

Water LLM Engine - Storm Overflow Prediction and Control

Meet the Smart Guardian

The Water LLM Engine is your digital storm officer.

It monitors weather and tank levels, predicts risks, and acts automatically to prevent overflows.

It Starts with a Storm Warning

- Listens to live weather forecasts
- Monitors water levels using sensor APIs
- Gathers real-time environmental signals

It Thinks Like a Human Operator

- Calculates overflow risk using:
 - Rainfall forecast
 - Tank fill percentage
- Risk levels: HIGH, MEDIUM, LOW

If There's a Risk It Acts Immediately

- HIGH risk Open overflow valve via SCADA/PLC
- MEDIUM risk Start buffer pump
- LOW risk No action, but keeps watching

Fully Integrated

- Sends commands using:
 - SCADA APIs
 - MQTT brokers
 - OPC-UA
 - PLC Modbus
- Real-time, reliable infrastructure control

Regulatory Compliance Reporting

- GPT-4 generates structured reports on overflow events
- Each report includes:
 - What happened
 - Why it happened
 - What action was taken
- Supports compliance with environmental and municipal laws

Smart Logging System

- Every action, forecast, and control decision is logged
- Logs include:
 - Timestamp
 - Location
 - Risk Level
 - Actuation command (if any)
- Enables audit trails and root cause analysis

AI-Powered Advisory

- GPT-4 explains decisions in plain English
- Operators can ask:
 - Why did we open the valve?
 - What should we do next?
- Promotes trust and human-AI collaboration

Integration Config Management

- Pulls settings from central SQLite database
- Includes config for:
 - SCADA APIs
 - MQTT brokers
 - OPC-UA endpoints
 - PLC Modbus URLs
- Makes the engine easily portable and customizable

Simulation Result Comparison

- Compares actual overflow data vs. simulation predictions
- Highlights errors or anomalies
- Enables fine-tuning of prediction models

In Simple Words

Water LLM Engine is a storm officer that:

1. Monitors the sky
2. Checks tank levels
3. Thinks quickly
4. Acts when needed
5. Keeps records
6. Advises humans