New Roots for Restoration

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Overview of project

- In plant biology an important task is making measurements in the field of physical properties of the plants - this is called "phenotyping"

- plant height, number of leaves, leaf angle, whether the plant is exhibiting plant stress, etc
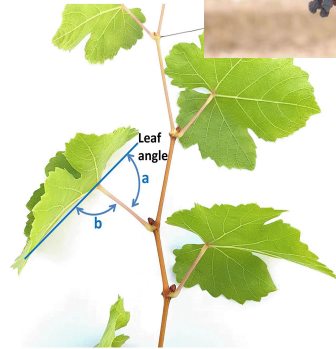

https://bygl.osu.edu/node/400

Joe Boggs, OSU Extension©

https://mywinedays.com/veraison-grapevine-life-cycle-wine-winepassport

https://www.mediastorehouse.com/auscape/biosphoto-collection/grapes-vitis-vinifera-15470746.html

Leaf angle
a
b

middle
lower

https://www.frontiersin.org/articles/10.3389/fpls.2020.00595/full

Overview of project

Problem: field measurements are difficult to organize - there is no standardization.

The Land Institute, Salina, KS

Danforth Center Field Research Site at Planthaven Farms, O'Fallon, MO

University of Vermont Horticulture Research and Education Center, Burlington, VT

Multi-site foundational planting to study the interaction of plant traits, community structure and the soil ecosphere in an agricultural system

University of Kansas Perennial Experiment station, Lawrence, KS

University of Missouri Center for Agroforestry, Columbia, MO

Chicago Botanic Garden Field Site Mettawa, IL

Overview of Project

- Goal: Design an application that streamlines this process.

Figure 1: An example of a QR that the app would scan.

Rootstock experimental vineyard at University of Missouri South Farm.

Basic Requirements

1. An app
2. Ability to capture QR codes
3. Display survey
4. Image upload option
5. Reliable, modifiable database
6. **EASE OF USE**
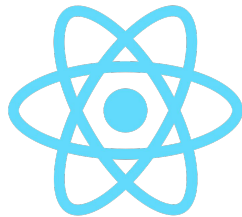
Framework

- We were given the choice of making an IOS app, or a cross platform app.
- React Native
  - Built/maintained by Facebook.
  - Is a cross-platform mobile development framework written in JavaScript.
  - Components wrap existing native code and interact with native APIs via React's declarative UI paradigm and JavaScript.
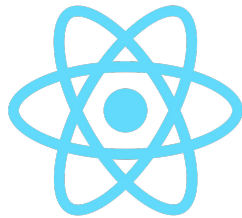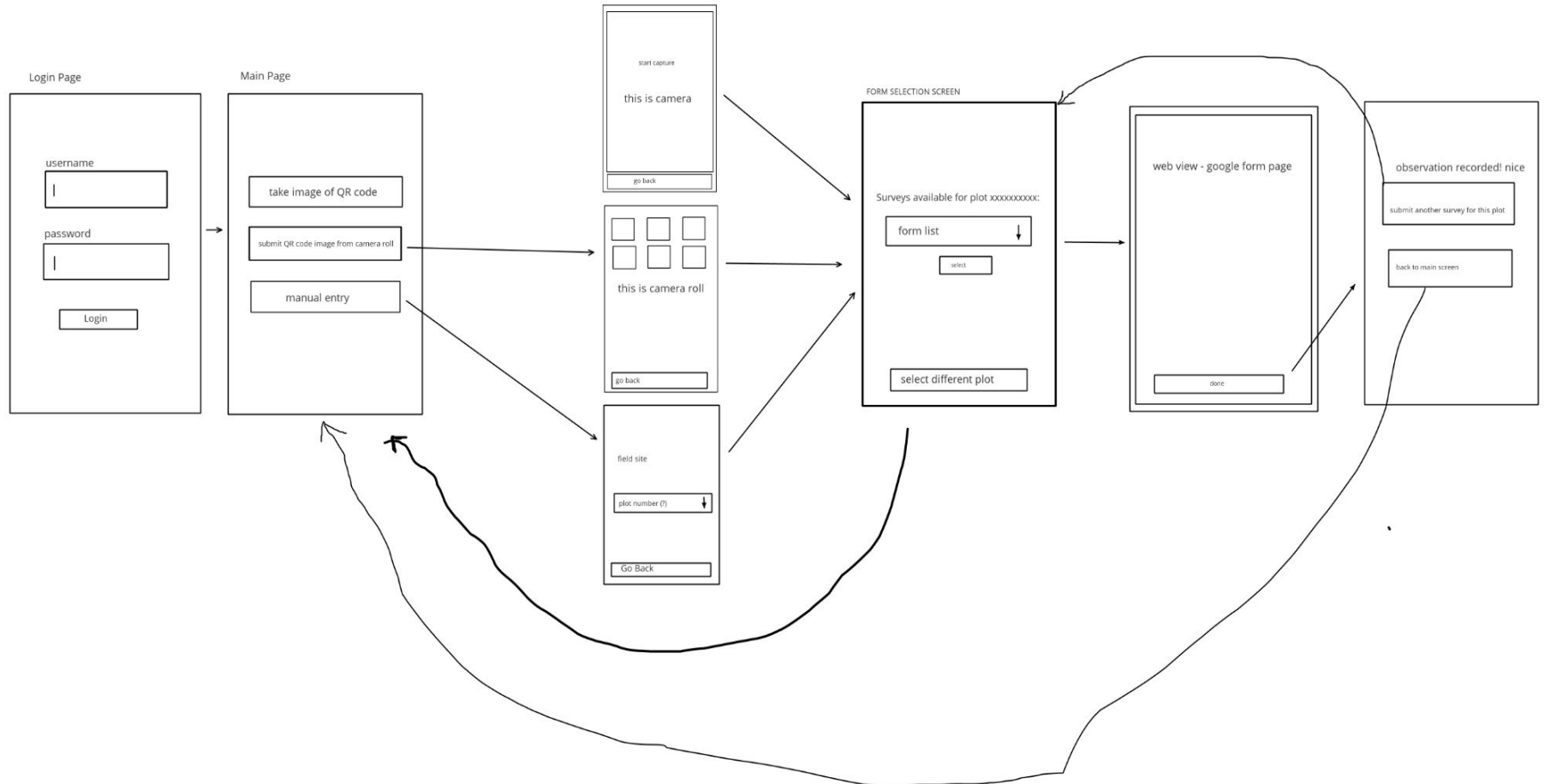
Framework

- With React Native you can always drop down to native code.
  - This is incredibly helpful sometimes but it comes at a cost: you need to send people your binaries if you want them to test them.
  - Can't develop for IOS without having a Mac.
- Expo
  - A set of tools built on top of React Native.
  - Provides a seamless way of deployment and debugging.
  - Allows you to develop cross-platform mobile apps without having the needed pieces of equipment to do so.
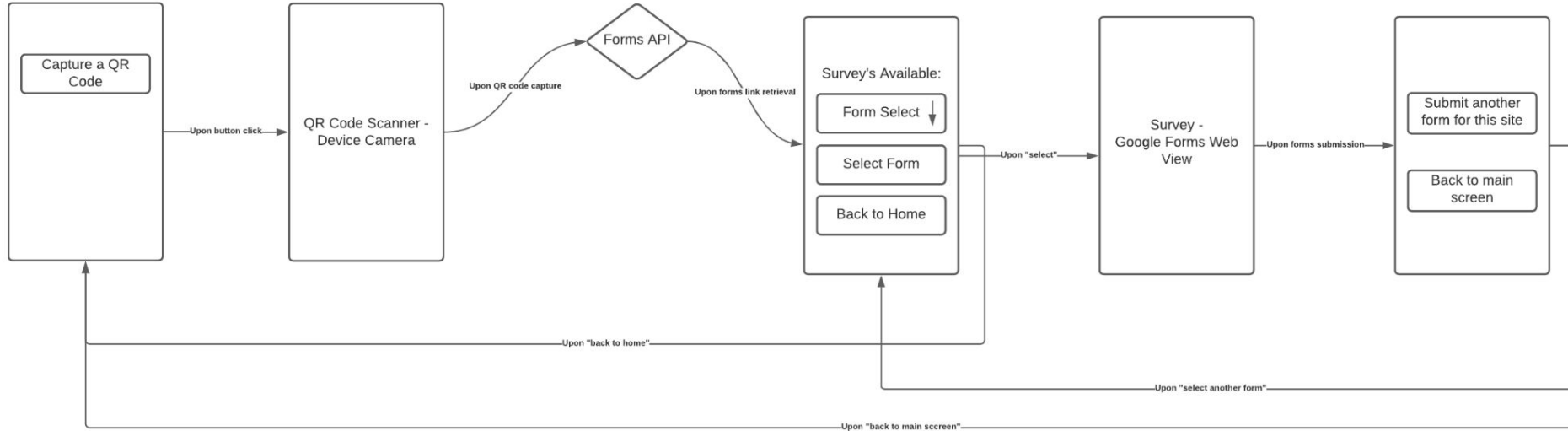
Survey and Database Options

- Survey Options:
  - Google Forms
    - Easy to create and manage.
    - Allows pre populated fields.
    - Links to Google Sheets

- Database Options
  - SQL
  - NoSQL
  - Google Sheets

Wireframes (Rough Draft)

Login Page

username

password

Login

Main Page

take image of QR code

submit QR code image from camera roll

manual entry

start capture

this is camera

go back

this is camera roll

go back

field site

plot number (?)

Go Back

FORM SELECTION SCREEN

Surveys available for plot xxxxxxxxxx:

form list

select

select different plot

web view - google form page

done

observation recorded! nice

submit another survey for this plot

back to main screen

Wireframes (Refined)

Capture a QR Code

—Upon button click→ **QR Code Scanner - Device Camera**

—Upon QR code capture→ **Forms API**

—Upon forms link retrieval→

Survey's Available:
- Form Select ↓
- Select Form
- Back to Home

—Upon "select"→ **Survey - Google Forms Web View**

—Upon forms submission→
- Submit another form for this site
- Back to main screen

—Upon "back to home"—
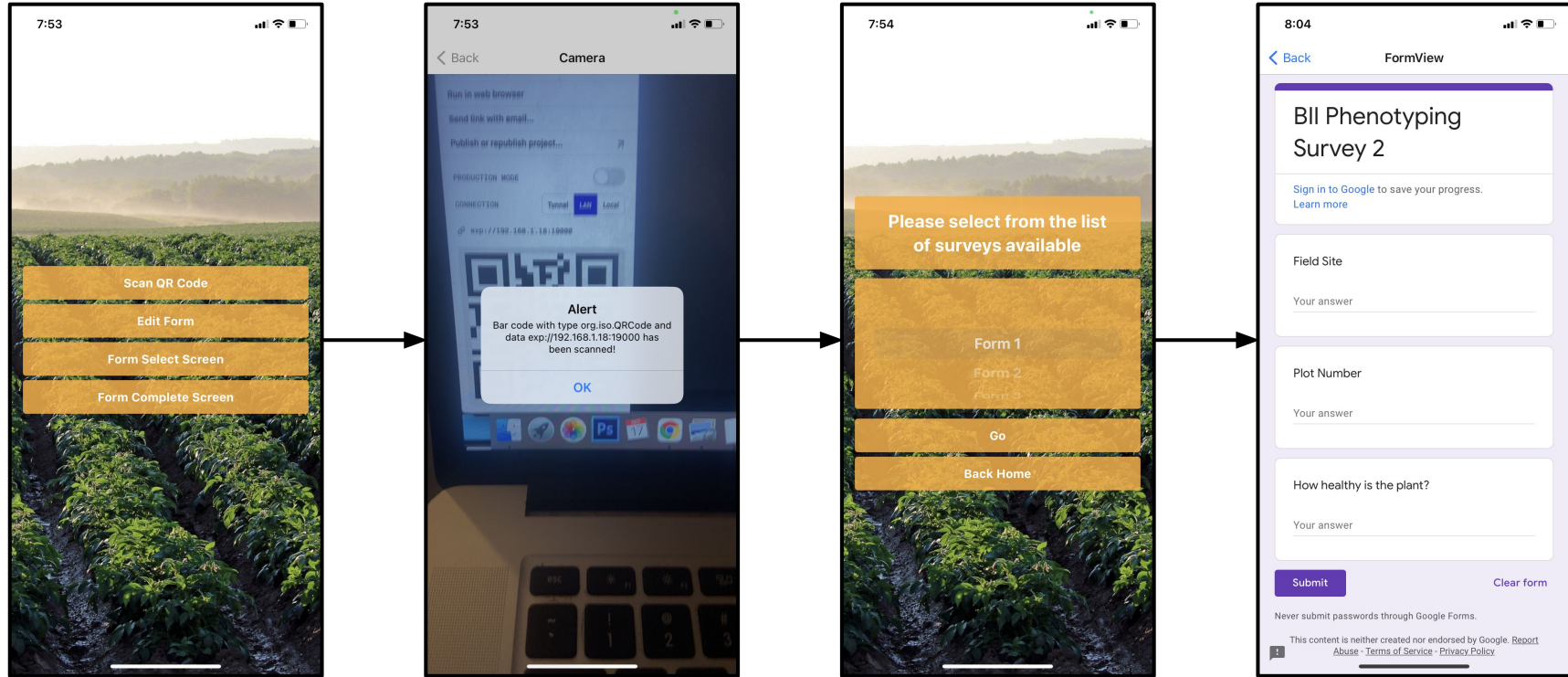
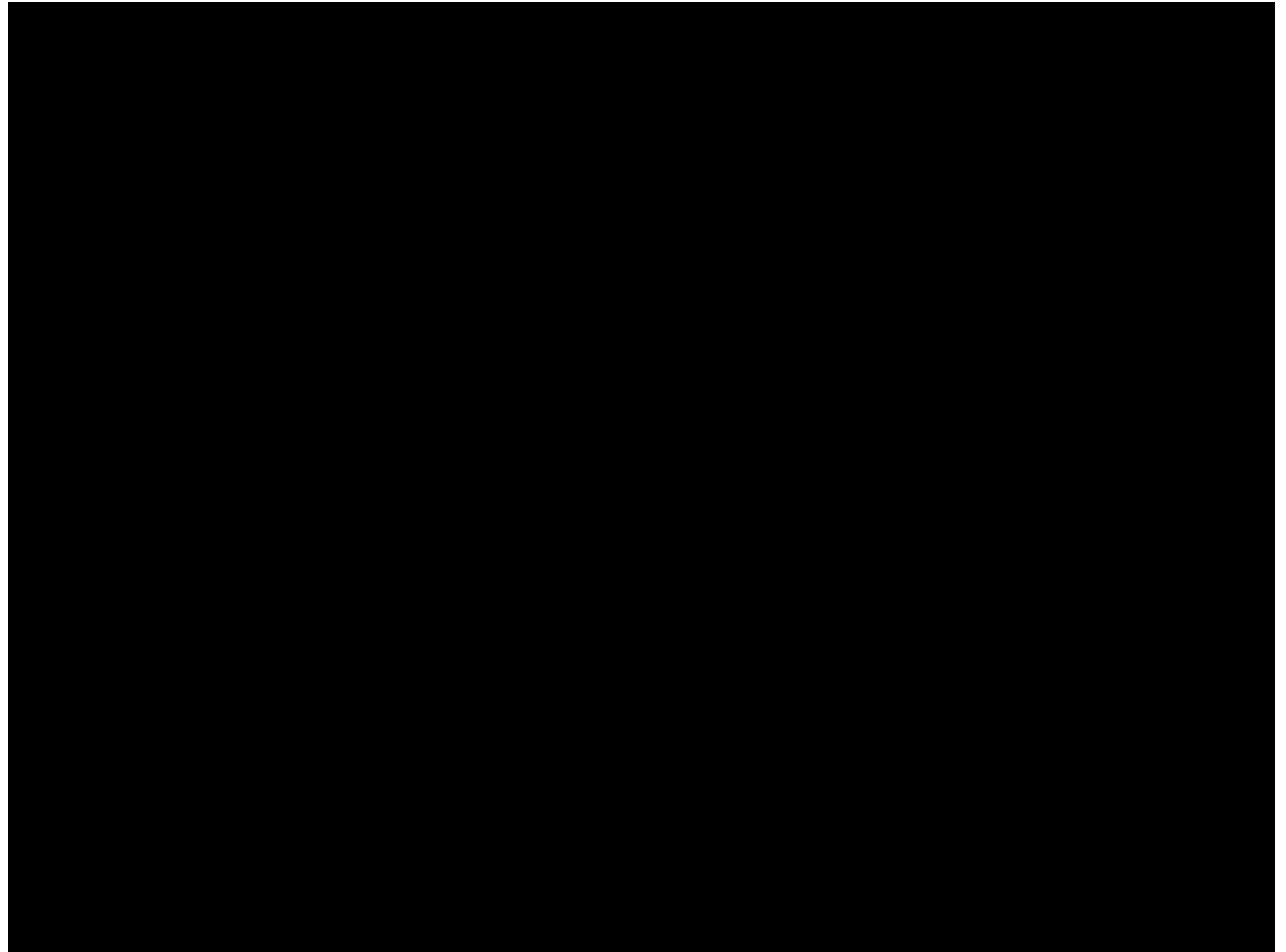—Upon "select another form"—

—Upon "back to main sccreen"—

Initial App Screenshots (iOS)

Current App Screenshots (iOS)

Demo

Deliverable 1

➔ Decide on survey method
➔ Decide database
➔ Choose framework
➔ Wireframes (drawn and basic page implementation)

Deliverable 2

➔ Ability to scan a QR code
➔ QR code scan leads to a web view
➔ QR code leads to identification of surveys available

Deliverable 3

➔ Preliminary working version of the app
➔ Connect database to app
➔ Preliminary feedback collection

Deliverable 4

➔ Iterate on user feedback
➔ Bug-free fully functional application
➔ Potentially: offline mode, image upload