NAAN MUDHALVAN PROJECT FILE FOR PHASE 5:

PROJECT NAME: SMART WATER MANAGEMENT

Objectives of SWM:

Efficient Resource Use:
Minimizing water waste and optimizing its usage through technological solutions.
Real-time Monitoring:
Implementing systems to monitor water distribution, consumption, and quality in real-time.
Leak Detection and Prevention:
Employing sensors and analytics to identify and mitigate leaks in water infrastructure.
Data-Driven Decision Making:
Using data analytics to make informed decisions for conservation and better resource allocation.
Integrated Systems:
Integrating various technologies to create a cohesive and responsive water management infrastructure.
Sustainability and Conservation: Promoting water conservation practices and sustainable usage.
Public Awareness and Engagement: Educating and involving the community in responsible water usage practices.

IOT Sensors used in SWM:

Flow Sensors:
Monitor the flow rate of water in pipes, aiding in leak detection and usage analysis.
Water Quality Sensors:
Check parameters such as pH levels, turbidity, dissolved oxygen, and contaminants to ensure water quality.

Pressure Sensors:
Measure pressure in pipelines to identify potential leaks or bursts.
Level Sensors:
Monitor water levels in reservoirs, tanks, or sewage systems.
Leak Detection Sensors:
Detect leaks in the water distribution network by identifying changes in pressure, flow, or acoustic anomalies.

Leak Detection Using AI/ML Solution:
- •Detect pipeline leakage in real-time
- •Get real-time notification alerts
- •Monitor underground pipelines
- •Reduce water wastage

Temperature Sensors:

Track water temperature to prevent pipe freezing or ensure appropriate conditions for certain applications.

Smart Water Meters:

IoT-enabled meters that provide real-time data on water consumption and usage patterns.

IOT sensor setup for SWM:
1. Sensor deployment
2. Connectivity infrastructure
3. Data collection and transmission
4. Data processing and analysis
5. Real time monitoring and alerts
6. Integration and Dashboard visualisation
7. Actionable insights and decision making

Raspberry Pi integration in SWM:
1. Data acquisition and processing
2. Edge computing
3. Control and automation
4. Remote monitoring and alerts
5. User interface and visualisation

Code for SWM:

HTML (index.html):

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="styles.css">
    <title>Water Consumption Data</title>
</head>
<body>
    <div class="container">
        <h1>Water Consumption Data</h1>
        <table id="data-table">
            <tr>
                <th>Date</th>
                <th>Consumption (gallons)</th>
            </tr>
            <tr>
                <td>2023-10-01</td>
                <td>120</td>
            </tr>
            <!-- Add more data rows as needed -->
        </table>
    </div>
    <script src="script.js"></script>
</body>
</html>
```

CSS (styles.css):

```css
body {
    font-family: Arial, sans-serif;
    text-align: center;
}

h1 {
    color: #0077b6;
}

#data-container {
    background-color: #f0f0f0;
    padding: 20px;
    margin: 20px;
    border: 1px solid #ccc;
```

```
}
```

JavaScript (script.js):

```javascript
// Sample water consumption data
const waterData = [
    { date: '2023-10-01', consumption: 250 },
    { date: '2023-10-02', consumption: 220 },
    // Add more data here
];

// Function to display water consumption data
function displayWaterData() {
    const dataContainer = document.getElementById('data-container');
    dataContainer.innerHTML = '<h2>Water Consumption Data</h2>';

    for (const entry of waterData) {
        dataContainer.innerHTML += `
          <p>Date: ${entry.date}</p>
          <p>Consumption: ${entry.consumption} liters</p>
          <hr>
        `;
    }
}

// Call the function to display the data when the page loads
displayWaterData();
```
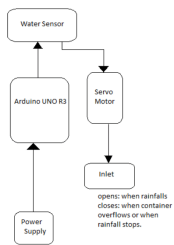
This code creates a simple web page that displays water consumption data.

Schematic diagram of SWM:

Block diagram for efficient SWM:

Advantages of SWM:

- •Efficient Resource Utilization
- •Leak Detection and Prevention
- •Improved Water Quality
- •Sustainability and Conservation

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