AquaSaver: Intelligent Water Monitoring and Conservation

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|              |  |            |  |            |
| Water Flow   |  | Microcontroller |  | User Interface |
| Sensors      |  | (NodeMCU)    |  | (Web/Mobile App)|
|              |  |            |  |            |
+------------------+  +------------------+  +------------------+
   |              |              |
   |              |              |
   |        +--------------------------------+   |
   |        |      Data Processing       |   |
   |        |      and Anomaly           |   |
   |        |      Detection             |   |
   |        +--------------------------------+   |
   |              |              |
   |              |              |
   |        +--------------------------------+   |
   |        |        Firebase          |   |
   |        |        Integration       |   |
   |        +--------------------------------+   |
   |              |              |
   |              |              |
   |        +--------------------------------+   |
   +--------|      User Authentication     |   |
            |      and Data Visualization  |<----+
            +--------------------------------+
```
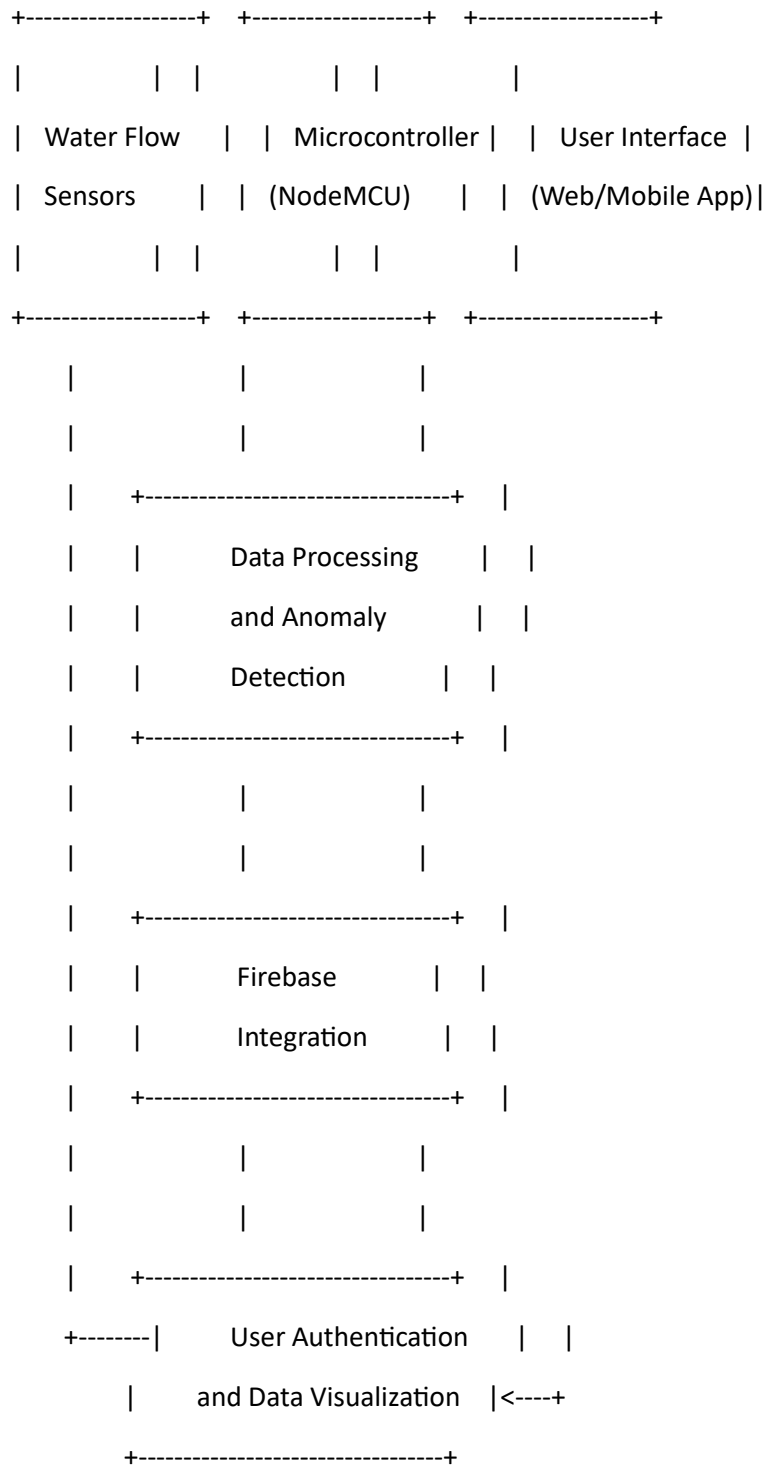
Components list

1. Water Flow Sensor: ₹300 - ₹1500

2. Microcontroller (NodeMCU): ₹300 - ₹500

3. Wi-Fi Module (ESP8266): Included with NodeMCU

4. Bluetooth Module (Optional): ₹100 - ₹300

5. DC Power Adapter: ₹200 - ₹500

6. Enclosure Box: ₹200 - ₹500

7. Mounting Hardware: ₹100 - ₹300

8. Jumper Wires, Connectors: ₹100 - ₹300

9. PCB Boards (if custom): ₹300 - ₹800

Estimated Total Budget Range: ₹1500 - ₹5000 (excluding development costs)

- Use the system in rental properties to monitor water usage and allocate bills accurately among tenants. Encourage responsible water usage among tenants.
- Deploy the system in communities to collectively manage water usage and identify conservation opportunities. Collaboratively reduce water wastage and promote sustainable living.

Problem Statement: Water scarcity and wastage are significant challenges faced by communities and individuals around the world. Traditional water metering systems often lack the ability to provide real-time monitoring and insights into water usage patterns. As a result, people are unaware of their consumption behaviours and are unable to detect leaks or wasteful usage promptly. This leads to increased water bills, environmental impact, and inefficiencies in water resource management. Solution: Our project aims to address these challenges through the "Water Wastage Monitoring and Conservation System." This innovative solution leverages IoT (Internet of Things) technology and data analytics to provide real-time monitoring, historical data tracking, anomaly detection, and user-friendly interfaces for water usage management

Proposed features

Certainly, here's a detailed explanation of each of the features you mentioned for your "Water Wastage Monitoring and Conservation System":

1. Real-time Monitoring:

Real-time monitoring provides users with up-to-the-minute information about their current water usage. It involves continuous data collection from water flow sensors and presenting this data in a user-friendly interface. Users can instantly see how much water they are using at any given moment.

2. **Historical Data:**

Historical data storage enables users to access past water usage patterns. This feature allows users to visualize trends over days, weeks, or months. Historical data can help users identify long-term usage patterns and make informed decisions about their water consumption habits.

3. Anomaly Detection:

Anomaly detection involves identifying abnormal water consumption patterns. The system can set thresholds based on historical data, and when the current usage exceeds these thresholds, it triggers alerts. Anomalies might indicate leaks, wasteful behaviour, or malfunctioning equipment.

4. Monthly Billing Estimation:

By collecting and analysing historical data, the system can estimate users' monthly water bills based on their consumption. This helps users understand the financial implications of their water usage and encourages conservation efforts.

5. Remote Control:

Remote control allows users to control their water supply remotely using the system's interface. For instance, users can turn off water supply to specific areas of their home or even the entire system. This is useful for preventing water wastage in case of leaks or when users are away from home.

6. Comparison:

Comparison features allow users to compare their water usage with predefined benchmarks or averages. Users can see how their consumption stacks up against similar households or recommended water usage guidelines. This feature can motivate users to reduce their usage and conserve water.