

Functionnal and non-functionnal requirements :

Functionnal	Non-functionnal
	L'application doit être développée avant le 07/06

Functionnal :

### **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