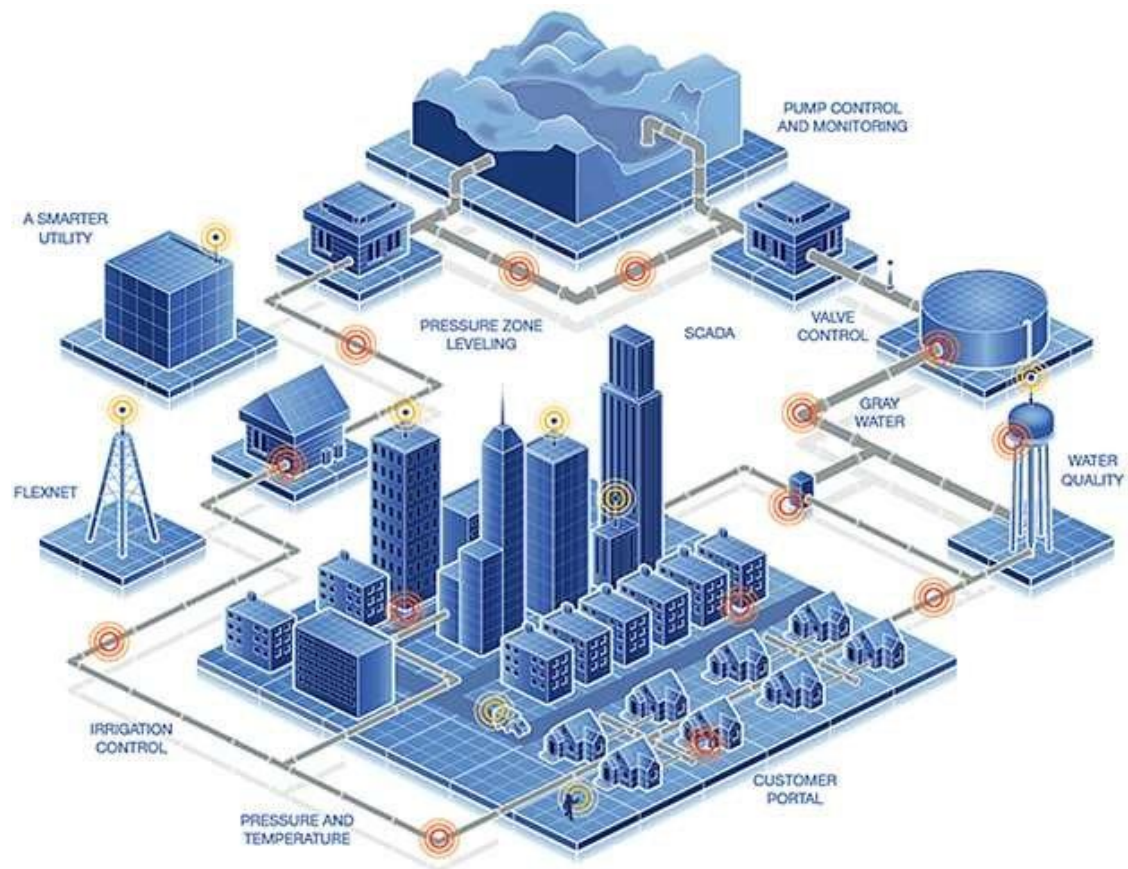


Smart water management using IoT

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Smart water management using IoT (Internet of Things) involves the integration of sensors, data analytics, and connectivity to efficiently monitor and control water resources. Here are some innovative applications and features of IoT in water management:

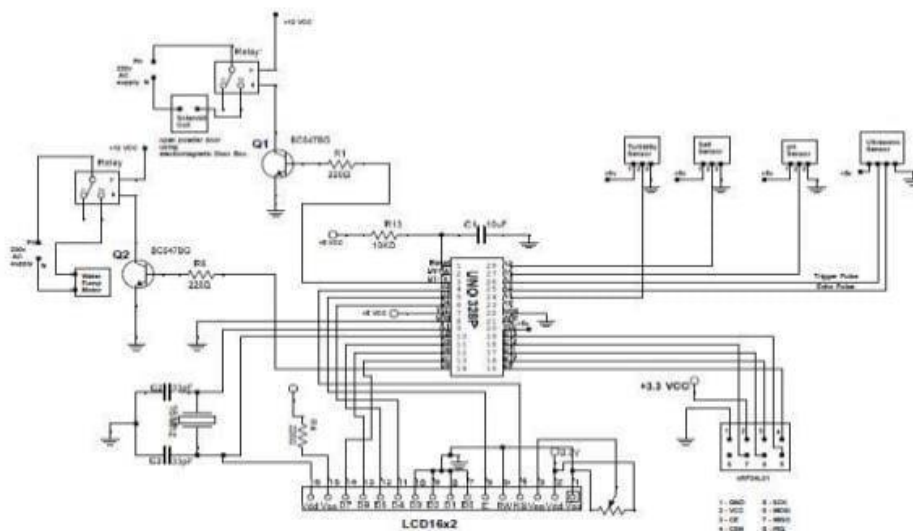
1. Leak Detection: IoT sensors placed throughout water infrastructure can detect leaks in real-time. When a leak is identified, alerts are sent to maintenance teams for quick repair, reducing water loss.

2. Water Quality Monitoring: IoT sensors can continuously monitor water quality parameters such as pH, turbidity, and chemical levels. If there are deviations from set standards, authorities can take immediate action to ensure safe drinking water.

3. Smart Irrigation: IoT-based irrigation systems analyze weather forecasts, soil moisture, and plant requirements to optimize watering schedules, conserving water resources in agriculture.

4. Water Consumption Tracking: Smart meters in homes and businesses can provide real-time data on water usage, enabling consumers to monitor and reduce their water consumption.

5. Flood Monitoring: IoT sensors placed in flood-prone areas can provide early warnings about rising water levels, helping authorities and residents prepare for floods.



Monitoring Design

6. Water Resource Management: Data collected from IoT sensors can be used to predict water demand patterns, allowing utilities to allocate resources more effectively.

7. Remote Valve Control: IoT-enabled valves can be controlled remotely, allowing for the quick shut-off of water supply in the event of a leak or contamination.

8. Asset Maintenance: IoT can help monitor the condition of water infrastructure assets such as pumps and pipelines, predicting when maintenance or replacement is needed to prevent failures.

9. Water Treatment Optimization: IoT sensors in water treatment plants can monitor the efficiency of purification processes, adjusting parameters in real-time for optimal results and reduced energy consumption.

10. Data Analytics: Advanced analytics and machine learning can process the vast amount of data collected from IoT devices to gain insights, improve efficiency, and plan for future water management strategies.

11. Mobile Apps and Dashboards: Users can access real-time water usage and quality information through mobile apps and web dashboards, empowering them to make informed decisions.

12. Integration with Smart Grids: Integration of water management systems with smart grids can help balance water and energy resources more effectively, particularly in regions with high water-energy interdependencies.

Overall, IoT-based smart water management systems offer the potential to conserve water resources, reduce costs, and enhance the resilience of water infrastructure in the face of climate change and growing water scarcity concerns.

5 benefits of Smart Water Management Systems

Here are five specific benefits of Water management technologies and activities, and how they can help address the growing problems of water scarcity.

1. Reducing waste of water-intensive industries

Agriculture, manufacturing or power production use very high volumes of water. Farming alone accounts for 70% of all water consumption. The same sector is liable for wasting approximately 60% of that water according to the UN's Food and Agriculture Organization.

Producers have to contend with increasingly erratic weather patterns which result in hotter and drier growing seasons.

2. Monitoring water quality to fight pollution and diseases

Manufacturing and other human activities can be responsible for polluting rivers and the groundwater table. **Sensors and IoT technology for real-time monitoring and control can help monitor and prevent pollution and even improve the water quality.**

To do so, IoT systems connected with AI-based software are deployed to capture standard parameters for monitoring the water quality: pH, Total dissolved solids (TDS)—including Oxygen, the Oxidation reduction potential (ORP) or the Temperature of different types of water. Using machine learning algorithms, the devices can be trained to **predict the quality of water, monitor the effectiveness of a sanitizing agent or adjust the water treatment plan accordingly.**

3. Improving the efficiency of water systems

Smart water systems allow the collection, treatment, distribution and recycling of water. These systems, often deployed underground, can leak, freeze, or breakdown. These systems are widely deployed on infrastructures nowadays.

By monitoring the pressure, flow, moisture, temperature, time difference between points and other parameters directly within the systems, the IoT can facilitate maintenance prediction and avoid breakage, leakage, and equipment downtime.

4. Creating awareness of household water use thanks to smart meters

Many households are guilty of wasting water, without really knowing how or how much a change of behavior could benefit them.

Most utility providers have now deployed smart meters to easily and remotely monitor and bill consumption. The information is also readily available to final users, which is a real incentive. **Individual consumers can now make savings by lowering their water bill while preserving water supplies on a daily basis.**

5. Providing running water through innovative solutions all around the world

Managing water is not just about delivering it efficiently. Sometimes it is about delivering it to all. In many developing countries, many people do not have easy access to running water. Water utility infrastructures suffer from lack of investment, lack of public water points, irregular delivery services. Chlorine pills are expensive and unreliable. As a result, **people with irregular or low incomes are faced with daily hardships in procuring water.**