



Smart Water Guardian: An AI & IoT-based Water Conservation System

Presented by: PRASHANT GUPTA
TEAM NAME : **HydroSaviors**

The Silent Crisis: Water Wastage & Contamination

Global Water Scarcity: Despite being covered in water, only 0.5% is fresh, accessible, and available. Leaky pipes, inefficient usage, and unmonitored consumption lead to massive wastage daily.

Vulnerable Populations: Elderly and specially-abled individuals face significant challenges in managing water usage and detecting issues like leaks or contamination.



- ⊗ **Contamination Risks:** Unseen threats lurk in water supplies, leading to health hazards. Current detection methods are often slow and reactive.

Introducing: Smart Water Guardian

A comprehensive AI & IoT solution revolutionizing water management for conservation, safety, and accessibility.



Real-time Monitoring

Track water flow and quality continuously.



Automated Filtration

Proactive purification based on detected contaminants.



Instant Alerts & Control

Notifications for leaks, anomalies, and remote shut-off.

The Core: AI + IoT Tech Stack

Our system leverages cutting-edge technologies to deliver unparalleled water intelligence.

Internet of Things (IoT)

- **Sensors:** Flow, pH, turbidity, conductivity, temperature.
- **Actuators:** Smart valves, automated filtration units.
- **Connectivity:** Low-power wide-area networks (LPWAN).



Artificial Intelligence (AI)

- **ML Models:** Anomaly detection, predictive analytics.
- **Real-time Dashboard:** User-friendly insights.
- **Voice Alerts:** Accessible notifications for all users.



System Architecture: Data to Action

Sensors continuously feed data to a secure cloud platform. Our ML models analyze this data in real-time, identifying anomalies and predicting contamination. This triggers instant alerts and system responses.

Unique Features for Enhanced Living

1

Elderly & Specially-Abled Friendly UI

Voice commands, large visual indicators, and simplified controls for seamless interaction.

2

Contamination Prediction & Auto-Filtering

AI predicts potential contamination before it occurs, initiating automatic filtration processes.

3

Leak Alerts & Emergency SMS

Immediate notifications via app, voice, and SMS for leaks, with option for remote shut-off.

Impact & SDG Link: Clean Water for All

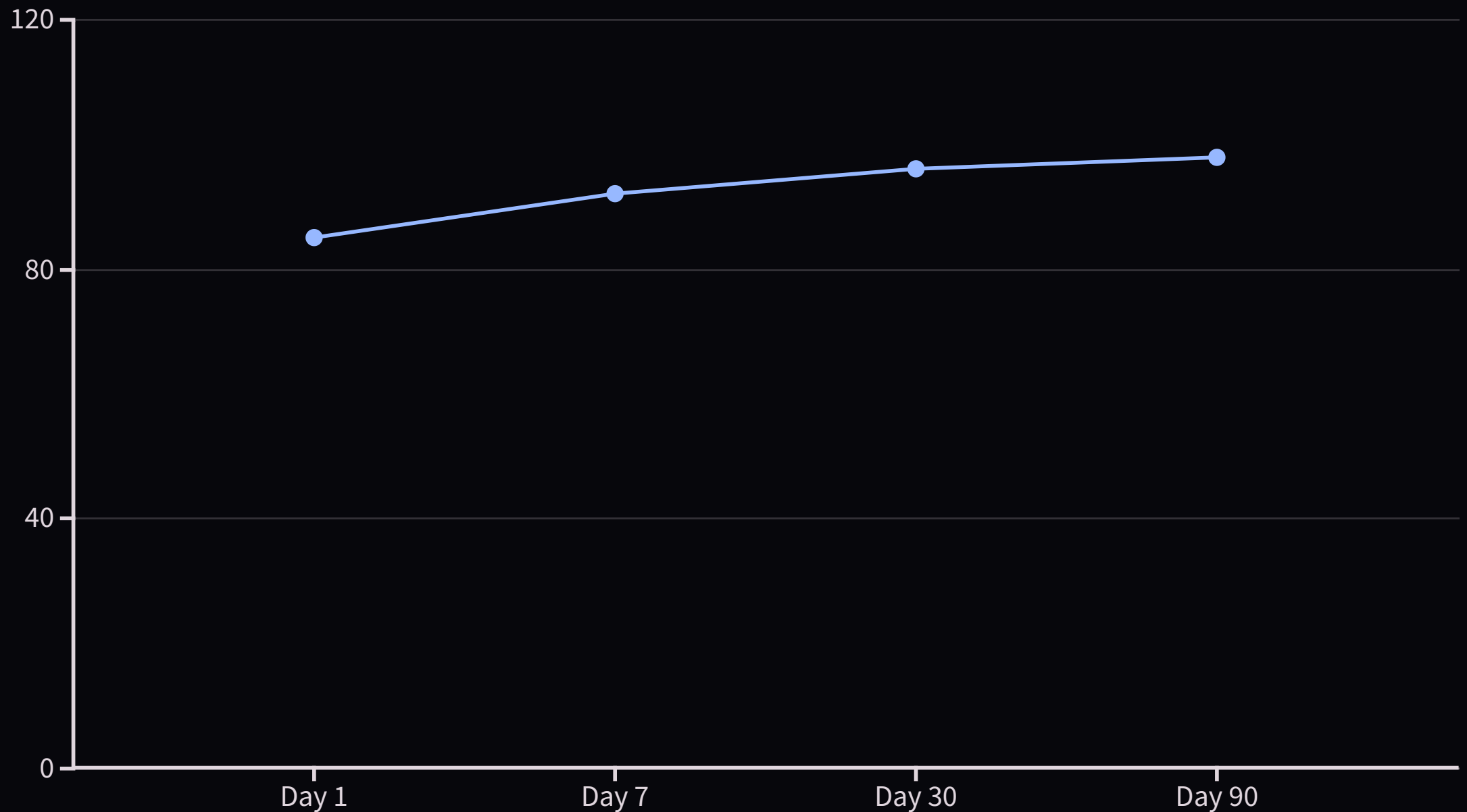
UN SDG Goal 6: Clean Water and Sanitation

Smart Water Guardian directly contributes to achieving SDG 6.4 (substantially increase water-use efficiency) and SDG 6.6 (protect and restore water-related ecosystems).

Real-world Use Cases: Homes, schools, hospitals, factories, and agricultural settings.



ML Model: Predictive Contamination



Our primary ML model, based on a fine-tuned **XGBoost classifier**, analyzes sensor data to predict water contamination events with high accuracy.

It learns from historical water quality data and environmental factors to identify patterns indicative of impurities, providing proactive alerts before issues escalate.

The Road Ahead: Future Enhancements



Solar-Powered Version

Developing energy-independent units for remote areas.



BharatNet Integration

Leveraging national fiber optic network for wider reach.



Multi-Language Voice Alerts

Expanding accessibility for diverse linguistic backgrounds.



Edge Computing Capabilities

Processing data locally for faster response times and reduced cloud dependency.