

GNANAMANI COLLEGE OF TECHNOLOGY

Department : BIO MEDICAL ENGINEERING

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TOPIC – SMART WATER MANAGEMENT

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SMART WATER MANAGEMENT

Definition

Smart water management is the activity of planning, developing, distributing and managing the use of water resources using an array of IoT technologies which are designed to increase transparency and make more reasonable and sustainable usage of these water resources.

With IoT, the whole water supply chain can become more transparent and easier to control. With the help of sensors, a smart city water management system can enable you to collect real time data information that helps you visualize water distribution across the network.

Components of smart water management:

Some of the components used in smart management in IOT technologies are

- smart device.
- speedy network.
- Digital solutions.

Technologies used in smart water management:

Microcontrollers and sensors – such as ultrasonic Sensors, Flow sensors, temperature, salinity. Conductivity. Humidity, pressure or luminosity sensors. Sensors placed on pipes or pumps. Measure the water level, flow, Temperature and quality of the water in real time.

Software involved in smart water management:

- Webby Lab's 2Smart standalone.
- Combined with the 2Smart cloud platform.

Working process of smart water management:

- Smart water management using IOT provides. The solution for the firms to regulate water. Flow by interconnecting smart sensors and smart meters.
- The main role of the sensors and meter is to collect water flow data and generate analytical water performance reports.
- With the aid of web dashboards, industries observe the utilization of water.

Challenges in smart water management:

- High deployment and maintenance costs.
- Lack sufficient infrastructure to support smart metering.
- Lack of skills interoperability issue.
- Weak Communication signals in some Location.
- Power cabling challenges in confined and remote locations.

Hardware and software requirements:

A Laser sensor of VL53L0X for precise water. Level indication in storage tanks can be utilized. This type of sensor can sense the water level in real-time and with an attached HC12 transmitter for data transfer to the cloud platform.

Components within the transmitter can comprise of an Arduino and Node Mcu utilizing low power and transmitting data using any of the wireless technology such as ZigBee, Low power wide area networks, RFID or Wi-Fi/ Wi-Fi Halow.

Major highlights of this technology :

Higher spatial Resolution: As its backbone is based on the internet, in spatial resolution is ideally infinite. It implies that monitoring water storage tank is possible from any corner of the globe wherever access to the internet is possible.

Reduced cost: As it uses the existing communication infrastructure of the internet, the overall cost for the system's development has been reduced.

Real-time feedback: Embedded systems centred around IOT technology can supply real-time feedback to its end. Users via a short message service tweeter, email and Facebook.

Main objectives of smart water management:

- Reduce wasting water.
- Improved water quality.
- Improves the efficiency of water systems.
- Implement leakage control.
- Practice consumption monitoring.

PHASE -2

Smart Water Management Innovations:

Smart water management involves the use of technology and innovation to optimize the distribution and conservation of water resources. Some innovations in this field include:

IoT Sensors: Internet of Things (IoT) sensors can monitor water quality, flow, and usage in real-time, allowing for better control and early detection of leaks or contamination.

Data Analytics: Advanced analytics can process the data from sensors to provide insights into water usage patterns, enabling more efficient resource allocation.

Remote Monitoring: Remote monitoring systems enable water utilities to manage infrastructure remotely, reducing the need for physical inspections.

Water Recycling: Innovative systems for treating and recycling wastewater can help conserve water resources and reduce pollution.

Leak Detection: AI-powered leak detection systems can pinpoint leaks in water distribution networks quickly, reducing water loss.

Smart Irrigation: Smart irrigation systems use weather data and soil moisture sensors to optimize watering schedules, conserving water in agriculture.

Water Purification: Novel water purification technologies, such as graphene filters or solar desalination, can improve access to clean drinking water.

Blockchain: Blockchain can enhance transparency and traceability in water management, reducing fraud and ensuring fair resource allocation.

Mobile Apps: Mobile apps and platforms can empower consumers to monitor and control their water usage, promoting conservation.

Green Infrastructure: Integrating natural elements like wetlands and green roofs into urban planning can help manage stormwater and reduce the strain on water treatment plants.

These innovations aim to enhance the sustainability, efficiency, and reliability of water management, addressing the challenges posed by growing water scarcity and environmental concerns.