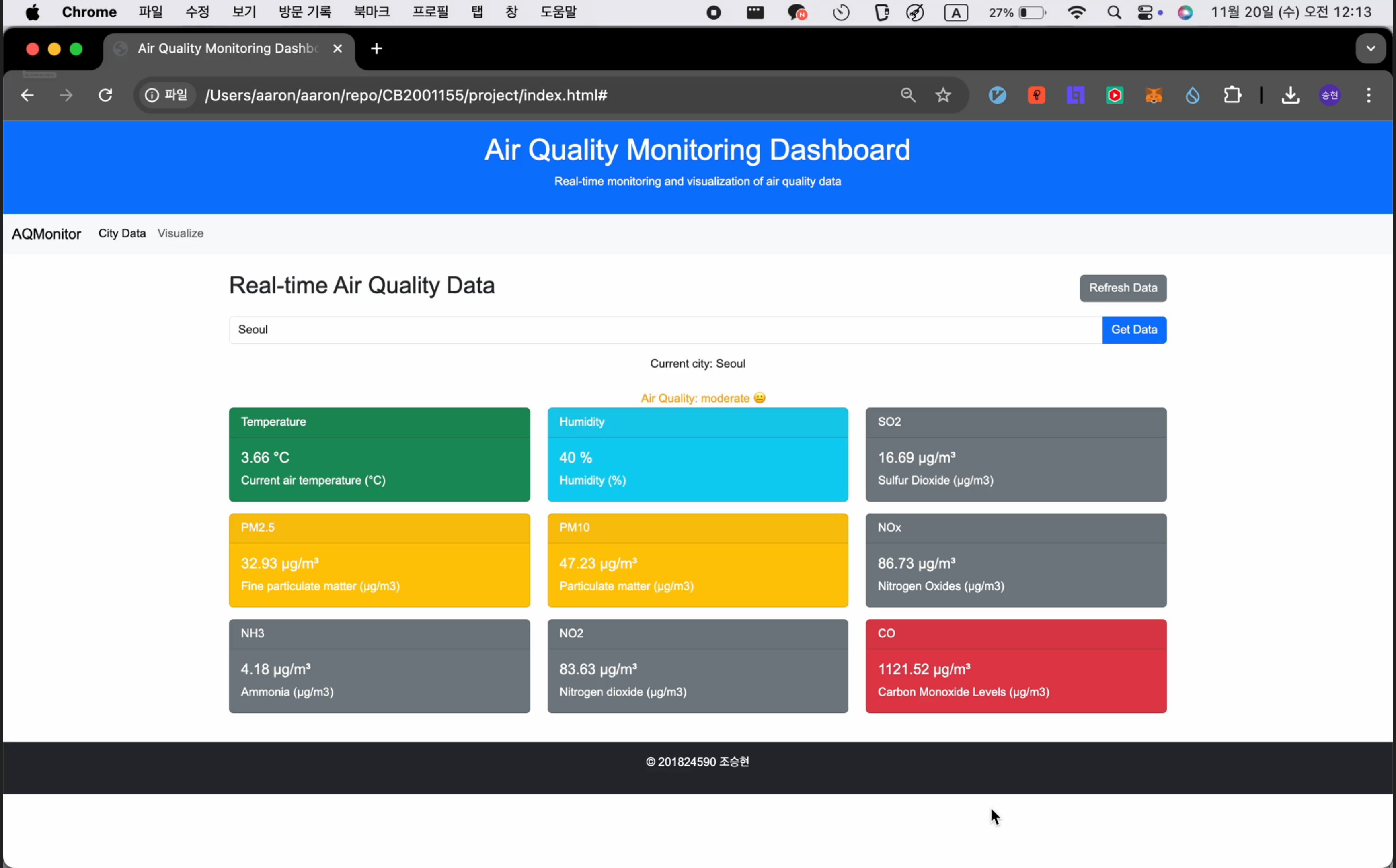
Air Quality Dashboard

201824590 조승현
WEB APPLICATION PROGRAMMING (062)

2024.11.19

Demo


Chrome
파일
수정
보기
방문 기록
북마크
프로필
탭
창
도움말
27%
11월 20일 (수) 오전 12:13
Air Quality Monitoring Dashbo
파일
/Users/aaron/aaron/repo/CB2001155/project/index.html#
승현

Air Quality Monitoring Dashboard

Real-time monitoring and visualization of air quality data

AQMonitor City Data Visualize

Real-time Air Quality Data

Refresh Data

Seoul | Get Data

Current city: Seoul

Air Quality: moderate 😐

Temperature
3.66 °C
Current air temperature (°C)

Humidity
40 %
Humidity (%)

SO2
16.69 µg/m³
Sulfur Dioxide (µg/m3)

PM2.5
32.93 µg/m³
Fine particulate matter (µg/m3)

PM10
47.23 µg/m³
Particulate matter (µg/m3)

NOx
86.73 µg/m³
Nitrogen Oxides (µg/m3)

NH3
4.18 µg/m³
Ammonia (µg/m3)

NO2
83.63 µg/m³
Nitrogen dioxide (µg/m3)

CO
1121.52 µg/m³
Carbon Monoxide Levels (µg/m3)

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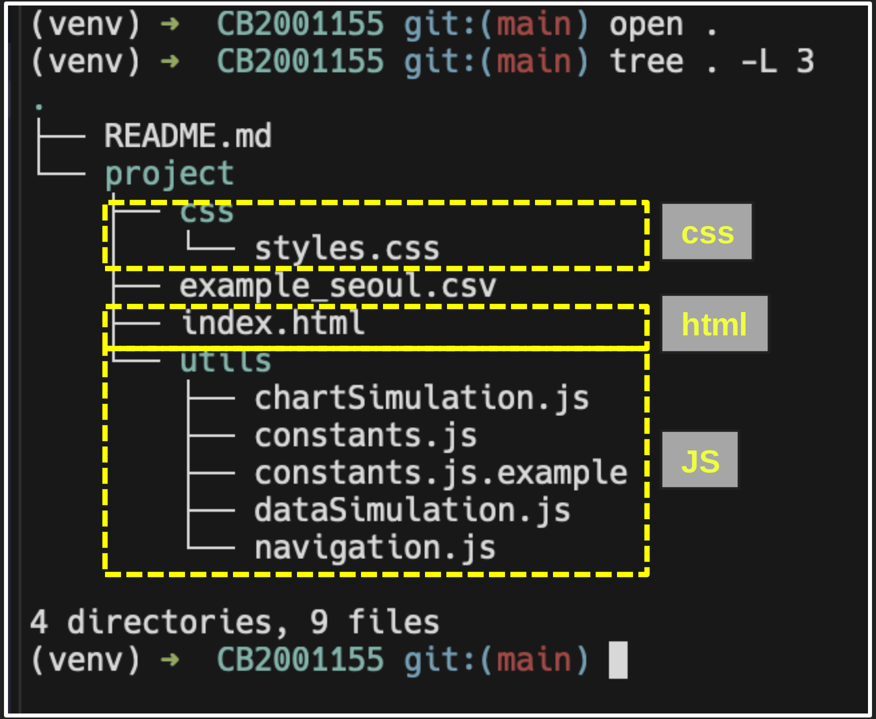
1. Layout
2. Key Features
3. Libraries used
4. TODO

Layout

Project File Layout

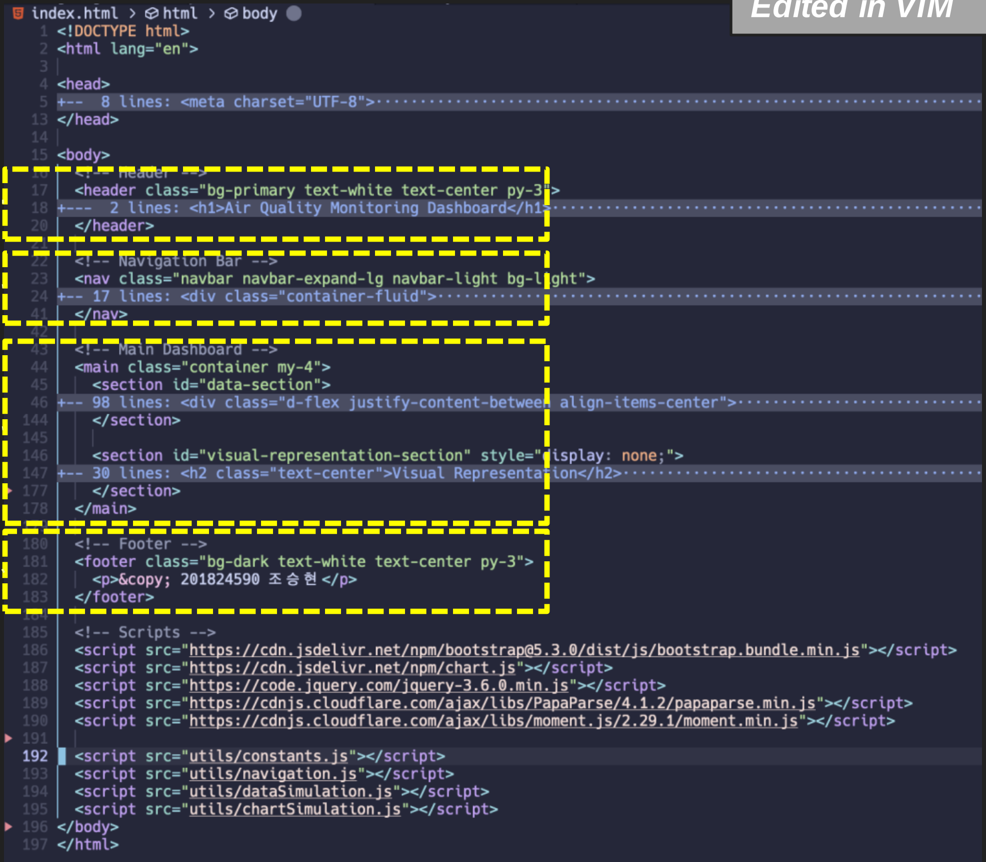


```
(venv) ➜  CB2001155 git:(main) open .
(venv) ➜  CB2001155 git:(main) tree . -L 3
.
├── README.md
└── project
    ├── css
    │   └── styles.css
    ├── example_seoul.csv
    ├── index.html
    └── utils
        ├── chartSimulation.js
        ├── constants.js
        ├── constants.js.example
        ├── dataSimulation.js
        └── navigation.js

4 directories, 9 files
(venv) ➜  CB2001155 git:(main) █
```

Project Layout Details (1/3)

- **HTML (structure)**
- ***Header***
- ***Nav***
- ***Main***
- ***> section (1)***
- ***> section (2)***
- ***Footer***

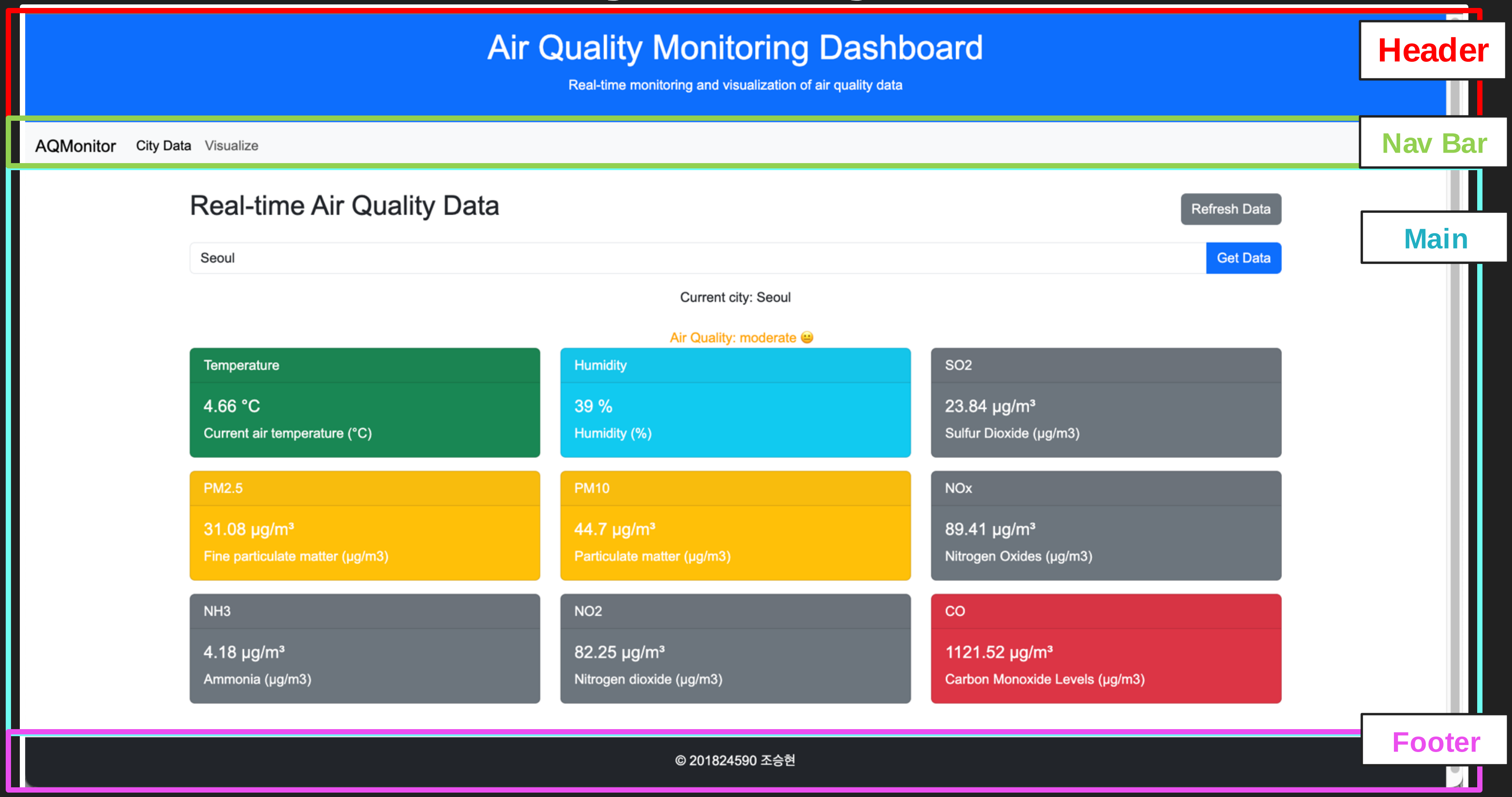
Edited in VIM



index.html › html › body

```html
<!DOCTYPE html>
<html lang="en">

<head>
+--  8 lines: <meta charset="UTF-8">
</head>

<body>
  <!-- Header -->
  <header class="bg-primary text-white text-center py-3">
+---  2 lines: <h1>Air Quality Monitoring Dashboard</h1>
  </header>

  <!-- Navigation Bar -->
  <nav class="navbar navbar-expand-lg navbar-light bg-light">
+-- 17 lines: <div class="container-fluid">
  </nav>

  <!-- Main Dashboard -->
  <main class="container my-4">
    <section id="data-section">
+-- 98 lines: <div class="d-flex justify-content-between align-items-center">
    </section>

    <section id="visual-representation-section" style="display: none;">
+-- 30 lines: <h2 class="text-center">Visual Representation</h2>
    </section>
  </main>

  <!-- Footer -->
  <footer class="bg-dark text-white text-center py-3">
    <p>&copy; 201824590 조승현</p>
  </footer>

  <!-- Scripts -->
  <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/js/bootstrap.bundle.min.js"></script>
  <script src="https://cdn.jsdelivr.net/npm/chart.js"></script>
  <script src="https://code.jquery.com/jquery-3.6.0.min.js"></script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/PapaParse/4.1.2/papaparse.min.js"></script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/moment.js/2.29.1/moment.min.js"></script>

  <script src="utils/constants.js"></script>
  <script src="utils/navigation.js"></script>
  <script src="utils/dataSimulation.js"></script>
  <script src="utils/chartSimulation.js"></script>
</body>
</html>
```

Project Layout



Header

Nav Bar

Main

Footer

Air Quality Monitoring Dashboard

Real-time monitoring and visualization of air quality data

AQMonitor City Data Visualize

Real-time Air Quality Data

Refresh Data

Seoul

Get Data

Current city: Seoul

Air Quality: moderate 😐

Temperature

4.66 °C

Current air temperature (°C)

Humidity

39 %

Humidity (%)

SO2

23.84 µg/m³

Sulfur Dioxide (µg/m3)

PM2.5

31.08 µg/m³

Fine particulate matter (µg/m3)

PM10

44.7 µg/m³

Particulate matter (µg/m3)

NOx

89.41 µg/m³

Nitrogen Oxides (µg/m3)

NH3

4.18 µg/m³

Ammonia (µg/m3)

NO2

82.25 µg/m³

Nitrogen dioxide (µg/m3)

CO

1121.52 µg/m³

Carbon Monoxide Levels (µg/m3)

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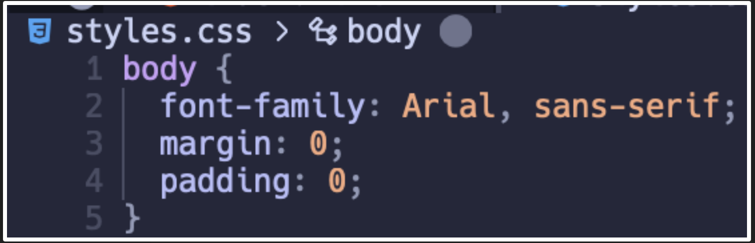
Project Layout Details (2/3)

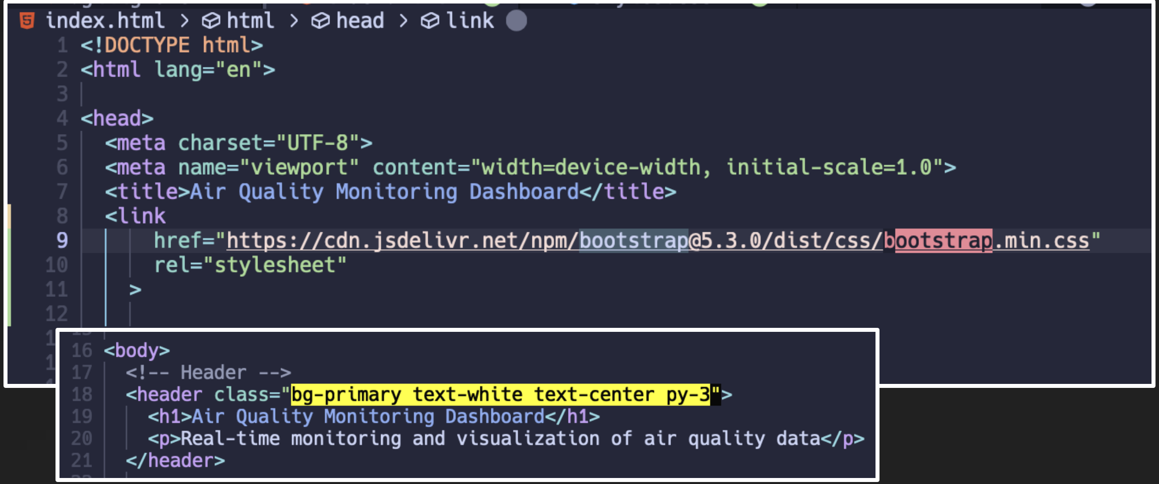
- CSS (styling)

1. css file (styles.css)



```
1 body {
2   font-family: Arial, sans-serif;
3   margin: 0;
4   padding: 0;
5 }
```

2. bootstrap
- *Import (line 9)*
- *Usage (line 18)*



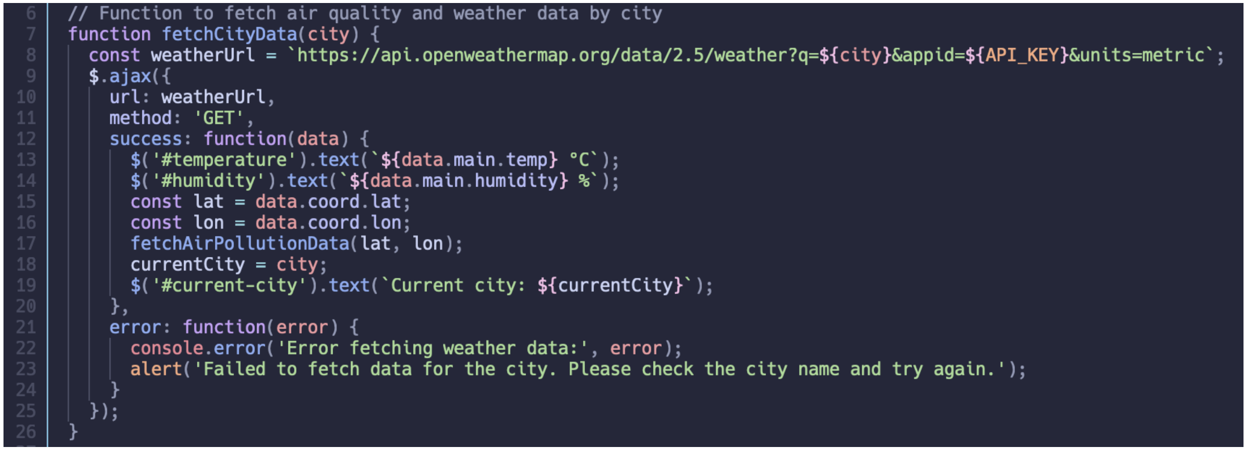
```
1  <!DOCTYPE html>
2  <html lang="en">
3
4  <head>
5    <meta charset="UTF-8">
6    <meta name="viewport" content="width=device-width, initial-scale=1.0">
7    <title>Air Quality Monitoring Dashboard</title>
8    <link
9        href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css"
10       rel="stylesheet"
11     >
12
```

```
16 <body>
17   <!-- Header -->
18   <header class="bg-primary text-white text-center py-3">
19     <h1>Air Quality Monitoring Dashboard</h1>
20     <p>Real-time monitoring and visualization of air quality data</p>
21   </header>
```

Project Layout Details (3/3)

- **Javascript (actions)**

- ***Fetching data***
- ***Openweather API, Ajax, JQuery***

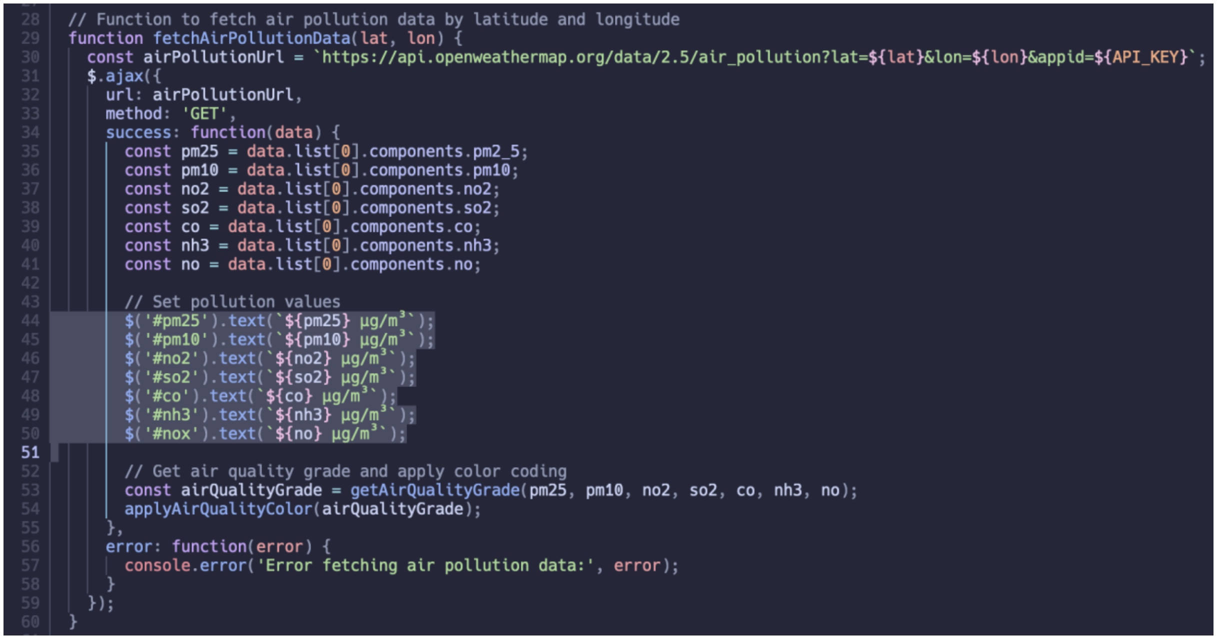


```
// Function to fetch air quality and weather data by city
function fetchCityData(city) {
  const weatherUrl = `https://api.openweathermap.org/data/2.5/weather?q=${city}&appid=${API_KEY}&units=metric`;
  $.ajax({
    url: weatherUrl,
    method: 'GET',
    success: function(data) {
      $('#temperature').text(`${data.main.temp} °C`);
      $('#humidity').text(`${data.main.humidity} %`);
      const lat = data.coord.lat;
      const lon = data.coord.lon;
      fetchAirPollutionData(lat, lon);
      currentCity = city;
      $('#current-city').text(`Current city: ${currentCity}`);
    },
    error: function(error) {
      console.error('Error fetching weather data:', error);
      alert('Failed to fetch data for the city. Please check the city name and try again.');
    }
  });
}
```

Project Layout Details (3/3)

- **Javascript (actions)**

- ***Rendering***
- ***JQuery***

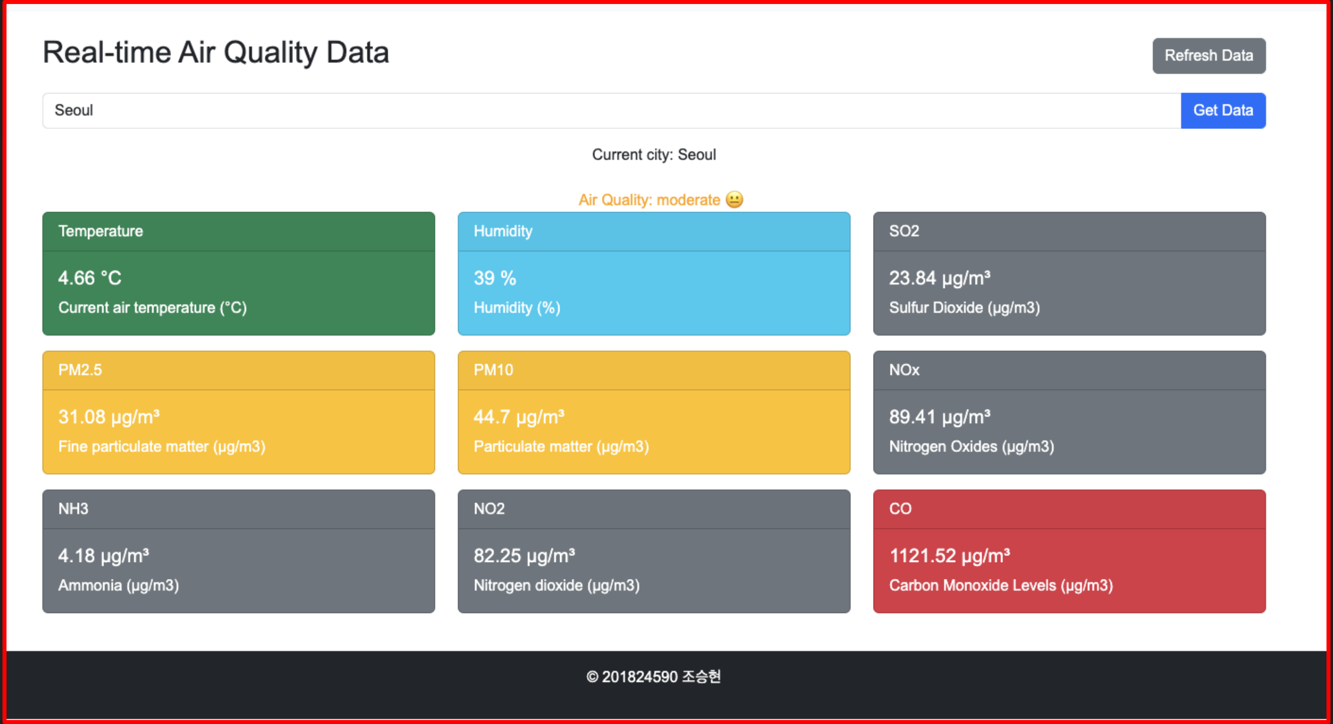


```javascript
// Function to fetch air pollution data by latitude and longitude
function fetchAirPollutionData(lat, lon) {
  const airPollutionUrl = `https://api.openweathermap.org/data/2.5/air_pollution?lat=${lat}&lon=${lon}&appid=${API_KEY}`;
  $.ajax({
    url: airPollutionUrl,
    method: 'GET',
    success: function(data) {
      const pm25 = data.list[0].components.pm2_5;
      const pm10 = data.list[0].components.pm10;
      const no2 = data.list[0].components.no2;
      const so2 = data.list[0].components.so2;
      const co = data.list[0].components.co;
      const nh3 = data.list[0].components.nh3;
      const no = data.list[0].components.no;

      // Set pollution values
      $('#pm25').text(`${pm25} µg/m³`);
      $('#pm10').text(`${pm10} µg/m³`);
      $('#no2').text(`${no2} µg/m³`);
      $('#so2').text(`${so2} µg/m³`);
      $('#co').text(`${co} µg/m³`);
      $('#nh3').text(`${nh3} µg/m³`);
      $('#nox').text(`${no} µg/m³`);

      // Get air quality grade and apply color coding
      const airQualityGrade = getAirQualityGrade(pm25, pm10, no2, so2, co, nh3, no);
      applyAirQualityColor(airQualityGrade);
    },
    error: function(error) {
      console.error('Error fetching air pollution data:', error);
    }
  });
}
```

Key Features

Key Features (1/2)

- Real-time Air Quality Data from ‘city’



Real-time Air Quality Data

Current city: Seoul

Air Quality: moderate 😐

Temperature

4.66 °C

Current air temperature (°C)

Humidity

39 %

Humidity (%)

SO2

23.84 µg/m³

Sulfur Dioxide (µg/m3)

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82.25 µg/m³

Nitrogen dioxide (µg/m3)

CO

1121.52 µg/m³

Carbon Monoxide Levels (µg/m3)

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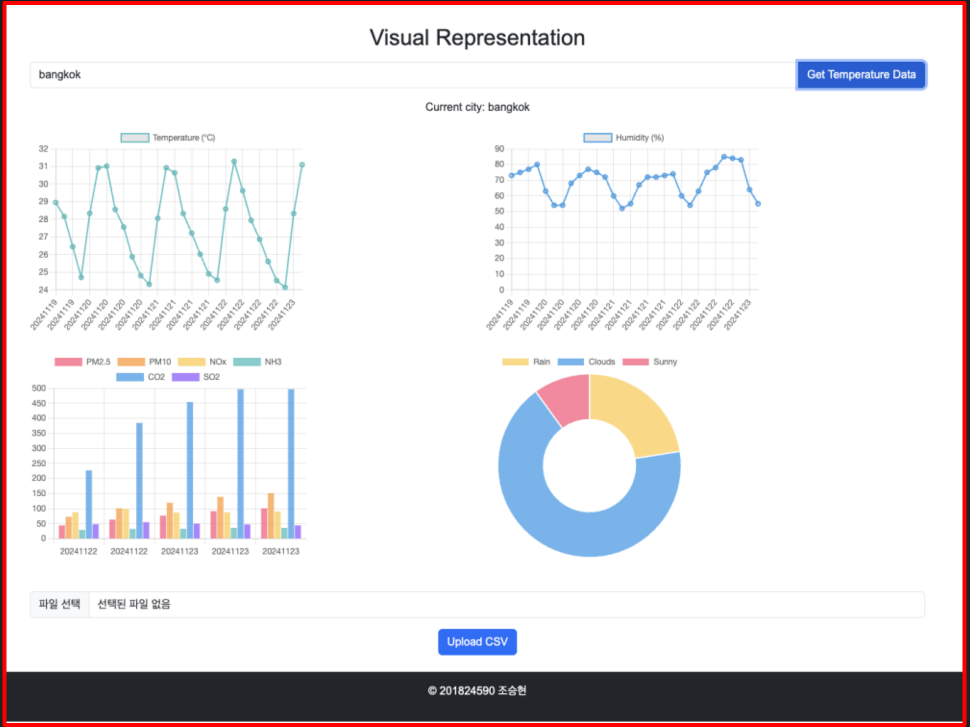
Key Features (1/2)

- **Real-time Air Quality Data from ‘city’**
- *Displays up-to-date information for a selected city*
- *Displays various air quality indicators visually, using different colors for easy distinction.*
- *Displays intuitive air quality grades using text colors and emojis, enabling quick and easy assessment of air quality.*
- *Allows users to search for city names and check the air quality status of multiple cities.*

Key Features (2/2)

- Visualize Air Quality Data in various charts



Visual Representation

bangkok

Current city: bangkok

선택된 파일 없음

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Key Features (2/2)

- **Visualize Air Quality Data in various charts**

- *Displays temperature, humidity, and pollutant data through interactive graphs for a selected city.*

- *Visualizes trends and variations in air quality metrics like PM2.5, CO2, and other pollutants using color-coded bar charts.*

- *Allows users to upload CSV files for additional analysis and integrates weather conditions like rain, clouds, and sunny days in a pie chart.*

Libraries used

Libraries & API used

- Bootstrap 5 - For responsive styling and layout.
- Chart.js - For creating dynamic charts to visualize temperature, humidity, and pollutant data.
- jQuery - To manage DOM manipulation and handle API requests.
- Moment.js - For date formatting.
- PapaParse - For parsing CSV files to provide custom data.
- OpenWeather API - To fetch real-time weather and pollution data.

TODO

TODO

- Rank countries based on air quality scores
- Create a leaderboard that ranks countries by their air quality to add an engaging, competitive aspect for users (gamification).

- Improve UX for enhanced user interaction
- Make the interface more intuitive, add helpful tooltips, and ensure smooth transitions for an overall better user experience.

- Devise a solution to provide the service without exposing the API_KEY
- Explore ways to securely store and manage the API_KEY to prevent unauthorized access, such as using a backend proxy or serverless functions.

Thank you