




# VinePilot

## VineRangers





Worldwide crops  
lost to disease

**40%**

World food supply

**2X**

by 2050

Farmland per  
capita will decrease  
by more than

**50%**

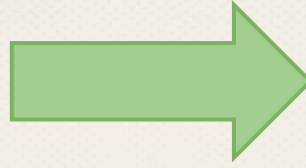
by 2030

# Drones & NDVI:

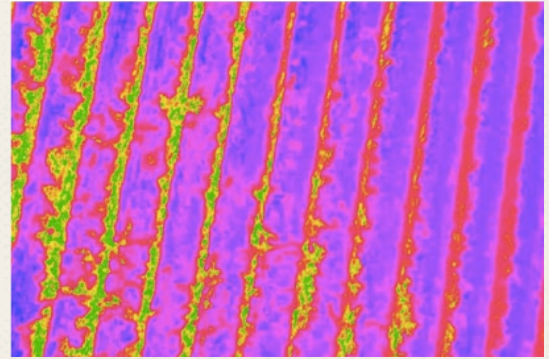
## Normalized Difference Vegetation Index



Drone takes visual and infrared images



Convert to NDVI



Now we can see

- Water saturation
- Ripeness
- Vigor
- Disease



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- **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



June 2013



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



June 2015



Farmer is still sad



## Proposed Solution



Map-Based Application



Persistent Data Storage



Interactive Platform



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- **What is VinePilot**

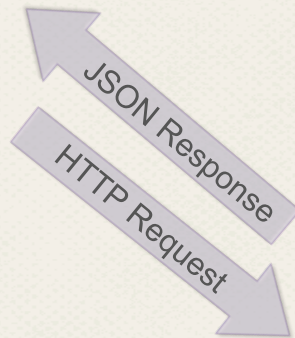
*Application that allows vineyard owners to monitor their fields remotely using NDVI imagery, notes and user-specific data.*



# System Overview



*JavaScript*  
*HTML*  
*CSS*

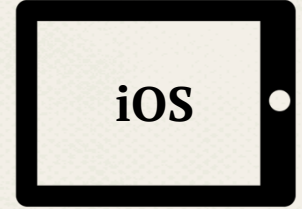


## SERVER

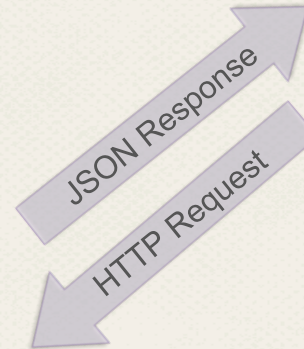
PHP Scripts listen for HTTP Requests



*Apache/PHP/MySQL*



*Objective-C*



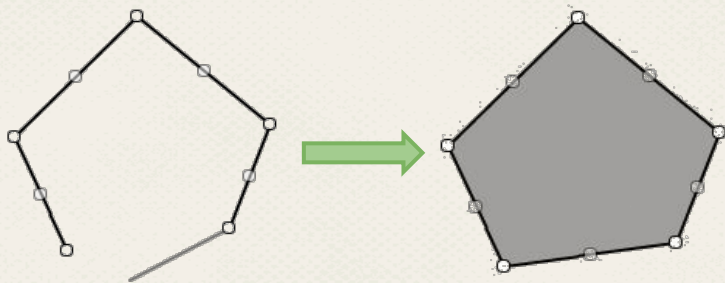


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**Web Demo**



## Polygon Overlay



### ! **Challenge 1**

Track arbitrary number of points and maintain the structure persistently

### ! **Challenge 2**

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

### ✓ **Solution 1**

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

### ✓ **Solution 2**

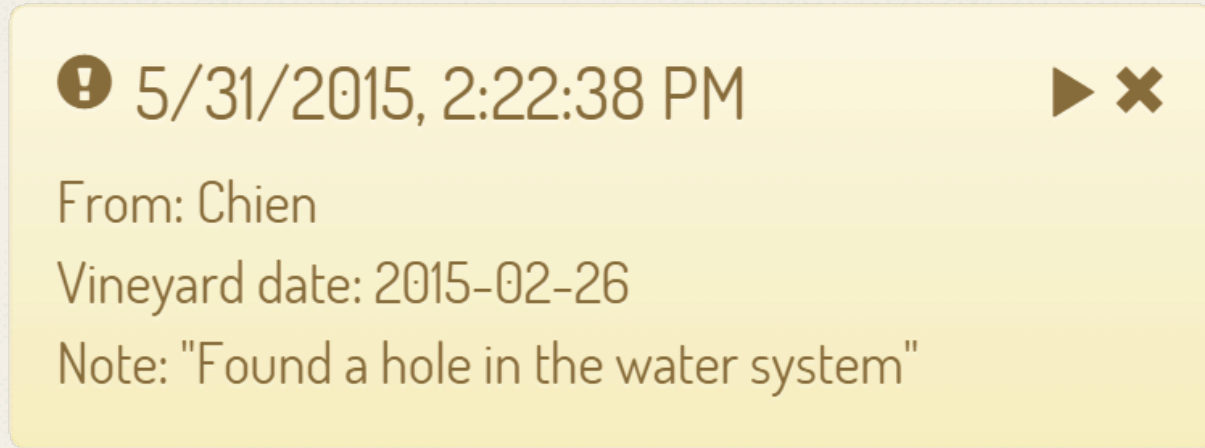
Manual calculation for center of polygons and custom on-drag event

## 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**



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iOS Demo



## Custom InfoWindow: iOS

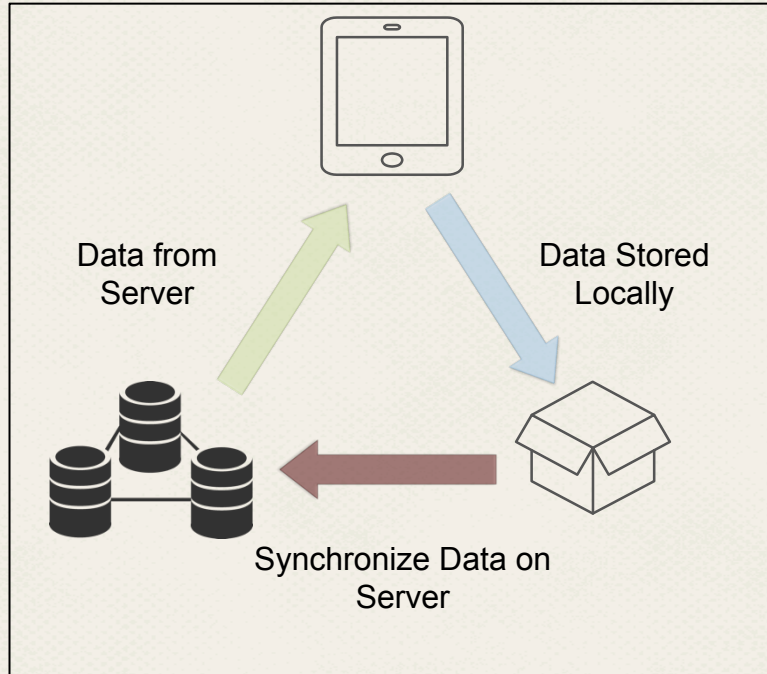


- **Designed with ChildViewController in Objective-C**
- **Extra feature: add image to marker**
- **Save will send HTTP request to server or store to cache**

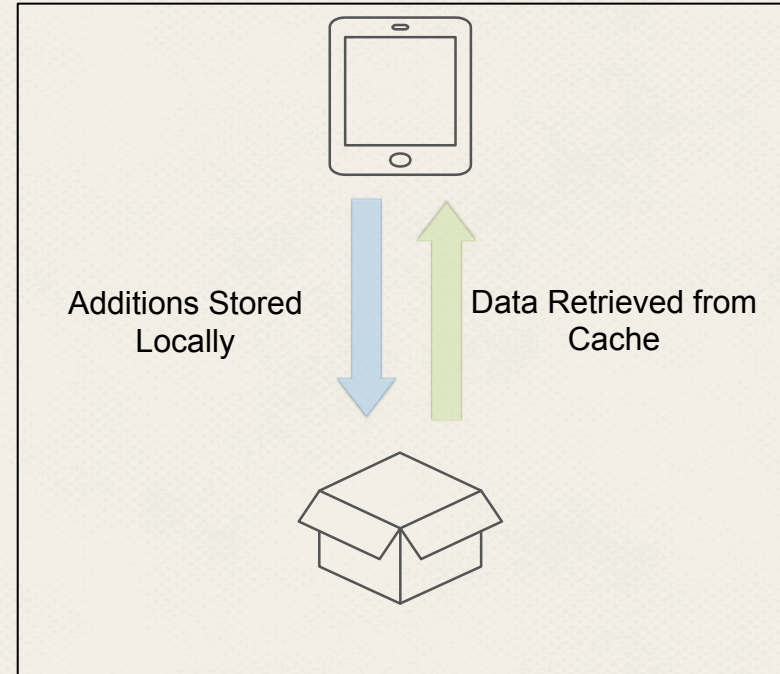
# Offline Support: Cache



**Online**



**Offline**



## Conclusion

### 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

=

### Results



Happy Farmers



More Crops

# Questions-gnon?

