

## **Functional Requirements:**

### **Data Analysis Functionality:**

- The system shall be able to analyze data from sensors to ensure their proper functioning.
- It shall calculate statistics such as mean air quality within a specified area and time frame.
- The system shall allow users to select a sensor and compare its data with others for similarity assessment.

### **Security Analysis:**

- The system shall analyze data from private individual sensors to detect and classify unreliable behavior.
- It shall mark unreliable data and exclude it from further queries to prevent manipulation and maintain data integrity.

### **Air Quality Prediction:**

- The system shall provide air quality values at specific geographical positions, even if no sensor is present at that location.
- It shall utilize historical data and algorithms to estimate air quality accurately.

### **Integration with Air Cleaners:**

- The system shall integrate data from air cleaners to observe their impact on air quality.
- It shall analyze the radius of cleaned zones and the level of improvement in air quality

## **Non functional :**

### **Performance:**

- The system's algorithms for data analysis shall execute efficiently, with a measurable duration in milliseconds
- Response time for user queries should be minimal to provide a smooth user experience

### **Reliability:**

- The system shall accurately identify malfunctioning sensors and unreliable data sources to maintain the reliability of analysis results.
- It shall handle large datasets efficiently without compromising performance.

### **Scalability:**

- The system architecture shall be designed to accommodate future expansion, including a growing number of sensors and users.
- It shall support concurrent user access without degradation in performance.

- **Security:**

- The system shall implement robust security measures to protect sensitive data and prevent unauthorized access.
- It shall encrypt communication between components and implement user authentication and authorization mechanisms.

- **Usability:**

- The console-based user interface shall be intuitive and user-friendly, providing clear instructions for different functionalities.
- It shall support multiple user roles with appropriate access levels to ensure efficient usage by different stakeholders.

- **Maintainability:**

- The system shall be designed with modularity and code readability in mind to facilitate future maintenance and updates.
- It shall include comprehensive documentation for developers and users to understand system components and functionalities