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Smart Resource Alert

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ABSTRACT

As technology is becoming more advanced, the world is heading to a state of huge energy scarcity. The existing resources are depleting at an alarming rate and people are struggling to find alternative sources of energy. On the contrary, a lot of valuable energy is getting wasted too in the form of a fault or leakage, commonly seen at our households. We propose an approach to keep track of energy and water usage at our households and thus alerting the consumers in the form of an application. The energy sensor ACS712 and the flow sensor YFS201 are used to measure the amount of energy and water consumed. The signals are sent as interrupt to the microcontroller where calculations are processed. A Wi-Fi module ESP8266 is used to upload the data to the cloud which can then be accessed by the user in the form of an application which keeps track of the usage and notifies the consumer. Extra features like gas leak detection can also be included in the application.

Keywords *- Technology, Energy sensor, Flow sensor, Microcontroller, Wi-Fi module, Application*

1. INTRODUCTION

Today there is an immense need for wise use of water and electricity and conserving it for the future. The rate at which energy is consumed is becoming staggeringly high and uncontrollable. The demand for water and electricity is increasing exponentially. Hence there is a need for reduction of energy and water usage in households.

Recently, the demand for freshwater and energy has increased largely due to the world's growing population. In the early days, delivery of electricity and water was completely dependent on traditional energy meters. These meters measure the consumption of energy and water in individual households. The usage of these meters has been slowly declining with the advancement in technology. One of the major drawbacks of this traditional method is that a meter reader comes to the households periodically. Any wastage of useful resources is not notified to the consumers initially. The solution for all these problems is to keep track of the consumers' usage on a timely basis.

We propose a smart system combined with an user-friendly application which will notify the consumers about their daily usage of water and electricity and also alert the consumer of any abnormal usage. Sensors are used to measure the quantity of water and energy consumed. The output is calibrated using a microcontroller unit and then sent to the cloud using the Wi-Fi module. The consumers get these readings in the application. The future is all about applications which provide people with everything they need at their fingertips. If the usage crosses a set standard tariff, it would be automatically updated in the application through the microcontroller and hence the resource and wealth of the consumer may be saved. The application may still be further improved by adding features such as gas leak detection, notifying the authorities in case of grave faults or leakages.

2. METHODOLOGY

We propose a smart system replacing the conventional traditional meters at our households which often fails to alert the consumers regarding any abnormal usage. This system helps the consumers to keep track of their energy and water usage on a timely basis.

Our system consists of sensors to measure the quantity, microcontroller to calculate the total reading, Wi-Fi module to send data, cloud platform to store the data and an application for displaying data.

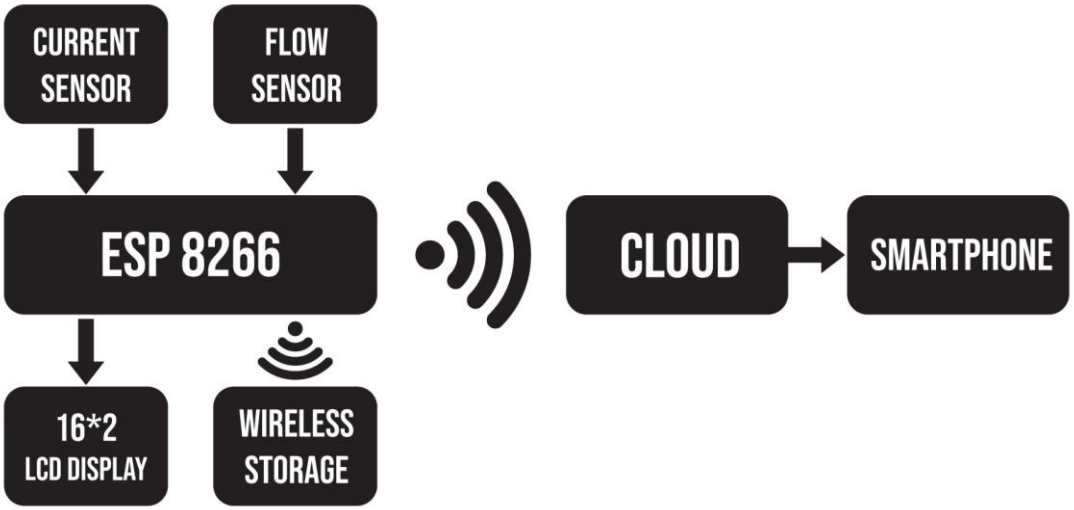

Chart 1: System Block Diagram

To measure the quantity of water consumed, we use a water flow sensor -YFS201.It is a Hall Effect sensor which gives a digital pulse signal for every rotation of the rotor. Coming to energy measurement, we employ the current sensor -ACS712. It is a current sensor with 2.1kVRMS voltage isolation and a integrated low-resistance current conductor. These pulse signals are sent as interrupt signals to the microcontroller where the values are processed. Then the Wi-Fi module -ESP8266 is used to upload the output to the cloud. The Wi-Fi module is compact and powerful with a power supply of 3.3 V. Now we can access data and analyses it graphically from anywhere in the world. In the modern era of applications, which is fast conquering the digital world due to the ease of usage, the required information regarding the resource usage are updated to the consumers. It can be accessed by the users from anywhere. Thus, it may be thought of as a smart method of consumer alert.

3. RESULTS AND CONCLUSION

The world is continuously looking for a change and use of new technologies to improve quality of life as well as reduce impact of human activities and consumption ways on the environment. Availability of clean water, its increasing demand due to the growing population, cost for management of water, storage, treatment, distribution, and billing for consumption are serious issues in various places. Similarly, energy is a fundamental need of our life. Energy shortage is a major issue today. So, the primary and main objective of focus for a solution is to reduce the strain on non-renewable resources like the electricity and water, so that it can be conserved for the future. Thus, the goal is to find a method wherein the user or the consumer gets aware of their energy and water consumption and gets alerted of any abnormal usage or wastage. Thus, energy and water can be saved, and the money wasted for our carelessness against leakage can be avoided. In this digital era, the alert system in the form of an application is helpful to a large extent.

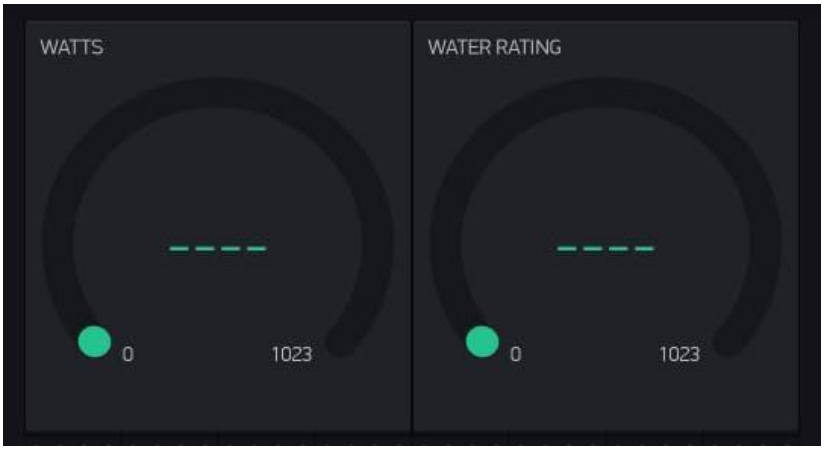

Chart 2: Application model

The system measures both energy and water consumed using sensors which provides an easier method of measuring the consumption rate. Over the past years many smart systems have been proposed such as Zigbee but it is not secure and ideal for long distance communication. Our system measures both energy and water consumed and integrates it onto a single application. The application can further be extended with other features too. Such small steps applied to individual domestic forms can go a long way to resource conservation for the future.

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