Dynamic IoT & AI Analytics Platform with Grafana

1. Overview

Intuitive Robotics aims to develop a **real-time IoT monitoring and AI analytics platform** with advanced data visualization using **Grafana**, **Flask for AI processing**, **Node.js for backend APIs**, and **MongoDB/InfluxDB for data storage**. The platform will provide users with real-time insights, device control, and AI-powered analytics.

2. Project Scope

The platform will include the following key features:

A. IoT Monitoring with Grafana

- Secure login for user-specific access.
- Real-time **sensor data visualization** using Grafana dashboards.
- **Data visualization components:**
    - Line Graphs (Time-series data visualization)
    - Gauges (Sensor readings: temperature, pressure, etc.)
    - Status Indicators (Colored circles for binary states: ON/OFF)
- Data storage using **InfluxDB for time-series data**.
- **Device control widgets** (Switches, sliders, numeric input boxes).
- **Admin panel** to customize user dashboards and add new data sources.

B. AI Analytics System (Flask + Node.js)

- **Real-time AI data analysis**:
    - Start/Stop Data Collection.
    - Execute Python-based AI models.
    - Display results via Flask API.
- **Pre-recorded Data AI Analysis**:
    - Load historical data for AI processing.
    - Generate AI insights and visualize results.

C. User Authentication & Access Control

- **JWT-based authentication** for security.
- Role-based access (**Admin, Client, Developer**).
- Each client will have personalized dashboards with controlled access.

D. Subscription & Payment Integration

- **Razorpay integration** for monthly/yearly subscriptions.
- Auto-renewal and cancellation options.

E. Admin Panel Features

- **User Management**: Create, delete, update users.
- **Dashboard Customization**: Assign Grafana dashboards per user.
- **Subscription Management**: Monitor & control user access.
- **Data Control**: Set storage limits & retention policies.

3. Technology Stack

Frontend:

- **React.js** (for authentication, AI results display, and Grafana embedding)
- Tailwind CSS / Material-UI for UI components

Backend:

- **Node.js + Express.js** (API handling, authentication, MQTT processing)
- **Flask (Python-based AI processing server)**

Database:

- **MongoDB** (Stores user, device, and AI analysis results)
- **InfluxDB** (Optimized for time-series IoT data storage)

Data Visualization:

- **Grafana** (Real-time IoT monitoring dashboards)

Communication Protocols:

- **MQTT & HTTP** for IoT data transmission.

Deployment:

- **Hostinger VPS for backend, Flask API, InfluxDB, and Grafana**.
- **MongoDB Atlas for cloud-based user management database**.