# Real-Time Quality Validation for Streaming Data Using AI

## Use Case: Real-Time Weather Data Streaming and Quality Validation

In this System, we chose the **weather data streaming** use case to demonstrate the power of AI-driven real-time data validation. Weather data, such as temperature, humidity, pressure, wind speed, and air quality, is constantly generated from various sensors and meteorological stations worldwide. Ensuring the quality and reliability of this streaming data is critical for making accurate forecasts, timely warnings, and informed decisions across various sectors like agriculture, transportation, and disaster management.

To address this, our system integrates **AI-based anomaly detection** using the **Isolation Forest** model. The system simulates the streaming of weather data in real-time, and as new data arrives, it undergoes preprocessing, validation, and anomaly detection to identify any unusual or unreliable values. The validated data is stored and continuously displayed in a **real-time dashboard** to allow monitoring and analysis.

By applying this real-time data validation system to weather data, we ensure that only trustworthy and consistent data is used, which is essential for critical decision-making processes in various fields.

Initializing the anomaly detection model...

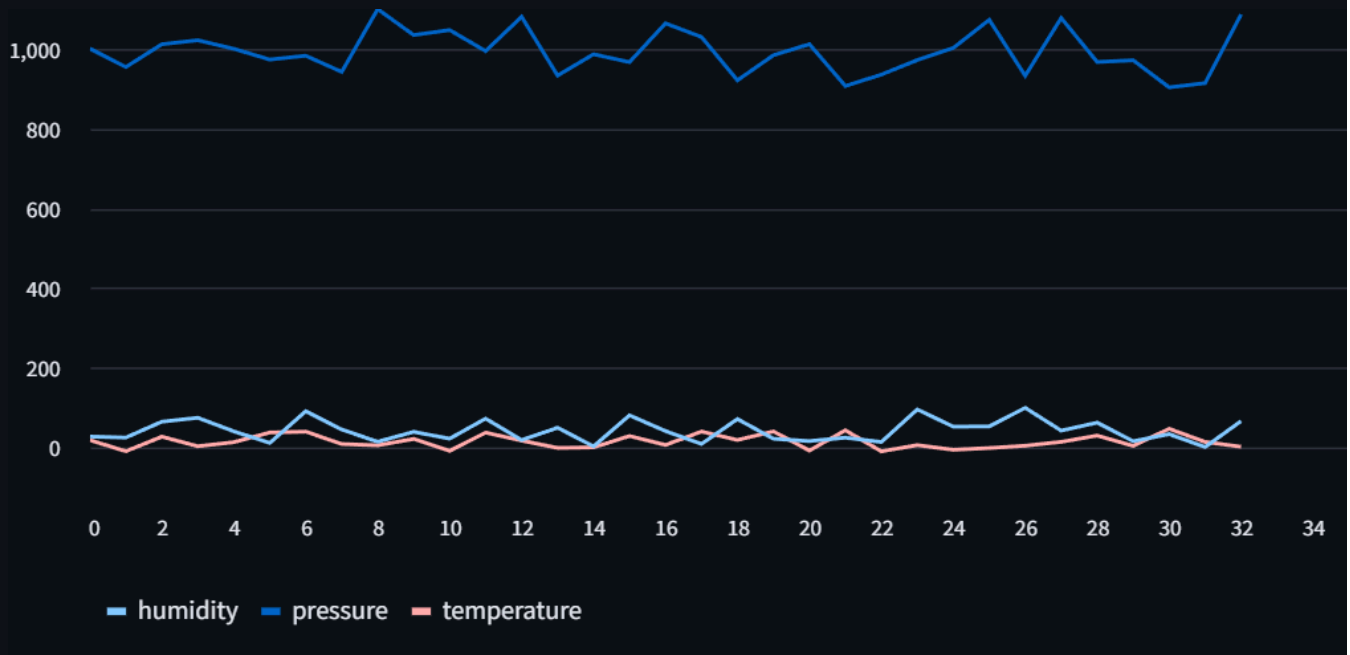
Model initialized successfully!

# Real-Time Data Quality Monitoring

## Latest Data with Validation Status

| | temperature | humidity | pressure | status |
|---|---|---|---|---|
| 23 | 6.1406 | 95.7509 | 971.9285 | Valid |
| 24 | -5.5243 | 52.5266 | 1,002.2873 | Valid |
| 25 | -1.0988 | 53.1383 | 1,072.8685 | Valid |
| 26 | 4.6368 | 99.7071 | 932.5101 | Valid |
| 27 | 14.3307 | 42.4999 | 1,077.372 | Valid |
| 28 | 30.1351 | 62.6183 | 967.1193 | Valid |
| 29 | 4.2223 | 16.0295 | 971.4096 | Valid |
| 30 | 47.1425 | 33.6804 | 903.475 | Anomal |
| 31 | 14.2067 | 1.3868 | 914.0858 | Anomal |
| 32 | 2.0554 | 66.4064 | 1,086.3513 | Valid |

## Data Trends Over Time




## Recent Anomalies

| | temperature | humidity | pressure | status |
|---|---|---|---|---|
| 21 | 43.3661 | 24.8162 | 906.9128 | Anomaly |
| 30 | 47.1425 | 33.6804 | 903.475 | Anomaly |
| 31 | 14.2067 | 1.3868 | 914.0858 | Anomaly |