# Design Specification

## Artificial Intelligence and Data Science for Climate Change Management with Focus on Drought and Wildfire in California

Prepared by:
Huy Lam
Lunar Raborn
Brian Gonzalez
Guadalupe Ortiz Nunez

Version 1.0
NASA & LA City
05/05/25

# Contents

# 1 Overview

This document outlines the design specifications of our climate change web platform. It breaks down each page, component, and tool used in the development, including the frontend, backend, data flow, and external integrations.

# 2 Page and Component Breakdown

## 2.1 1. Home Page

- **Purpose:** Introduces users to the application, its objectives, and main features.
- **Components:**
  - Hero banner with title and background image.
  - Summary cards linking to Wildfire Map, Drought Map, and Dashboard.
  - Navigation bar with branding and menu items.

## 2.2 2. Wildfire Map Page

- **Purpose:** Displays real-time wildfire data across California.
- **Components:**
  - ArcGIS map embedded with CAL Fire data.
  - Legend for fire severity and size.
  - Filter panel (date range, severity).

## 2.3 3. Drought Map Page

- **Purpose:** Visualizes drought intensity across the state using NOAA data.
- **Components:**
  - ArcGIS drought map with interactive layers.
  - Time slider to view historical drought patterns.
  - Data layer toggle for severity levels.

## 2.4 4. Data Analysis Dashboard

- **Purpose:** Allows users to explore trends, patterns, and correlations over time.
- **Components:**
  - Line graphs for temperature, fire count, and drought index.

- Bar charts for regional comparisons.
- Dropdowns and date filters.

### 2.5 5. About Page

- **Purpose:** Describes the team, project mission, and data sources.
- **Components:**
  - Team bios with photos.
  - Links to APIs and open data.
  - NASA and LA City project description.

# 3 Tools and Technologies

## 3.1 Frontend

- **HTML5/CSS3**: Base structure and layout.
- **JavaScript (ES6+)**: Client-side interactivity.
- **ArcGIS JS API**: Maps and spatial data layers.
- **Chart.js or D3.js**: Data visualization and analytics charts.
- **Bootstrap 5**: Responsive design and UI components.

## 3.2 Backend

- **Node.js / Express.js**: API routing and server-side logic (or Django if Python used).
- **Real-time Fetching**: External API integration instead of traditional databases.

## 3.3 External APIs

- **NOAA API**: Drought severity and climate data.
- **CAL Fire Data**: Wildfire incidents and live status.
- **ArcGIS JS API**: Interactive map rendering and layers.

## 3.4 Hosting and Deployment

- **GitHub Pages / Vercel / Netlify**: Hosting for frontend.
- **GitHub Repository**: Source control and team collaboration.

# 4 Responsive and Accessibility Design

- Mobile-first layout using Bootstrap grid.
- Color contrast optimized for accessibility.
- Semantic HTML and ARIA attributes for screen reader support.

# 5 Future Enhancements

- User login and saved dashboards.
- Integration with climate prediction models.
- Custom alerts and regional push notifications.