

Air Quality Monitoring

Real-time air quality data

Abstract:

Air quality monitoring is a crucial aspect of environmental management, public health, and urban planning. This abstract provides an overview of the significance, methods, and key findings in air quality monitoring. It discusses the importance of continuously assessing air quality to mitigate the harmful effects of air pollutants on human health and the environment. Various monitoring techniques, including remote sensing, ground-based stations, and sensor networks, are employed to collect data on air pollutants such as particulate matter, nitrogen dioxide, sulfur dioxide, carbon monoxide, and ozone. Monitoring efforts have revealed spatial and temporal variations in air quality, driven by factors like industrial emissions, traffic, weather conditions, and natural events. This data is crucial for implementing air quality management strategies, setting regulatory standards, and promoting public awareness. As air quality concerns continue to rise, the development of advanced monitoring technologies and data analysis tools remains essential for creating healthier and more sustainable urban environments.

1. Index.html

```
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <link rel="stylesheet" href="styles.css">

  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.2/dist/css/bootstrap.min.css" rel="stylesheet">

  <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.2/dist/js/bootstrap.bundle.min.js"></script>

  <script src="https://cdn.jsdelivr.net/npm/chart.js"></script>

  <title>Air Quality Monitoring</title>

</head>

<body>
```

```
<div class="container-fluid text-center bg-primary" style="min-height: 15vh;">
```

```
<h1 class="text-white py-4"> Air Quality Monitoring</h1>
```

```
</div>
```

```
<div class="container mt-4">
```

```
<div class="row">
```

```
<div class="col-md-4">
```

```
<h2>Location: <span id="location">Coimbatore</span></h2>
```

```
<p>Temperature: <span id="temperature">Loading...</span> &deg;C</p>
```

```
<p>Humidity: <span id="humidity">Loading...</span>%</p>
```

```
<p>PM2.5: <span id="pm25">Loading...</span> µg/m³</p>
```

```
<p>PM10: <span id="pm10">Loading...</span> µg/m³</p>
```

```
<button onclick="updateRandomData()" class="btn btn-primary">Update Data</button>
```

```
</div>
```

```
<div class="col-md-4">
```

```
<h2>Location: <span id="location1">Chennai</span></h2>
```

```
<p>Temperature: <span id="temperature1">Loading...</span> &deg;C</p>
```

```
<p>Humidity: <span id="humidity1">Loading...</span>%</p>
```

```
<p>PM2.5: <span id="pm251">Loading...</span> µg/m³</p>
```

```
<p>PM10: <span id="pm101">Loading...</span> µg/m³</p>
```

```
<button onclick="updateRandomData1()" class="btn btn-primary">Update Data</button>
```

```
</div>
```

```
<div class="col-md-4">
```

```
<h2>Location: <span id="location2">Trichy</span></h2>
```

```
<p>Temperature: <span id="temperature2">Loading...</span> &deg;C</p>
```

```
<p>Humidity: <span id="humidity2">Loading...</span>%</p>
```

```
<p>PM2.5: <span id="pm252">Loading...</span> µg/m³</p>
```

```
<p>PM10: <span id="pm102">Loading...</span> µg/m³</p>
```

```
<button onclick="updateRandomData2()" class="btn btn-primary">Update Data</button>
```

```
</div>
```

```
</div>
```

```
<div class="row">

  <canvas id="airQualityChart" width="400" height="200"></canvas>

</div>

</div>

<script src="./script.js"> </script>

</body>

</html>
```

2. Script.js

```
function updateRandomData() {

  const locationElement = document.getElementById("location");
  const temperatureElement = document.getElementById("temperature");
  const humidityElement = document.getElementById("humidity");
  const pm25Element = document.getElementById("pm25");
  const pm10Element = document.getElementById("pm10");

  // Generate random air quality data

  const randomTemperature = (Math.random() * 40 + 10).toFixed(2); // Random temperature between 10 and 50 °C
  const randomHumidity = (Math.random() * 50 + 30).toFixed(2); // Random humidity between 30% and 80%
  const randomPM25 = Math.floor(Math.random() * 100); // Random PM2.5 between 0 and 100 µg/m³
  const randomPM10 = Math.floor(Math.random() * 150); // Random PM10 between 0 and 150 µg/m³

  // Update the displayed data

  locationElement.textContent = "Coimbatore";
  temperatureElement.textContent = randomTemperature + " °C";
  humidityElement.textContent = randomHumidity + "%";
  pm25Element.textContent = randomPM25 + " µg/m³";
  pm10Element.textContent = randomPM10 + " µg/m³";

}

function updateRandomData1() {
```

```

const location1Element = document.getElementById("location1");
const temperature1Element = document.getElementById("temperature1");
const humidity1Element = document.getElementById("humidity1");
const pm251Element = document.getElementById("pm251");
const pm101Element = document.getElementById("pm101");

// Generate random air quality data
const randomTemperature = (Math.random() * 40 + 10).toFixed(2); // Random temperature between 10 and 50 °C
const randomHumidity = (Math.random() * 50 + 30).toFixed(2); // Random humidity between 30% and 80%
const randomPM25 = Math.floor(Math.random() * 100); // Random PM2.5 between 0 and 100 µg/m³
const randomPM10 = Math.floor(Math.random() * 150); // Random PM10 between 0 and 150 µg/m³

// Update the displayed data
location1Element.textContent = "Chennai";
temperature1Element.textContent = randomTemperature + " °C";
humidity1Element.textContent = randomHumidity + "%";
pm251Element.textContent = randomPM25 + " µg/m³";
pm101Element.textContent = randomPM10 + " µg/m³";
}

function updateRandomData2() {
    const location2Element = document.getElementById("location2");
    const temperature2Element = document.getElementById("temperature2");
    const humidity2Element = document.getElementById("humidity2");
    const pm252Element = document.getElementById("pm252");
    const pm102Element = document.getElementById("pm102");

    // Generate random air quality data
    const randomTemperature = (Math.random() * 40 + 10).toFixed(2); // Random temperature between 10 and 50 °C
    const randomHumidity = (Math.random() * 50 + 30).toFixed(2); // Random humidity between 30% and 80%
    const randomPM25 = Math.floor(Math.random() * 100); // Random PM2.5 between 0 and 100 µg/m³
    const randomPM10 = Math.floor(Math.random() * 150); // Random PM10 between 0 and 150 µg/m³

```

```

// Update the displayed data
location2Element.textContent = "Trichy";
temperature2Element.textContent = randomTemperature + " &deg;C";
humidity2Element.textContent = randomHumidity + "%";
pm252Element.textContent = randomPM25 + " µg/m³";
pm102Element.textContent = randomPM10 + " µg/m³";
}

// Sample historical air quality data
const historicalData = {
  labels: ["Day 1", "Day 2", "Day 3", "Day 4", "Day 5", "Day 6", "Day 7"],
  pm25: [12, 15, 10, 8, 13, 9, 11],
  pm10: [20, 18, 22, 19, 21, 17, 20],
};

const ctx = document.getElementById("airQualityChart").getContext("2d");
const airQualityChart = new Chart(ctx, {
  type: "line",
  data: {
    labels: historicalData.labels,
    datasets: [
      {
        label: "PM2.5 (µg/m³)",
        data: historicalData.pm25,
        borderColor: "rgba(75, 192, 192, 1)",
        fill: false,
      },
      {
        label: "PM10 (µg/m³)",
        data: historicalData.pm10,
        borderColor: "rgba(192, 75, 75, 1)",
        fill: false,
      },
    ],
  },
});

```

```

    ],
  },
  options: {
    scales: {
      x: {
        beginAtZero: true,
      },
      y: {
        beginAtZero: true,
      },
    },
  },
});

function updateAirQualityChart() {
  // Generate new random historical data (for demonstration purposes)
  const newPM25Data = [...historicalData.pm25.map(() => Math.floor(Math.random() * 20 + 10))];
  const newPM10Data = [...historicalData.pm10.map(() => Math.floor(Math.random() * 20 + 10))];

  // Update the chart's data
  airQualityChart.data.datasets[0].data = newPM25Data;
  airQualityChart.data.datasets[1].data = newPM10Data;

  // Update the labels if needed
  airQualityChart.data.labels = historicalData.labels;

  // Update the chart
  airQualityChart.update();
}

```

OUTPUT

Air Quality Monitoring

Location: Coimbatore

Temperature: Loading... °C
Humidity: Loading... %
PM2.5: Loading... $\mu\text{g}/\text{m}^3$
PM10: Loading... $\mu\text{g}/\text{m}^3$

Update Data

Location: Chennai

Temperature: Loading... °C
Humidity: Loading... %
PM2.5: Loading... $\mu\text{g}/\text{m}^3$
PM10: Loading... $\mu\text{g}/\text{m}^3$

Update Data

Location: Trichy

Temperature: Loading... °C
Humidity: Loading... %
PM2.5: Loading... $\mu\text{g}/\text{m}^3$
PM10: Loading... $\mu\text{g}/\text{m}^3$

Update Data

