**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 functionnal :

 **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