TEAM DELENITORS

Intelligent Flood Warning System

Smart India Hackathon 2020

ABOUT US

Team Delenitors is a six-member team from Siliguri Institute of Technology, West Bengal.

We are a group of motivated students who have committed themselves towards the betterment of society by making use of technology.

OUR PROBLEM STATEMENT

BY MINISTRY OF POWER

Development of IoT based advance Public Address and Flood Warning Systems across all Hydro Power project areas.

BEFORE WE BEGIN

HOW DID WE APPROACH THE PROBLEM STATEMENT?

We conducted surveys to find out that most of the processes followed in India to detect flood were manual, which caused a delay in detection and hence a short warning time.
To contain these problems, we thought of a system that integrates recent technology like IoT, Machine Learning and Cloud.

What problems did our solution tackle?

REAL TIME MONITORING

Real time is data gathered and displayed in the dashboard.

EARLY PREDICTION

Use of Machine Learning for early flood prediction and predicting time for opening of dam gates.

IDENTIFYING AREAS OF HIGH RISK

Identifying areas of high risk using historical data.

PUBLIC AWARENESS

Effective public awareness by using every mode of communication.

SOLUTION IN A NUTSHELL

FLOOD FORECASTING SYSTEM

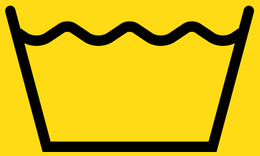
Weather API will provide rain forecast, snow forecast, etc

Prediction of water level rise using AI

Volume of water to be discharged is calculated based on rise

AI based equation will calculate the travel time of the discharge

Next dam on the course will calculate water rise using AI



River level rise at low level station will be calculated based on inflow

Calculated level increase due to rainfall will also be used to predict river water level

Alerts will be raised accordingly if the calculated water level exceeds the threshold

SOLUTION IN A NUTSHELL

AUTOMATIC PUBLIC ALERT SYSTEM

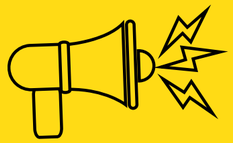
Sensor will measure water level

Weather station will record current weather

Data gathered from field will be sent to MQTT broker via LoRa

Data from MQTT will be stored in SQL Database by an API

REST API will fetch the data from Database and display in Dashboard



Alerts will automatically be issued if water rises beyond the danger level

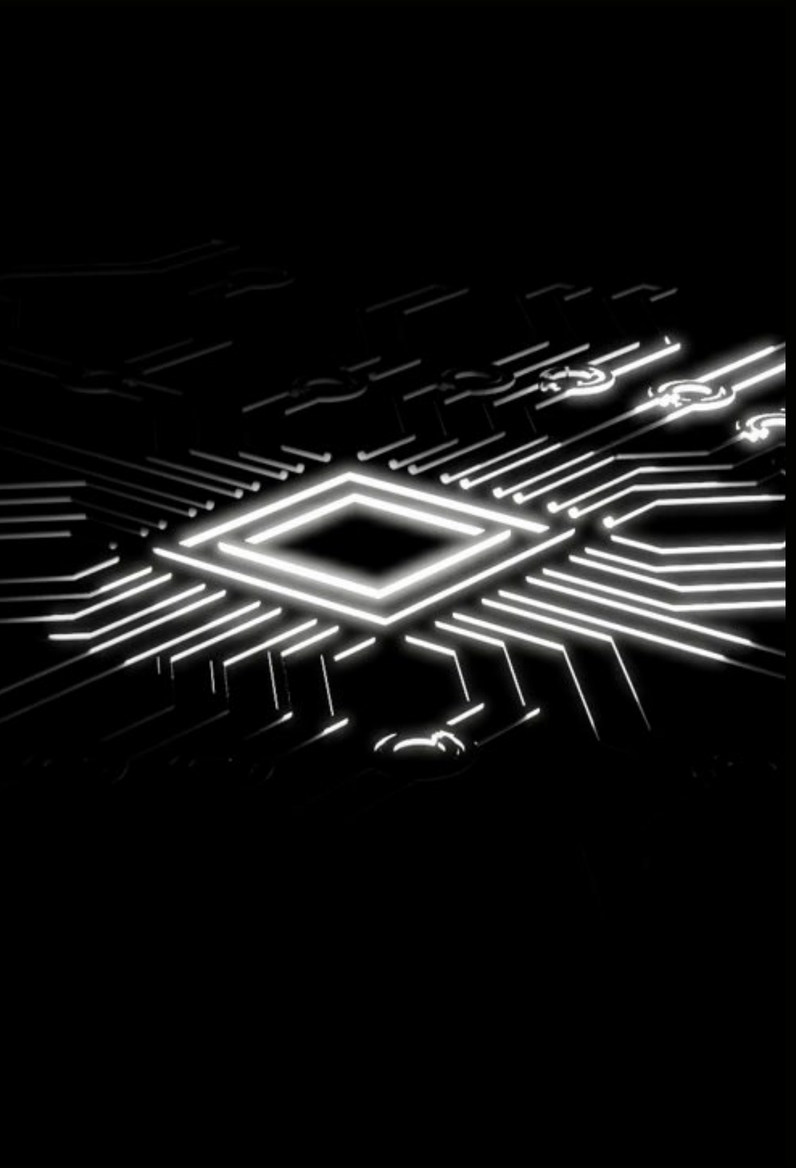
Awareness will also be spread through calls and SMS

Concerned authorities will be initimated about high risk areas

TECHNOLOGY USED

SOFTWARE STACK

- Microsoft Azure Cloud Service
- Twilio - Call and SMS
- SendGrid - Email Service
- Twitter
- MQTT
- SQL - Database



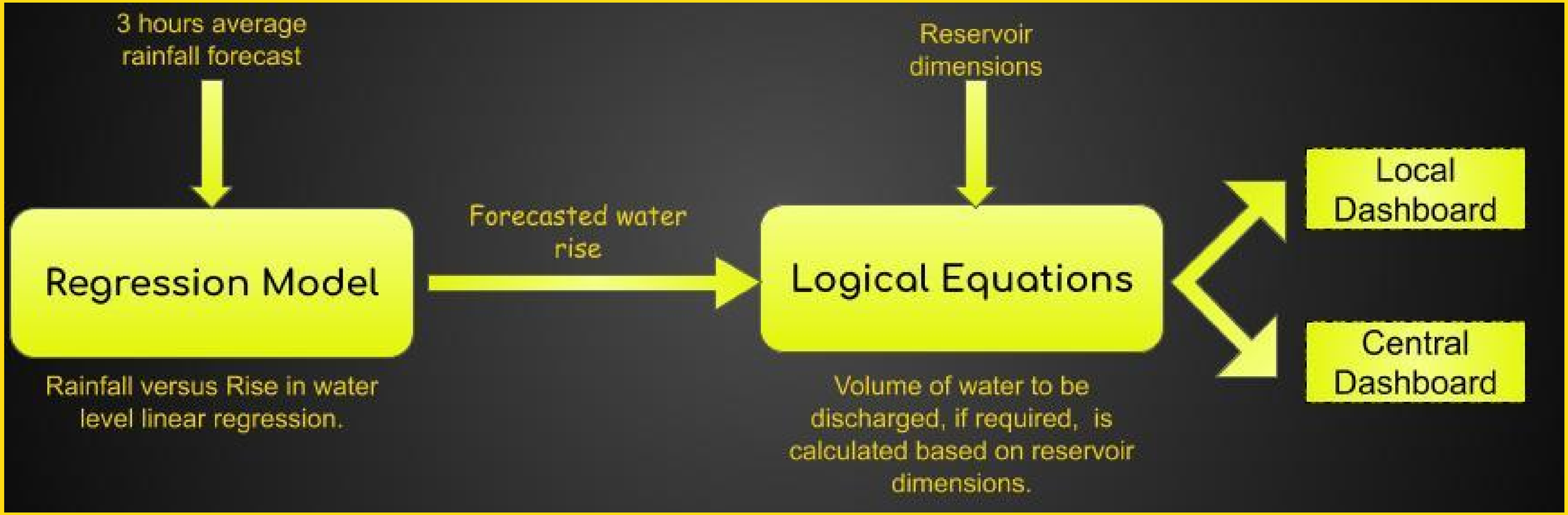
TECHNOLOGY USED

HARDWARE STACK

- LoRa Gateway
- Weather station
- Ultrasonic water level sensor
- Raspberry Pi
- Arduino UNO board
- 16 x 2 RGB LCD

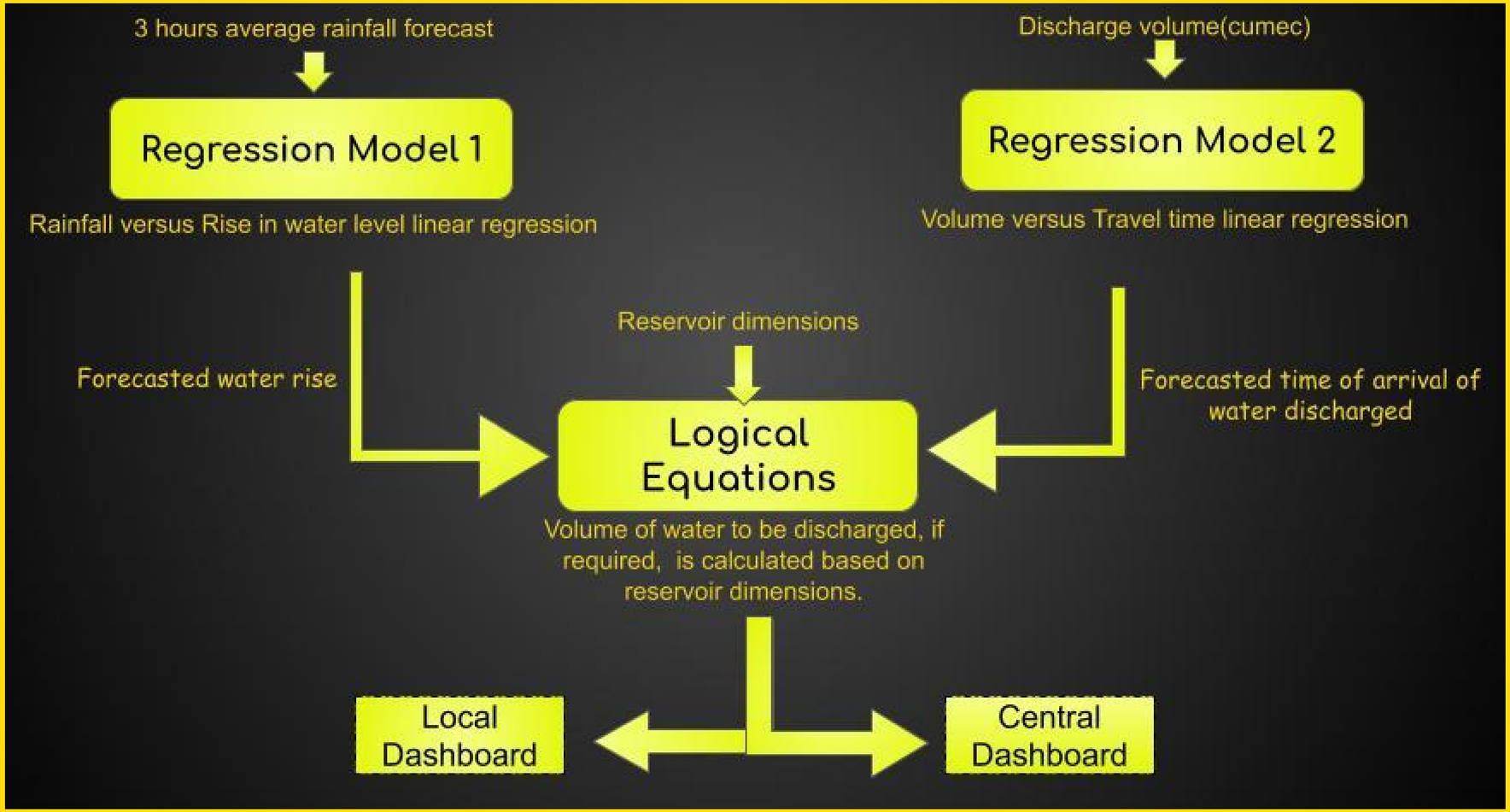
FLOOD FORECASTING SCHEMATIC

DAM 1(HIGHEST ELEVATION)



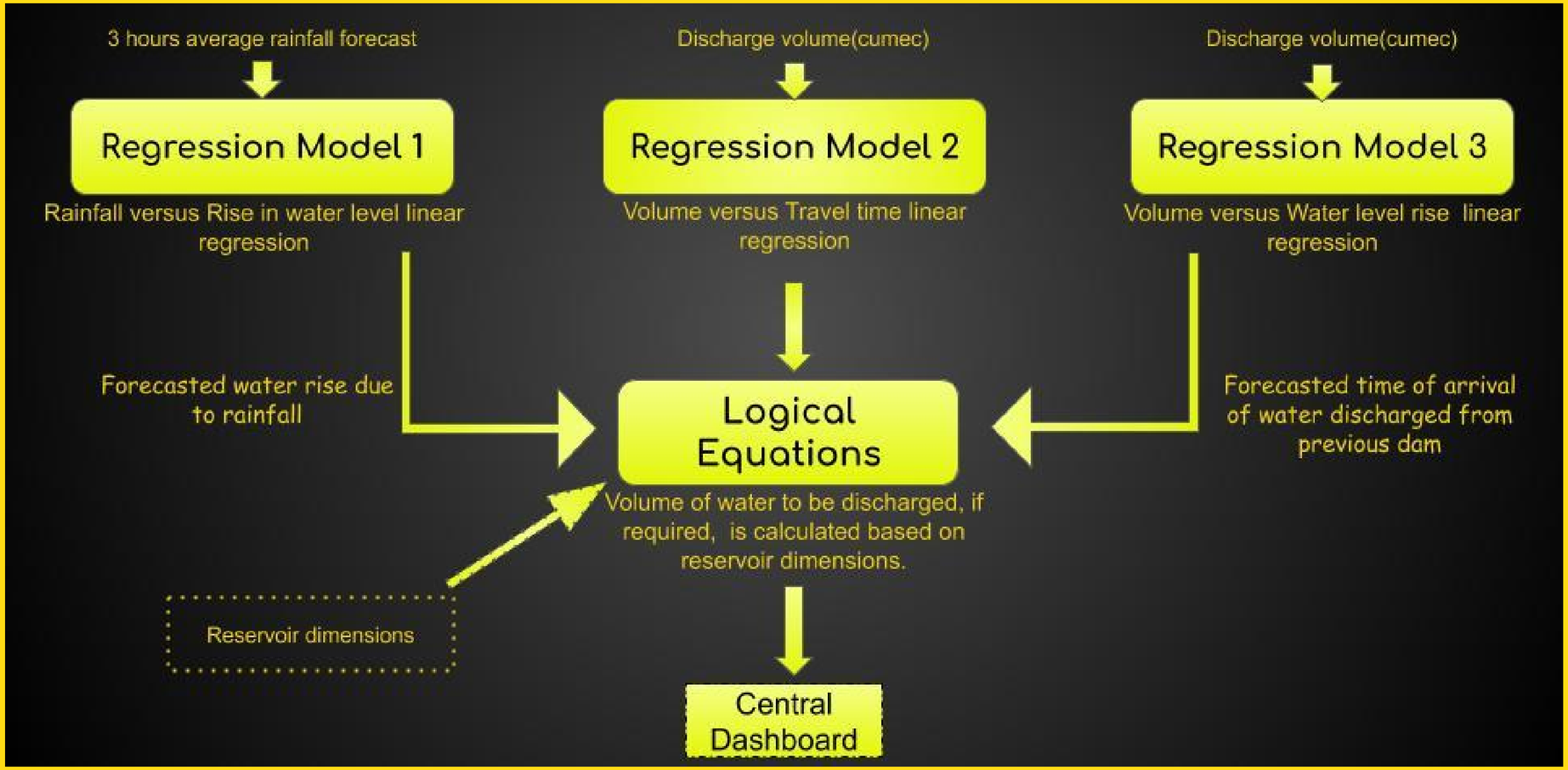
FLOOD FORECASTING SCHEMATIC

DAM 2

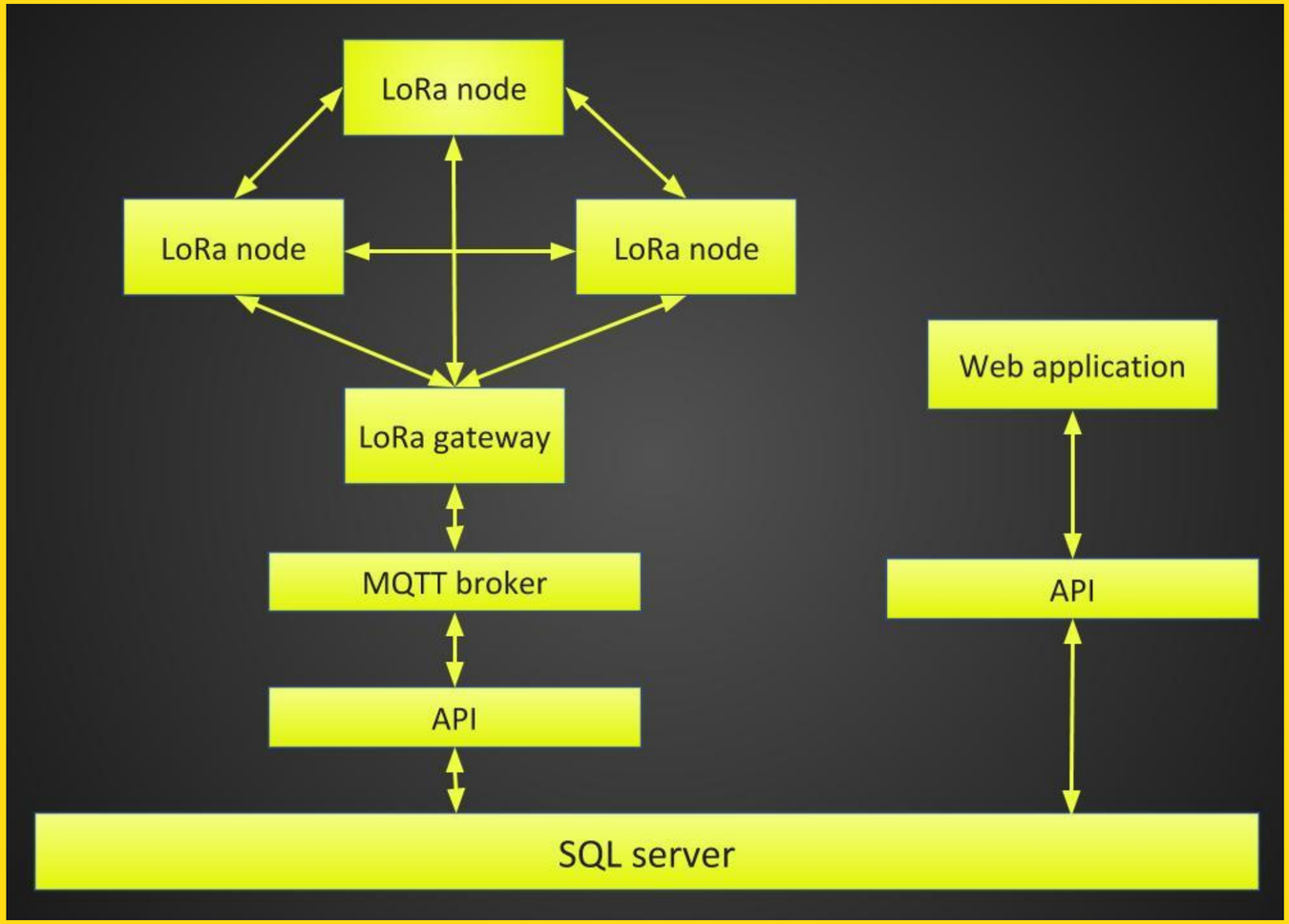


FLOOD FORECASTING SCHEMATIC

GAUGE STATION(LOWEST ELEVATION)

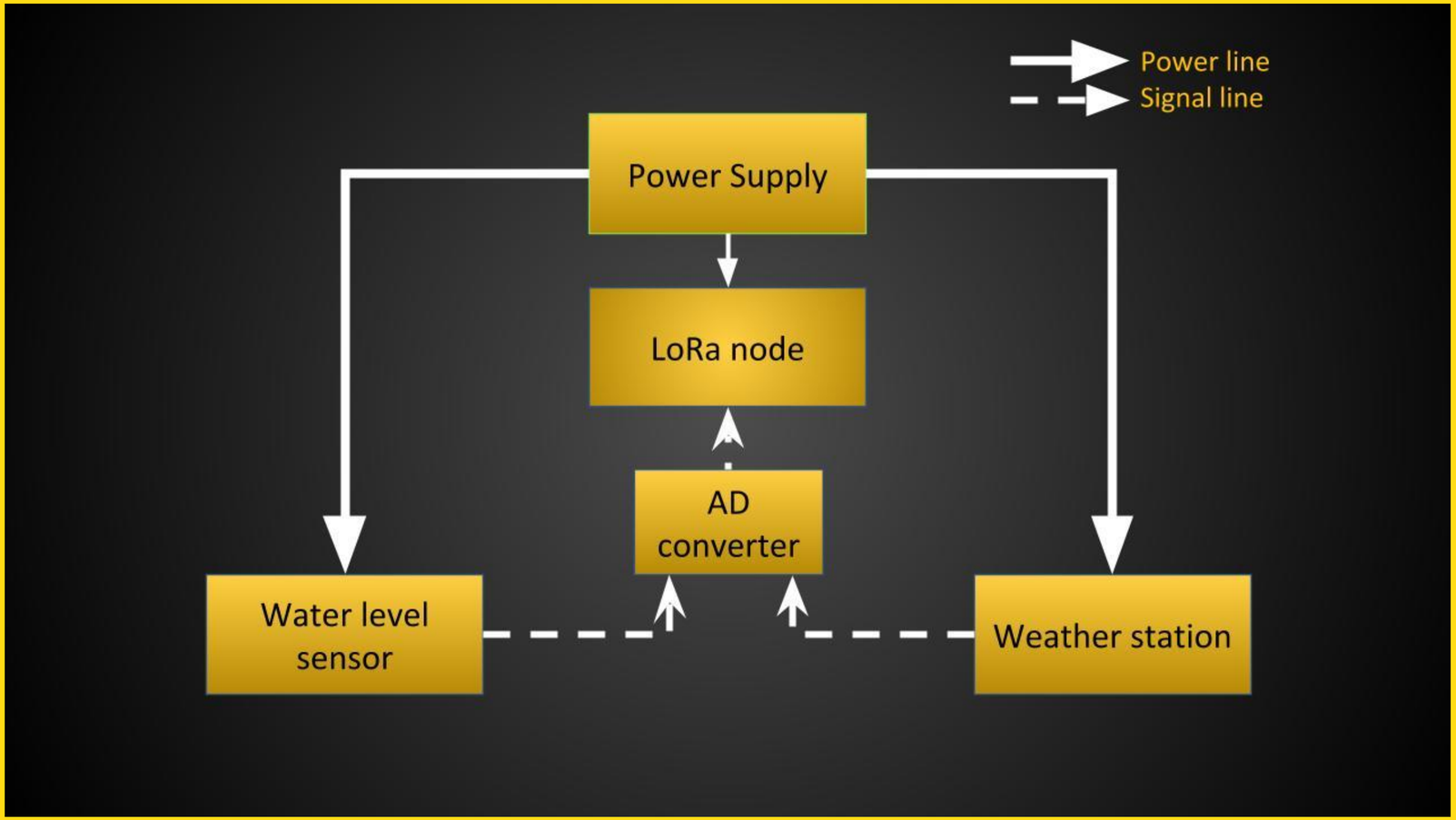


WORKFLOW


LoRa node
LoRa node
LoRa node
LoRa gateway
MQTT broker
API
SQL server
Web application
API

SENSOR CONNECTION

SCHEMATIC



KEY POINTS OF OUR SOLUTION

- DATA COLLECTION AND TRANSFER USING IOT
- FLOOD PREDICTION USING MACHINE LEARNING
- AUTOMATED ALARM TRIGGER
- LAST MAN CONNECTIVITY
- HIGH SECURITY
- COST EFFECTIVE
- POWER EFFICIENT

Our Team

DELENITORS

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