INT217

PROJECT REPORT

(Project Semester January–April 2025)

REAL TIME AIR QUALITY INDEX DASHBOARD

Submitted by

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B.Tech CSE – Section K23GS

Course Code: INT217

Under the Guidance of

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DECLARATION

I, **Abhin Thomas**, student of **B.Tech in Computer Science and Engineering** under the CSE Discipline at Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date:
Signature:
Registration No: 12311075
Name: Abhin Thomas

CERTIFICATE

This is to certify that **Abhin Thomas**, bearing Registration No. **12311075**, has completed **INT217** project titled, **“Real Time Air Quality Index Dashboard”** under my guidance and supervision. To the best of my knowledge, the present work is the result of his original development, effort, and study.

Signature & Name of the Supervisor
Gargi Sharma
Assistant Professor
School of Computer Science and Engineering
Lovely Professional University
Phagwara, Punjab

ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to my mentor, **Ms. Baljinder Kaur**, for her continuous support, valuable feedback, and constant encouragement throughout the completion of this project.

I also thank **Lovely Professional University** for providing the platform and resources to apply and showcase data visualization skills through a real-world dataset.

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1. Introduction

In recent years, air pollution has emerged as one of the most critical environmental challenges worldwide, affecting human

health, climate, and ecosystems. Monitoring real-time air quality is essential to assess pollution levels and take timely actions for public safety and environmental sustainability.

The objective of this project is to create an interactive and insightful **Excel-based dashboard** that visualizes air quality data across various Indian cities and states using real-time data from authorized sources. The dashboard aims to identify pollution hotspots, provide pollutant-wise analysis, and allow easy filtering for user-specific exploration.

Through this project, I have applied data analysis and visualization techniques in Microsoft Excel, using pivot tables, slicers, charts, and dynamic filters to generate a comprehensive dashboard that transforms raw data into an understandable and engaging visual format.

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2. Source of Dataset

The dataset used in this project is titled **"Real Time Air Quality Index"**. It was sourced from a government-based public dataset platform and includes pollution readings recorded from various monitoring stations across Indian cities and states.

The dataset includes the following fields:

- Country
- State
- City
- Station

- Last Update
- Latitude and Longitude
- Pollutant ID
- Pollutant Min, Max, and Average

These attributes were used to analyze pollution trends, identify top polluted areas, and create geographical and statistical representations of the air quality status.

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3. Dataset Preprocessing

The dataset was preprocessed in Microsoft Excel before visualizing. Key preprocessing steps included:

- **Converting Raw Data into Table Format**: Structured the data for pivot operations.
- **Date Formatting**: Reformatted the last_update column to standard Excel format.
- **Removing Blank Entries**: Filtered rows with missing values in key fields.
- **Sorting & Filtering**: Sorted by pollutant_avg to highlight high/low zones.
- **Creating New Fields**: Created severity levels using formulas.

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4. Analysis on Dataset (Objectives)

Objective 1: Average Pollution by Pollutant

General Description: Shows average pollutant levels for each pollutant type.
Requirement: Pivot Table (Pollutant ID as rows, Pollutant Avg as values).
Result: Identify which pollutant types are most prevalent.
Visualization: Column Chart

Objective 2: Top 10 Polluted Cities/Stations

General Description: Lists top 10 cities or stations with highest average pollution.
Requirement: Sort by Pollutant Avg and filter top 10.
Result: Highlight locations with most critical air quality.
Visualization: Bar Chart

Objective 3: Pollutant-Wise Dashboard

General Description: Interactive slicer-based dashboard to filter data by pollutant type.
Requirement: Slicer for Pollutant ID + Pivot Charts.
Result: Allows deep-dive into specific pollutants.
Visualization: Slicer + Combo Charts

Objective 4: State-Wise Pollution Analysis (Map)

General Description: Compare average pollutant levels across Indian states.
Requirement: Group by State, plot on filled map chart.
Result: Identify which states are facing higher pollution.
Visualization: Map Chart

Objective 5: Pie Chart on Maximum Pollution by State

General Description: Pie chart representing maximum pollution values from each state.
Requirement: Use State as label and Max Pollutant as values.
Result: Visual distribution of extreme pollution readings by state.
Visualization: Pie Chart

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5. . Future Scope

The dashboard can be improved further by:

- Integrating live data feeds from APIs
- Adding severity indicators like AQI scales
- Including machine learning models for prediction
- Extending to mobile-friendly formats using Power BI or web tools

6 .Conclusion

- This project offered hands-on experience in data wrangling, analysis, and visualization using Excel. The dashboard built provides a user-friendly and insightful representation of real-time air quality across Indian regions. Through filtering and interactive visuals, decision-makers can quickly interpret the data and identify areas of concern.
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7. References

[1] Government of India Open Data Platform: https://data.gov.in/
[2] Excel Official Documentation: https://support.microsoft.com/en-us/excel
[3] WHO Air Quality Guidelines: https://www.who.int/publications/i/item/9789240034228

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