MICHIGAN STATE UNIVERSITY

Project Plan Presentation
Air Pollution Health Outcomes Forecasting Tool
The Capstone Experience

Team Anthropocene Institute 1

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From Students…
…to Professionals

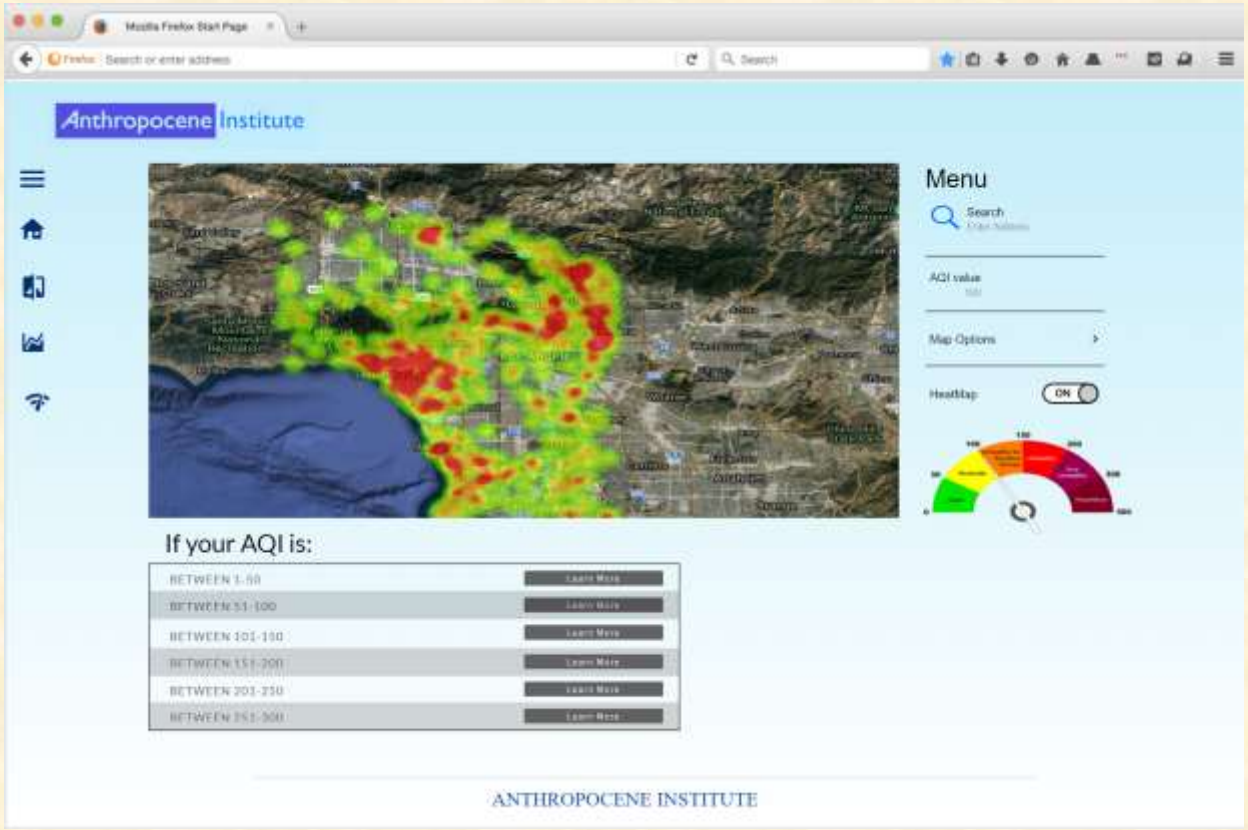
Functional Specifications

- There is a lack of precise data about air pollution and health effects on the individual
- This information is important for the public to know, as poor air quality can result in an increase in infant mortality, lung cancer, asthma hospitalizations, and other health issues
- Keep consumers, researchers, and politicians informed about air quality in their area when making decisions about housing, personal health, and public policy
- Designing a web app that uses machine learning to predict air quality information in each area, and displays that with a map overlay

Design Specifications

- User may also scroll through an interactive map overlay
- Search function and map will display pertinent information about air pollution and health risks in the area
- User can compare air quality in two different locations using easy to understand graphical representations
- Analytics page shows best and worst air quality areas in the US
- “The Zillow of air pollution”

Screen Mockup: Web Interface



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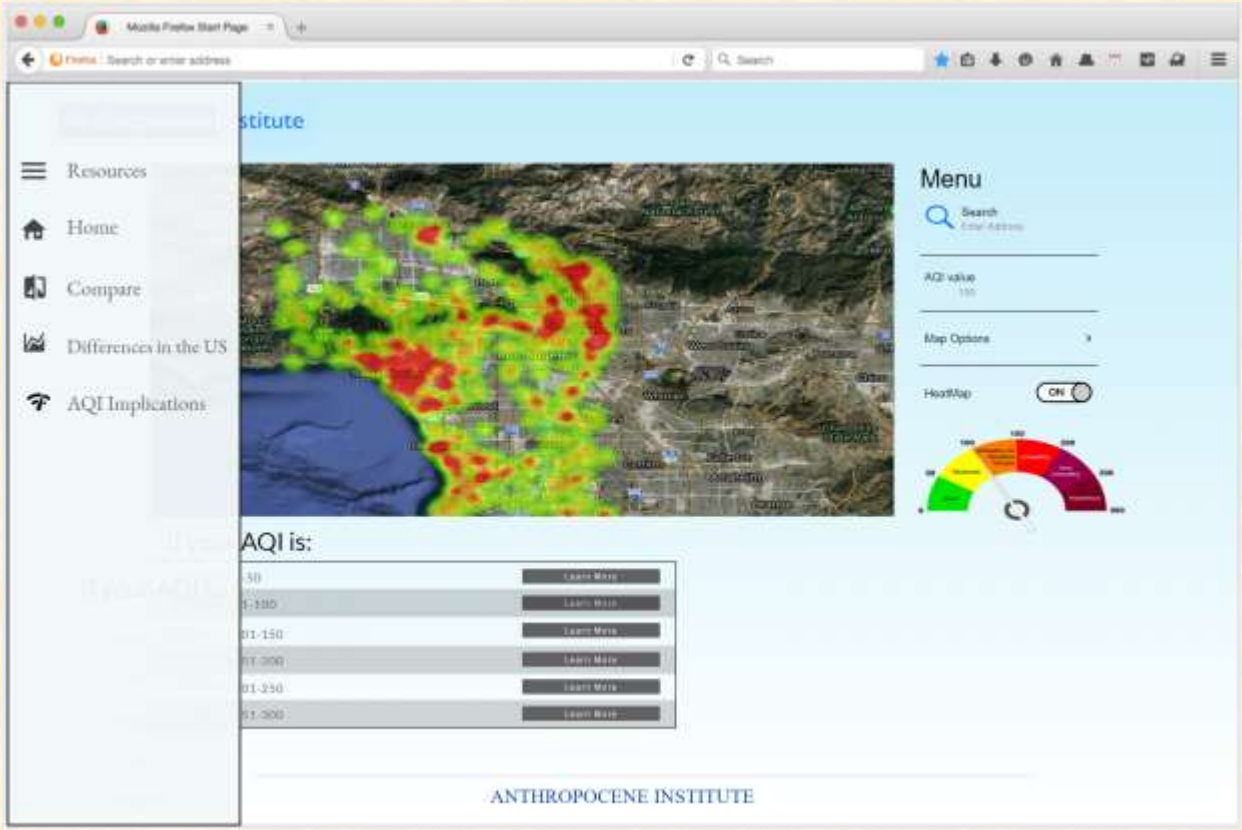

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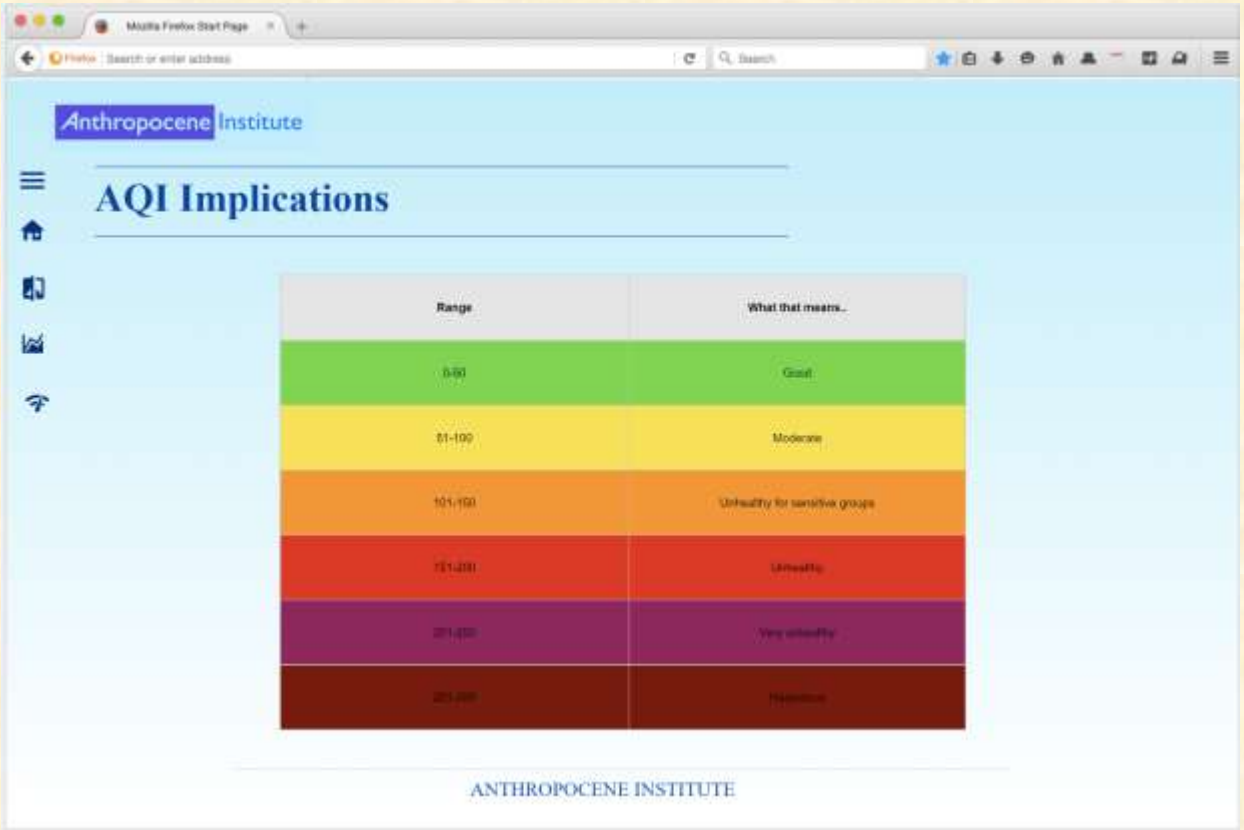
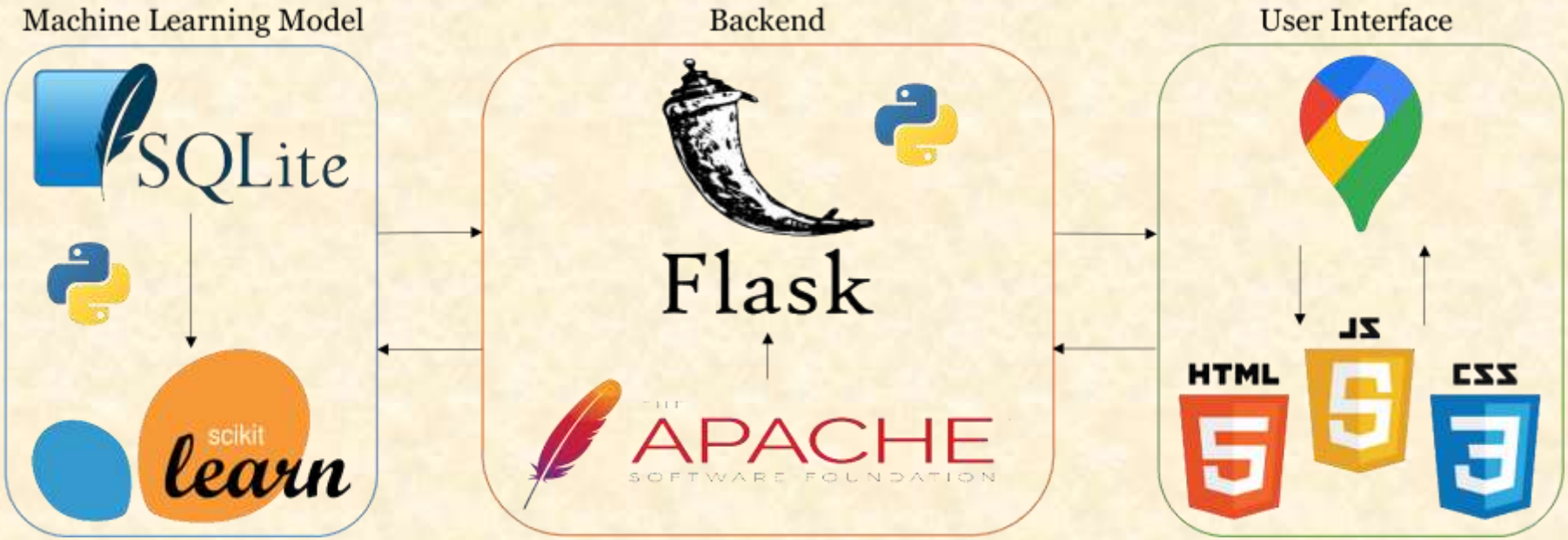


Technical Specifications

- Machine learning with Python using Scikit-learn
- HTML, CSS, and JavaScript user interface
- Backend with Python using Flask
- Application hosted on an Apache Server on capstone iMacs
- SQLite database

System Architecture



System Components

- Hardware Platforms
  - Hosting on Capstone iMac
  - VM Fusion with Windows VM
  - Python virtual environment
- Software Platforms / Technologies
  - Scikit-Learn
  - Flask/Apache
  - HTML/CSS/JavaScript
  - Google Maps API
  - SQLite database

Risks

- Data Collection
  - There is lots of data to collect from many sources without a standard organization of information
  - Currently collecting more data and preprocessing it so that we have a single format for our data set
- Handling Errors with Live Sensor Data
  - We need to be able to update the database with the newest sensor data every hour, but sometimes the sensors fail to update their status with the API
  - Experiment with different ways to manage old data, i.e. assign lower weight to prediction with that value, or use the old data until a certain threshold time
- Making Predictions with Sparse Sensor Data
  - Some areas have very few sensors, so predictions will be less accurate
  - Potentially offset the error with accurate population or GDP data

Questions?