

Hydro Citizens

Citizens Science Mobile App for Hydrology Reporting

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Client: Dr. Ruddell

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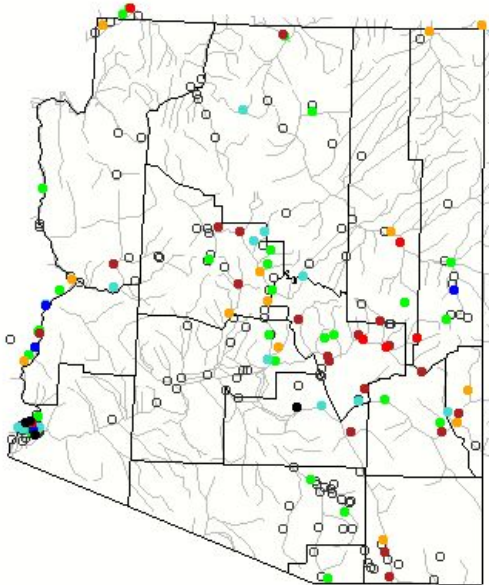
Why Hydrological Data Collection is Important

- Flood Prevention
 - Better warnings
 - Flood preparation
- Water Management
 - Measure river flow, runoff levels
 - Infrastructure design
- Public Education/Knowledge
 - Influence how community votes for public officials based on how important they think water management is
 - When to evacuate



What's Wrong With The Current System?

Friday, November 17, 2017 14:30ET



- USGS - United States Geological Survey
- The USGS installs stream gage sensors that monitor water level
- Works with the National Weather Service to provide emergency flood data





Our Client

- PhD, Civil Engineering, University of Illinois at Urbana-Champaign
- MS, Civil Engineering, University of Illinois at Urbana-Champaign
- BS, Engineering, Calvin College
- President of Ruddell Environmental consulting, the Director of the National Water-Economy Project (NWEF) and the Director of the FEWSion project



Citizens Science Mobile Application

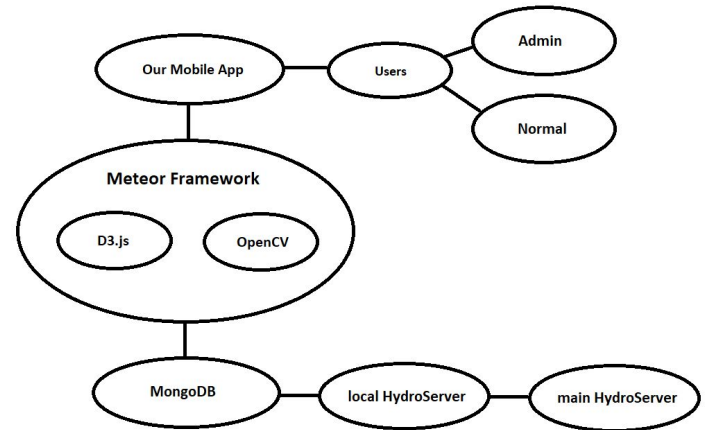
- Citizens are able to set up these stations to collect hydrological data across the country
- Very simple data collection
 - Build a station
 - Take a picture on their phones
 - Upload picture to the website once they're home
- Drawbacks
 - Only works on the website
 - There is no instant feedback
 - There are no notifications





Our Solution Overview

- We are creating a mobile app that creates a fast way for users to collect hydrological data from stations that are set up in small or ephemeral waterways
- Big features
 - Instant feedback
 - User adjustable water line
 - Push notifications for several different conditions



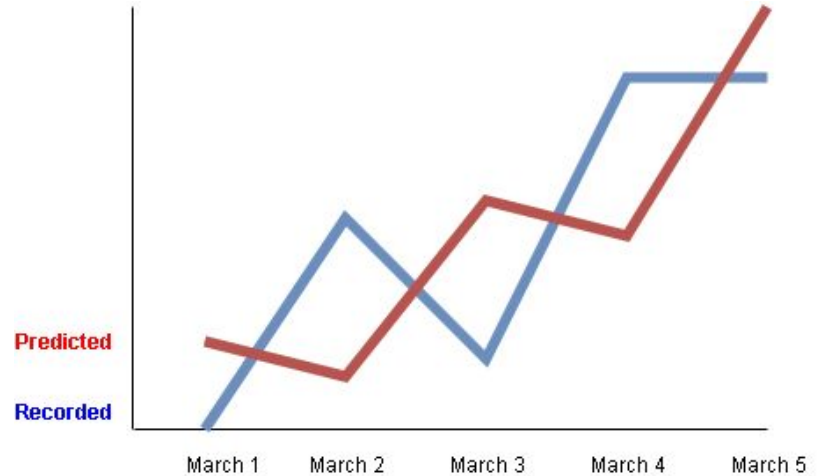


Key Requirements

- **Offline Functionality**
 - Collection from water gauges when the user does not have internet access
- **Geolocation**
 - Identification of water gauges through device location
 - Notifications based on location
- **Image Processing**
 - Display a line where the algorithm thinks that the water level is
 - User will be able to adjust the algorithm's prediction before submitting the data.
- **Maintainability**
 - A small team will be maintaining and updating our finished product, so we need to build the application such that maintenance will be low.

Key Requirements (Continued...)

- Database
 - Store water height and pictures of the sites in an online database
- User Accounts
 - The user will not need to register in order to use the application
 - Change preferences within the application
- Gamification
 - Send notifications to the user to collect data from high-value locations
 - Data visualizations
 - Plot user-collected data alongside data from the National Weather Service and the National Water Model





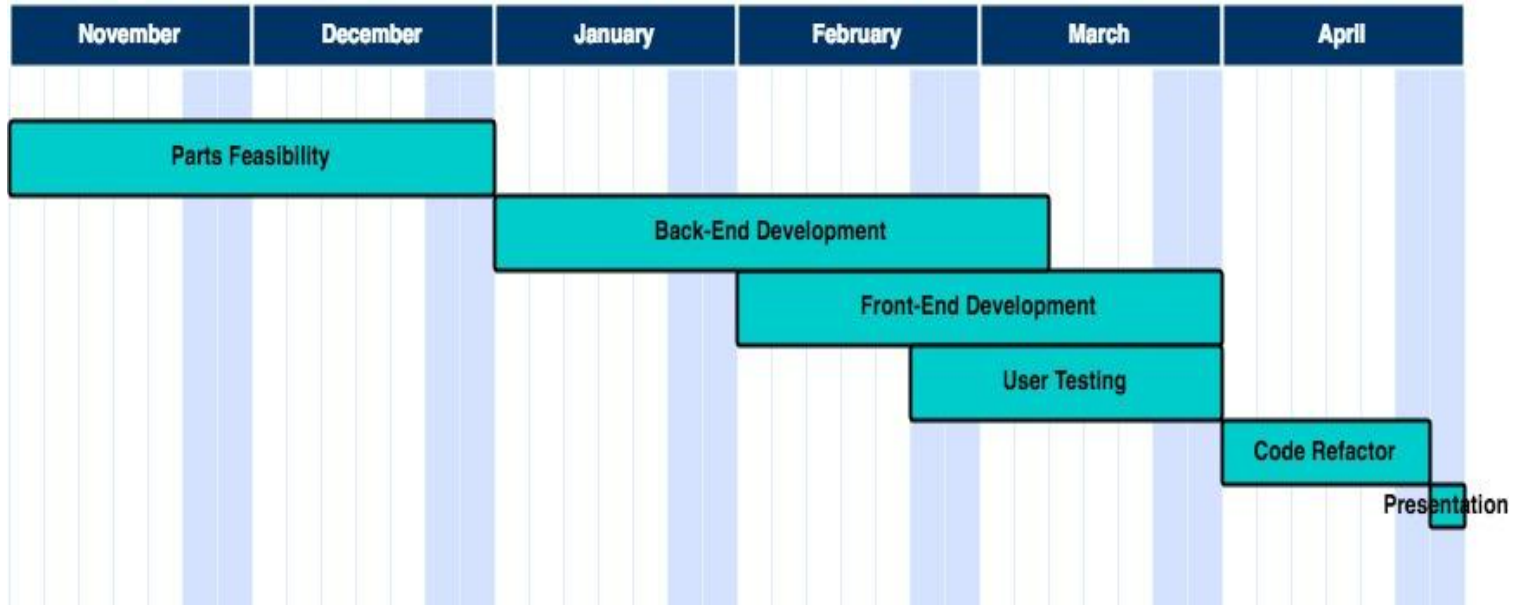
Risks and Feasibility

- Connecting to the HydroServer
 - Set up our own HydroServer
- National Water Information System (NWIS) data format changing
 - It will support the old data format
- Change the APIs and application services
 - Well-documented and well-structured code
 - Make it easy for future developers
- Geolocation Accuracy
 - QR Code

Risk Type	Risk Level
Connecting to the HydroServer	High
National Water Information Systems	Medium
Application Services	Low
Geolocation Accuracy	Low



Schedule





Conclusion

Key Functionalities

1. Mobile application
2. Collect more data points
3. Save money



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