**FLOOD MONITORING SYSTEM**

**Project Definition:**

* The project involves deploying IoT sensors near water bodies and flood-prone areas to monitor water levels and provide early flood warnings through a public platform.

**Project Objective:**

* The objective is to enhance flood preparedness and response by issuing timely warnings to both the public and emergency response teams.

**Design:**

**1.Sensor Network:**

* + **Rainfall Sensors:** Deploy rain gauges and weather stations across the area to measure rainfall intensity.
  + **River and Stream Gauges:** Install sensors in rivers and streams to monitor water levels and flow rates.
  + **Soil Moisture Sensors:** Place sensors in the ground to measure soil moisture levels, which can indicate the potential for saturated soil and increased flood risk.
  + **Weather Radar and Satellite Data:** Integrate real-time weather data from radar and satellite sources to track weather patterns.

**2.Data Collection and Transmission:**

* + Establish a communication network (e.g., cellular, satellite, or IoT) to transmit data from the sensors to a central data repository.
  + Use data loggers or IoT devices to collect and store sensor data locally if real-time transmission is not possible.

**3.Data Processing and Analysis:**

* + Implement data analytics and machine learning algorithms to process and analyze the incoming data.
  + Calculate rainfall intensity, river levels, and soil moisture trends.
  + Combine historical data with real-time measurements to identify patterns and predict potential flooding events.

**4.Early Warning System:**

* + Set up a decision support system that triggers alerts when specific thresholds are exceeded.
  + Create a hierarchy of alerts based on the severity of the flood risk.
  + Integrate the warning system with local emergency services and agencies.

**5.User Interface:**

* + Develop a user-friendly dashboard or web application for system operators and the public.
  + Display real-time data, flood risk levels, weather forecasts, and emergency information.
  + Include maps and visualizations to help users understand the situation.

**6.Public Notifications:**

* + Send automated alerts to residents and businesses in flood-prone areas through various channels (e.g., SMS, email, mobile apps).
  + Provide clear instructions on evacuation routes and safety measures.

**7.Response Coordination:**

* + Integrate the flood monitoring system with local emergency response agencies.
  + Automate the process of dispatching resources and personnel to affected areas.
  + Coordinate with law enforcement, firefighters, and rescue teams.

**8.Data Storage and Backup:**

* + Ensure secure and redundant storage of historical and real-time data.
  + Implement backup systems to prevent data loss in case of system failures.

**Technology Stack**

The following technologies will be used in the project:

* **IoT Sensors:** Water level sensors,Rainfall sensors,Humidity Sensors
* **Communication Protocol:** MQTT
* **Data Storage:** PostgreSQL
* **Web Development:** Python (Django), HTML/CSS, JavaScript
* **Data Analysis:** Python (Pandas, NumPy)
* **Visualization:** Python (Matplotlib, Plotly)
* **Hosting:** [Cloud Service Provider]

**BLOCK DIAGRAM:** 