

CS 307 | Software Engineering I

Group 12 | Project Charter



ANDA: Application for Natural Disaster Avoidance

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1. Problem Statement

Premise: As global temperatures rise and extreme weather becomes more frequent, the need to adapt to changing conditions grows. Our application leverages real-time IoT sensor feeds and meteorological data to monitor unsafe regions, blocked roads, and hazardous areas. This enables users to be rerouted to safer, more accessible paths. Unlike existing solutions that rely on limited, manually reported data from government agencies, our approach provides an affordable and reliable way to track weather conditions in remote areas in real time.

2. Project Objectives

- Create a web application which displays high-risk areas and roads available to the general public.
- Create an ESP32 IoT mesh network of sensors which reports condition data to an SQL database.
- Create management systems for administrators to: view and edit sensor data, mark sensors offline/online, control whether data is publicly or privately available.
- Create custom weather report systems for the general public.
- Offer rerouting services to destinations using harvested data to the general public.

3. Stakeholders

Project Manager: Danning Xie

Developers: Gleb Bereziuk, James Lamparski, Josh Rubow, Jinhoo Yoon

Users: General Public, and **Government Agencies** as defined below.

Government Agencies: FEMA, Department of Transportation, Local and State agencies (ex. WLFD, WLPD)

4. Deliverables

- React.js frontend web application which allows the general public to access real time weather and condition data.
- Node.js and Express.js backend for managing sensor APIs, user APIs and other essential API services.
- Google Maps API integration for sensor data visualization and destination mapping capabilities.
- SQL Database for storing sensor data (temperature, humidity, precipitation and more), user & admin data, and other misc. data.
- ESP32 IoT mesh network reliant on Bluetooth LE for inter-device communication as well as two sentinel devices (for redundancy) within network range for sensor reporting via our sensor API.
- Small custom container for ESP32 devices to prevent environmental corrosion.