SMART WATER MANAGEMENT USING IoT :

Objectives :

- The Key objectives of Smart water management using IoT refer to goals and strategies aimed at optimizing the use, conservation, and distribution of water resources through the integration of technology, data analytics, and sustainable practices. Here are some common objectives for smart water management.

IoT setup devices :

1. Sensors.
2. Actuators.
3. Communication Modules.
4. Edge Computing.
5. User Interface.

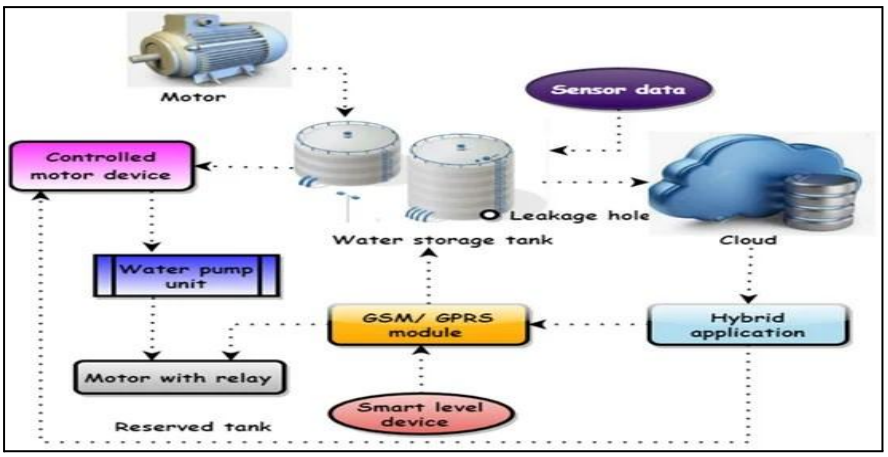
Hardware specifications :

1. Microprocessor.
2. Water level sensor.
3. Water Quality sensor.
4. Power supply.
5. Microcontroller board.
6. Enclosure.
7. Data Storage.
8. Software programming.
9. Security Measures.
10. Cloud Measures.

Software specifications :

1. Data Acquisition and Sensors.
2. Data Processing and Analysis.
3. Communication Protocols.
4. Data Storage and Database Management.
5. User Interface.

Circuit Diagram :



☐ . Smart water tank using IoT.

Working Principle:

- Smart water management using IoT (Internet of Things) involves the integration of sensors, data analytics, and communication technologies to monitor and control water resources efficiently. Here's a simplified explanation of how it works:

    1. **Sensors and Devices**: IoT-enabled sensors are deployed at various points in the water supply and distribution system. These sensors can measure parameters like water flow, pressure, quality, temperature, and levels in reservoirs, pipes, and tanks.
    2. **Data Collection and Transmission**: The sensors continuously collect data and transmit it in real-time to a central server or cloud platform using wireless communication technologies like Wi-Fi, cellular networks, or low-power, wide-area networks (LPWAN).
    3. **Data Processing and Analytics**: The data received from the sensors is processed and analyzed using specialized software and algorithms. This can involve identifying patterns, detecting anomalies, and generating insights based on the collected data.
    4. **Decision-Making and Control**: The analyzed data is used to make informed decisions.

1. **Source Code :**

****HTML (index.html)****
'''html

```
<!DOCTYPE html>
<html>
<head>
  <title>Smart Water Management System</title>
</head>
<body>
  <h1>Smart Water Management System</h1>

  <div id="status">
    <h2>Status:</h2>
    <p id="status-text">Loading...</p>
  </div>

  <div id="control">
    <h2>Control:</h2>
    <button onclick="turnOn()">Turn On</button>
    <button onclick="turnOff()">Turn Off</button>
  </div>

  <script>
    function turnOn() {
      // Send a request to IoT device to turn on water management
      // Update status text
```

```
        document.getElementById("status-text").textContent = "Water management
turned ON";
    }

    function turnOff() {
        // Send a request to IoT device to turn off water management
        // Update status text
        document.getElementById("status-text").textContent = "Water management
turned OFF";
    }
  </script>
</body>
</html>
```

2. CSS (Style.Css) :

```
        '''CSS
        /* Overall Styles */
        body {
          font-family: Arial, sans-serif;
          background-color: #f4f4f4;
          margin: 0;
          padding: 0;
        }

        .container {
          max-width: 1200px;
          margin: 0 auto;
          padding: 20px;
        }

        /* Header Styles */
        header {
          background-color: #007bff;
          color: #fff;
          padding: 10px 0;
          text-align: center;
        }

        h1 {
          margin: 0;
        }

        /* Navigation Styles (if applicable) */
        nav {
          display: flex;
          justify-content: center;
```

```
  margin-top: 10px;
}

nav a {
  color: #fff;
  text-decoration: none;
  margin: 0 10px;
}

/* Card Styles for IoT Device Readings */
.card {
  background-color: #fff;
  border-radius: 10px;
  box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
  margin-bottom: 20px;
  padding: 20px;
}

.card h2 {
  margin-top: 0;
}

.card p {
  margin: 10px 0;
}

/* Button Styles (if applicable) */
button {
  background-color: #007bff;
  color: #fff;
  border: none;
  border-radius: 5px;
  padding: 10px 20px;
  cursor: pointer;
}

button:hover {
  background-color: #0056b3;
}

/* Footer Styles */
footer {
  background-color: #f8f9fa;
  text-align: center;
  padding: 10px 0;


  }
```

3. JavaScript (java.js) :

'''javascript

```
// Initialize IoT platform connection
const awslot = require('aws-iot-device-sdk');

const device = awslot.device({
  keyPath: 'path_to_your_private_key',
  certPath: 'path_to_your_certificate',
  caPath: 'path_to_root_certificate',
  clientId: 'unique_client_id',
  host: 'iot_platform_endpoint'
});

device.on('connect', () => {
  console.log('Connected to IoT platform');

  // Code to read sensor data (e.g., water level, flow rate)
  // ...

  // Code to send data to IoT platform
  const data = {
    waterLevel: 50, // Example value, replace with actual data
    flowRate: 10    // Example value, replace with actual data
  };

  device.publish('topic', JSON.stringify(data));
});

// Code to control actuators based on received data
device.on('message', (topic, payload) => {
  const data = JSON.parse(payload.toString());

  // Example logic: If water level is too low, turn on pump
  if (data.waterLevel < 30) {
    // Code to control pump
    // ...
  }
});
```

Conclusion:

- **In conclusion, implementing IoT technology in water management has shown tremendous potential in revolutionizing how we monitor and conserve this precious resource. The integration of sensors, data analytics, and real-time communication allows for more accurate and timely information on water usage, leakage detection, and overall system efficiency**