# Requirements Analysis for the Analysis Team

## Core Responsibilities of the Analysis Team:

Receive raw sensor data from the Data Team, complete deviation analysis → anomaly labeling. Provide real-time anomaly status to the UI Team and return structured analysis results to the Data Team for storage.

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## I. Input Data Requirements (Data Team)

### 1. Data Format Specifications

| Field | Description | Example Value | Constraints |
|---|---|---|---|
| collection_time | Data collection time (accurate to seconds) | 2025-03-12 19:50:43 | Timestamp must be incremental |
| sensor_id | Sensor ID (format: left_1, right_2) | left_1 | Only 4 predefined IDs allowed |
| pitch_angle | Pitch angle (front/back swing, in degrees) | -66.5 | Range: [-90°, 90°] |
| roll_angle | Roll angle (left/right tilt, in degrees) | 50.554 | Range: [-180°, 180°] |

### 2. Data Quality Requirements

Collection frequency: ≥5Hz (at least 5 data points per second, ±30% fluctuation allowed).
Completeness: Daily data loss rate <10%; mark missing data as "error_type": "missing".

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## II. Analysis Team Processing Workflow

### 1. Data Processing Stages

| Stage | Requirements Description |
|---|---|
| Data Cleaning | 1. Filter invalid sensor IDs.<br>2. Remove outliers (e.g., pitch_angle=999). |
| Sliding Window Calculation | Calculate the mean over 5 consecutive data points (noise reduction). |
| Constrast &Deviation Analysis | Determine if the mean exceeds the standard range → generate anomaly labels. |
| Result Packaging | Format data according to specifications and distribute to UI and Data Teams. |

### 2. Anomaly Labeling Rules

Single anomaly: Filtered data exceeds the standard range.
Persistent anomaly: Same angle exceeds limits 3 times consecutively → mark as "persistent_abnormal": true.

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## III. Output Definitions

### 1. Push the comparison and analysis results to the UI group in real time

Method: HTTP GET polling (once per second).
Endpoint: /api/realtime

### 2. Structured Results to Data Team

Method: Structured JSON via API (e.g., POST /api/store_analysis_result).