be sent to store all the necessary fields
- InfoWindows are tied to overlays with unique IDs using prototypes
Notification System

Intra-vineyard communication: work order

- Send notification to database when marker is saved
- Loads all unread notification when login
- Callback function that deletes itself when closed

5/31/2015, 2:22:38 PM
From: Chien
Vineyard date: 2015-02-26
Note: "Found a hole in the water system"
iOS Demo

VINEPILOT
Custom InfoWindow: iOS

- Designed with ChildViewController in Objective-C
- Extra feature: add image to marker
- Save will send HTTP request to server or store to cache
Offline Support: Cache

Online

- Data from Server
- Data Stored Locally
- Synchronize Data on Server

Offline

- Additions Stored Locally
- Data Retrieved from Cache
Solution 1: Geographical Context

- NDVI Images overlaid on map

Solution 2: Compare Data Efficiently

- Availability of images from different dates

Extras: Feedback & Communication

- Drop pins, use polygons, add images

Conclusion

\[ \text{Happy Farmers} \] \[ \text{More Crops} \]
Questions-gnon?