Universidad Politécnica de Valencia *June 27th, 2023*

EXPLORING AIR QUALITY IN VALENCIA

Data Science Degree

Subject: EDM

Miembros: Jacob López Minguela
Antonio Martí Mora

Escola Tècnica Superior d'Enginyeria Informàtica

etsinf

A R SHINY PROJECT REVIEW

- Introduction

The deployment of an Air Quality project in the city of Valencia using R Shiny was aimed at analyzing air quality data from various weather stations over the time period of 2019-2022. This review aims to provide an overview of the project, highlighting the different statistical and visualization tools utilized to gain insights into the changing trends in air quality over the years.

- Data Description and Pre-Processing

The dataset used in the project consists of approximately 13,000 rows of data, representing various weather stations in Valencia and their corresponding air pollution contributions to the Air Quality Index (AQI) over a time span of four years, from 2019 to 2022.

To ensure the reliability and accuracy of the data analysis, several pre-processing steps were undertaken. The first step involved addressing missing values (NA) in the dataset. Missing data can impact the integrity of statistical analyses and visualization outputs. Therefore, an imputation technique was employed to fill in these missing values, ensuring a complete dataset for analysis.

Furthermore, to focus the analysis on areas with significant variations in AQI levels, cities or stations with relatively stable or consistent air quality were filtered out. This step allowed for a more targeted investigation of locations that experienced notable fluctuations in air pollution levels over the four-year period.

- Project Overview

The primary objective of the project was to analyze the air quality data obtained from multiple weather stations in Valencia. The data spanned a significant time period of four years, enabling the investigation of air quality trends and their potential correlations with various factors such as weather conditions, time of year, and pollution sources.

- Visualization Tools

To facilitate data exploration and enhance the presentation of findings, a range of visualization tools were employed in the R Shiny project. Time series plots were utilized to visualize the air quality trends over the four-year period, allowing for the identification of patterns and anomalies. Scatter plots were used to explore potential relationships between air quality and weather variables, providing valuable insights into the impact of weather conditions on air quality.

Furthermore, interactive maps were incorporated to display the spatial distribution of air quality levels across the city of Valencia. This visual representation allowed users to identify areas with consistently poor air quality, highlighting potential pollution hotspots and enabling targeted interventions. The incorporation of interactive elements within the maps enhanced user engagement and provided a more immersive exploration experience.

- Insights and Findings

The utilization of different statistical and visualization tools yielded valuable insights into the changing trends in air quality over the specified time period. The project identified both short-term fluctuations and long-term patterns in air quality levels, enabling a deeper understanding of the factors influencing air pollution in Valencia.

Additionally, the analysis revealed potential correlations between air quality and weather conditions. For example, certain weather patterns, such as temperature inversions or periods of low wind speed, were associated with increased pollution levels. These findings have significant implications for policymakers and city planners, as they provide evidence for the development of targeted strategies to mitigate air pollution during specific weather conditions.

- Conclusion

The R Shiny project focused on analyzing air quality data from various weather stations in Valencia over the time period of 2019-2022. By employing a range of statistical and visualization tools, the project provided valuable insights into the changing trends and correlations between air quality and weather conditions. Therefore, we believe the findings of this project have the potential to inform city planners, helping them in the development of effective strategies to improve air quality and public health in Valencia and helping the people to avoid places with high pollution as well.