



# HydrAware ALERT SYSTEM

Because Every Second Counts, Smart Flood Alerts for Safer Roads and Smart Choices

## Citations

<https://shorturl.at/LuBN9>, <https://shorturl.at/h8jM0>,  
<https://shorturl.at/WkpE8> <https://rb.gy/wj0gz2>, <https://rb.gy/r5rptv>  
<https://rb.gy/j3vmdq>, <https://rb.gy/p3rsl3> <https://rb.gy/rsprqu>,  
<https://short-link.me/Y-AZ>

## Problem Statement

Flooded roads endanger public safety, especially for essential workers and families, as current infrastructure lacks timely, location-specific flood data. A reliable system is urgently needed to guide safe, informed travel.

## Objectives

- Protect Public Safety: Provide real-time flood alerts and speed guidance to prevent accidents like hydroplaning.
- Support Essential Workers: Help people like Sam travel safely and avoid lost wages during floods.
- Address Inequity: Assist underserved communities that are most vulnerable to flood-related transportation issues.
- Expand Access: Share live flood data beyond Dade City to reduce stress and damage in more at-risk areas.

## User Requirements

### Explicit

Reliable access to the hospital

Equal access to safety tools, regardless of income or vehicle type

Quick re-routing around flooded areas

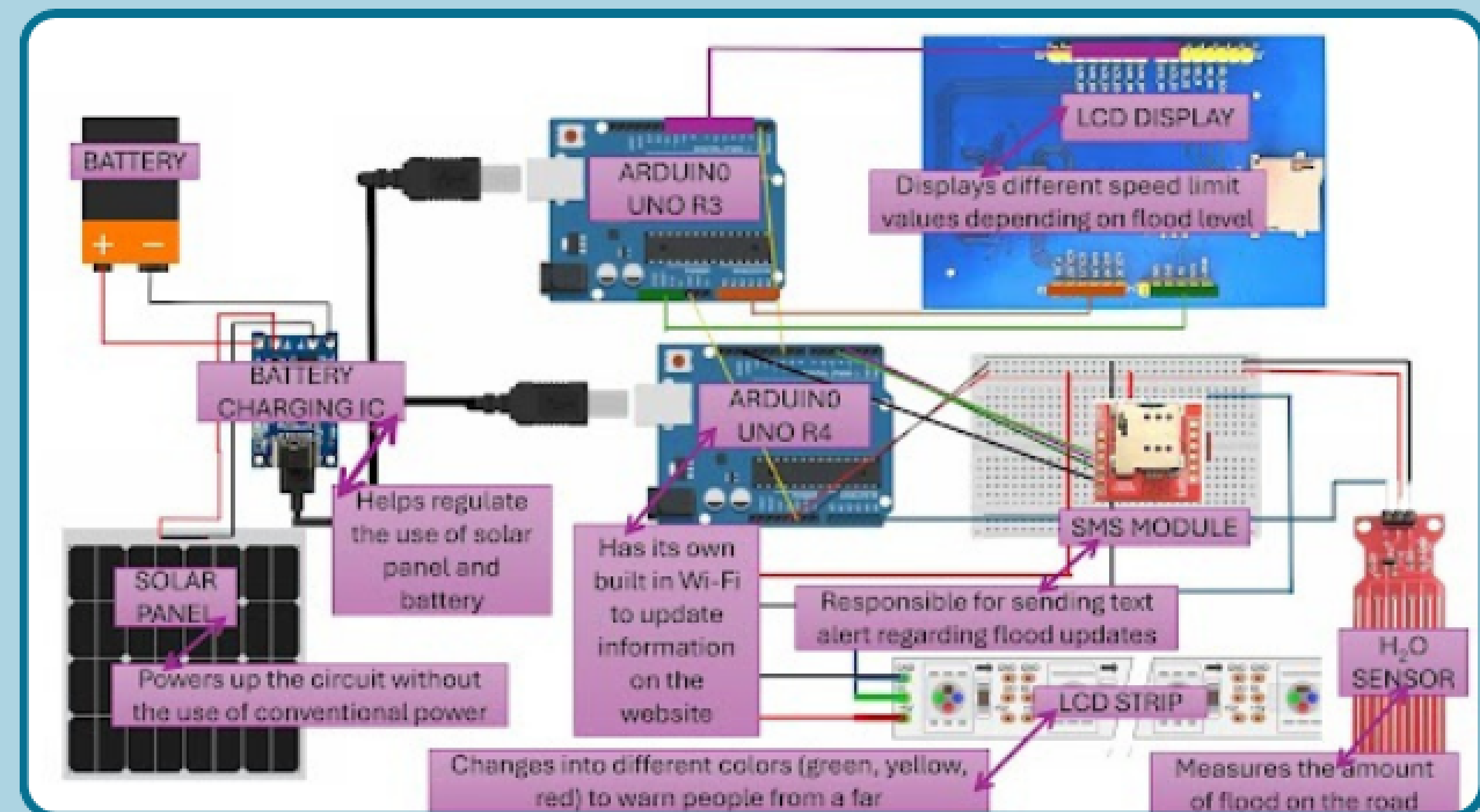
### Implicit

- Alerts systems around flooded areas

- Free accessibility to civilians with the mapping feature from the website and text alert

- Confidence in road safety before leaving home
- Make a map to show detours

## Final Prototype Iteration

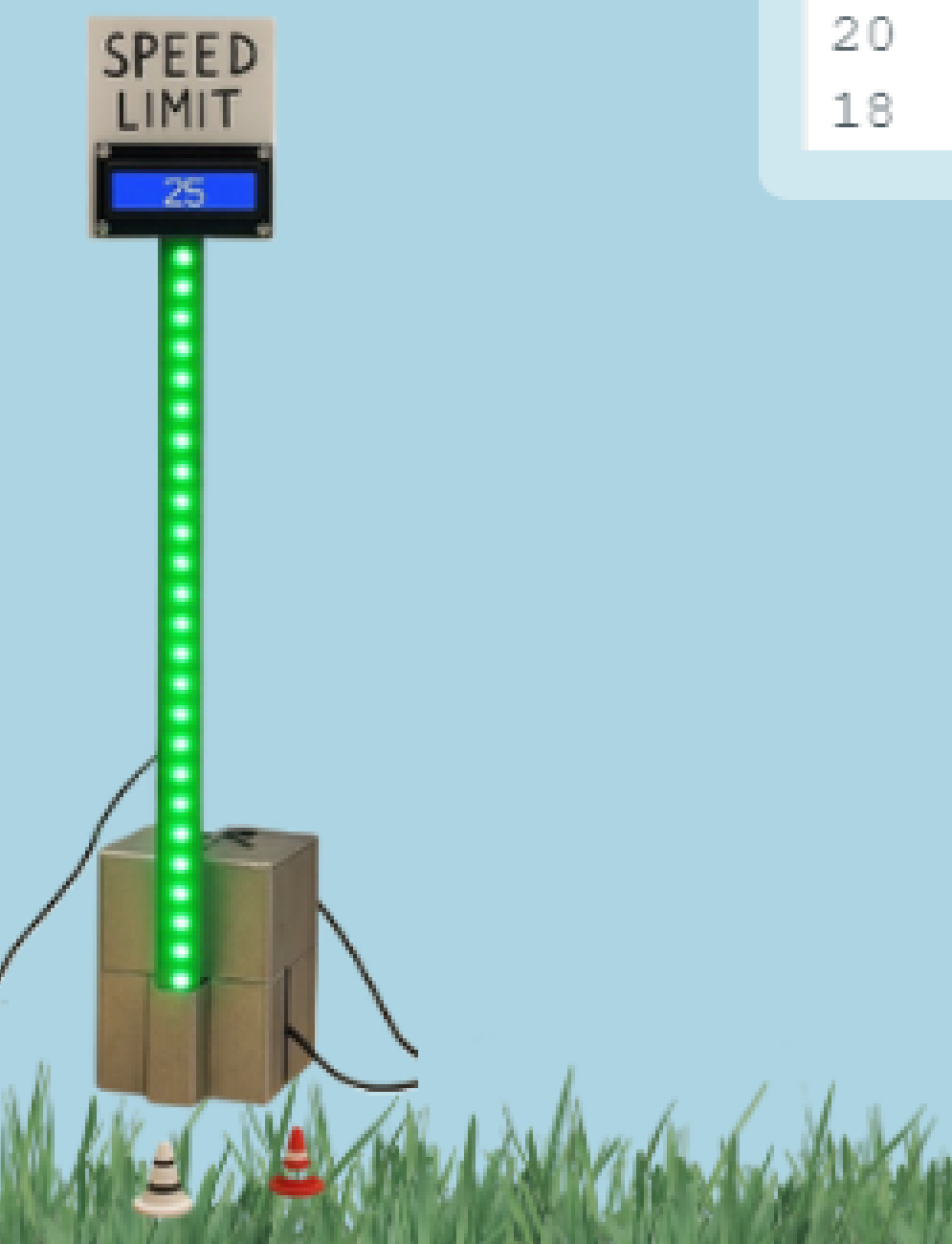


SPEED LIMIT  
45 MPH  
SAFE

Iteration 1



Iteration 2



## Design Iteration

ITERATION	DESCRIPTION
1. Initial Prototype	<ul style="list-style-type: none"><li>Goal: Detect floodwater using a basic water level sensor</li><li>Build: Arduino Uno + water sensor + RGB LEDs</li><li>Result: Successfully showed water levels, but...</li><li>Issue: LEDs too simple can't be seen from a far.</li></ul>
2. Improved Visibility	<ul style="list-style-type: none"><li>Change: Upgraded and added Solar panel and added more LED</li><li>Test Result: Better because it creates clean energy but...</li><li>New Issue: LED became unstable due to so many wires.</li></ul>
3. Addition of New Parts	<ul style="list-style-type: none"><li>Change: Changed individual LED to LED Strip and added LCD Display</li><li>Test Result: Better because lights are more stable and LCD helps change speed limit for safer driving but...</li><li>New Issue: We need to make it communicate these results to people</li></ul>
4. Communicating Results	<ul style="list-style-type: none"><li>Final Additions:</li><li>Location-based text alerts</li><li>Flood map on the website</li><li>Outcome: Safer, more informed travel decisions for users like Sam</li></ul>



## Visual Data

Water Level	LED Color	LCD Display
49	Green	Safe=45mph
56	Green	Safe=45mph
222	Yellow	SUV & Truck=20mph
234	Red	No Crossing=0mph
226	Yellow	SUV & Truck=20mph
47	Green	Safe=45mph
20	Green	Safe=45mph
18	Green	Safe=45mph

## Results

- Accurately detected water levels and adjusted speed limits in real time
- RGB LEDs and 7-segment display effectively communicated flood risk
- Web interface was user-friendly; SMS alerts arrived within 30 seconds and free
- Location-based alerts helped with early trip planning
- Users felt more confident, understood the alerts, and design improvements boosted visibility
- Alleviates financial burden for Low-income family

## Conclusions

Our flood-aware sign uses solar-powered Arduino tech to alert drivers in real time, helping essential workers like Sam travel safely and avoid costly flood damage