A NOVEL MULTI SENSOR BASED WATER USAGE MONITORING SYSTEM USING WIRELESS NETWORK

Engineering

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ABSTRACT
In this paper a system is designed which can help us to save water consumption at every node. The following report focuses on the design and implementation of water management system and calculating the respective quantities of water. Installing water meters at every valve and pipes (if possible) for example it is a good way to monitor the establishment's water consumption, by doing so we can determine the monthly water consumption and cost of our workplace. And also we find out the PH of the wate. The PH of pure water is 7 in general.

KEYWORDS
Water management; Water consumption; pH sensor; Water flow sensor

1. INTRODUCTION
Hostel consume a significant amount of water in the U.S and around the world. Most hotel do not monitor individual guest usage water and as a millions of gallons of pure water are wasted every year by the hotel guests. This problems are overcome by a self powered wireless device for monitoring water usage in hostel showers. In this paper this same method are used to the flat. Because in flat at many rooms are there but in each room not a same average person and also cost of the water usage is same.

Also because of this we introduces in the wireless device for monitoring water usage in hotel method to the flat. From this we can find particular house water usage and we can pay based on how much water used that much of cost are payed. So no need to pay same amount in each house. We know the cost of the water usage from that we can saved the water.

We create a web server. From this we know the monthly consumption of cost and water per liters and PH value. All the data transmitted through the Wi-Fi device in detail. Four row and four column tabulation are updated in this pattern which also available. By doing this we know the last four month cost and usage of water. And also motor ON and OFF operation is created in same homepage.

Here two type of mode is available they are auto mode and manual mode. Auto mode mean motor ON and OFF automatically while (water is available and unavailable).

Motor consists two status they are ON status which mean with green color and OFF status which mean with red color .Water available mean it become blue color and water is unavailable means yellow.

A sensor network is a group of the node that are end with each other using a communication in infrastructure, including low cost of placement , maintenance and safety. The power supply is one of the essential components of wireless sensor nodes. Batteries are primarily used to power these sensor nodes, but a main drawback of using them is finite battery capability. So it is difficult to use batteries in such embedded systems due to maintenance and replacement costs .using an energy harvester as a power supply is an attractive alternative.

2. PROPOSED SYSTEM
The flow meter are attached at each pipeline of water consuming unit to identify the usage of water. It enable us to calculate the amount of water consumed and it cost. The information about water consumption and leakage are sent to main server. The residents of house receive Their water consumption rate through web server. And also water purifier is installed. Also find out the PH value of the water. PH value of the water should be around the range 6.5 to 7. The wireless device can be used to transfer the all data like usage of the water per litre, cost of the water usage and PH value of the water. The wireless device designed with in built microcontroller and wireless have password. From this the homepage are created with IP address. It will show the all detail about water usage and it cost.

2.1 Advantages
Few advantages of the proposed system is it avoids unwanted leakage of water. The over usage of water can be avoided by the customer. The usage of water is limited. The water is purified so we can be hygiene.
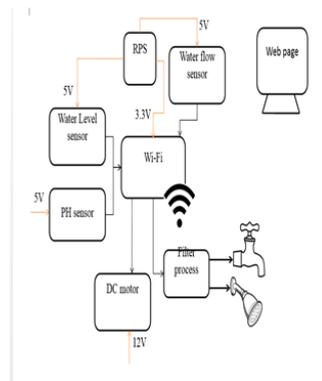
Fig 1. Block Diagram

Water level sensor is used to indicate the level of water content. PH sensor is used to indicate the purity of water. Filter process is used to filter water. RPS is used to give power supply.

2.2 Hardware
Wi-Fi – ESP826, PH Sensor, Water Level Sensor – CGQLTW Water Flow Sensor – YYFS201, DC motor, RPS, Filter.
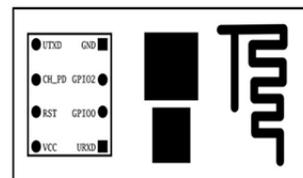
2.2.1 Wifi Module (Esp8266)
It is an Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller via a UART serial connection.

Fig.2 WIFI Module

The module can even be reprogrammed to act as a standalone Wi-Fi connected device.

Fig 3. Pin Description

It has 8 pins, 4 in the row of 2. The 1st pin to top left is GND. The two pins right from the GND are GPIO 2 and 0.The pin on the top right side is the RX pin and the pin on the lower left is TX. These are the pins for communication. The middle pins on the bottom are CH_PD (chip power-down) and RST (reset).The main thing to remember is, that this device works with 3.3V; Even the RX and TX pins.Controller or many USB to serial .converters work with 5V ESP8266.

2.2.1.1 Specification
802.11 b/g/n protocol. Wi-Fi Direct (P2P), soft-AP. Integrated TCP/IP protocol stack. Integrated TR switch, balun, LNA, power amplifier and matching network. Integrated PLL, regulators, and power management units.+19.5dBm output power in 802.11b mode.

Integrated temperature sensor. Supports antenna diversity. Power down leakage current of < 10uA. Integrated low power 32-bit CPU could be used as application processor.

2.2.2 Water Flow Sensors
When water flows through the rotor, rotor rolls. The hall-effect sensor outputs the corresponding pulse Signal. The sensor comes with three wires: red (5-24VDpower), black (ground) and yellow (Hall effect pulse output).

2.2.3 Flow Meter
Table 1. Specification Of Flow Sensor

Parameters of Sensor	Value / Range
Working Voltage (Volts)	5 - 24
Maximum Current (mA)	15
Flow rate range (L/min)	1 - 30
Operating temperature (ºC)	0 – 80
Liquid temperature (ºC)	<120
Operating humidity (RH)	35%-90%
Operating pressure (Mpa)	Under 1.2
Store temperature (ºC)	-25 to +80

2.2.4.Water Level Sensor
Water level sensor measures the level of water content in tank. Water level sensor mainly used to avoid over flow of water in tank. By avoiding the over flow we can stop the wastage of fresh water. Model of water level sensor is CGQ-LTW.

A liquid control system uses a float sensor which works on the principle of buoyancy, which states, "A float immersed in a liquid is buoyed towards upward direction by an applied equal force to the weight of the displaced liquid". So, the body drive and submerge on the liquid surface and cover the same distance the liquid moves.

2.2.5 Water Level Indicator
The water level indicator employs simple mechanism to detect and indicate the level in a tank. The sensing is done by using a set of four probes which are placed at four different level on the tank wall, increasing order of height, common probs. The level 4 represent the "tank full" condition while the level 1 represent the "tank empty" condition.

2.2.6 PH Meter
The PH meter is used to measure the concentration of hydrogen ions. Concentration of hydrogen ions will detect the purity of water. The purity of water is indicated by the amount of hydrogen. The PH of pure water is 7 in general, water with a PH lower than 7 is considered acidic and with PH greater than 7 is considered basic .

Fig 4 Water Level Indicator

2.2.7 Dc Motor
The stator is the stationary outside part of a motor. The rotor is the inner part which rotates. Just as the rotor reaches alignment, the brushes move across the commutator contacts and energize the next winding.
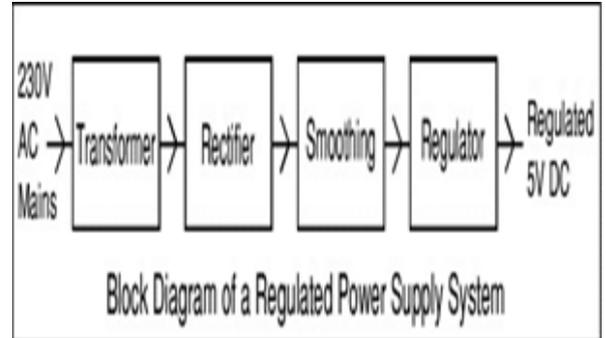
2.2.8 Regulated Power Supply
Each of the blocks is described in more detail below:
Transformer - steps down high voltage AC mains to Low voltage AC.
Rectifier - converts AC to DC, but the DC output is varying.
Regulator - eliminates ripple by setting DC output to a fixed voltage.

Fig 5 Block Diagram Of Regulated Power Supply

3 RESULT AND DISCUSSION
In result Four row and four column tabulation are updated in this pattern which also available. By doing this we know the last four month cost and usage of water. And also motor ON and OFF operation is created in same homepage. Here two type of mode is available they are auto mode and manual mode. Auto mode mean motor ON and OFF automatically while (water is available and unavailable) Motor consists two status they are ON status which mean with green color and OFF status which mean with red color .Water available mean it become blue color and water is unavailable means yellow.

4   CONCLUSION
In this paper a device to monitor water usage, to help encourage water conservation is done. A smartphone with the capability to share water usage, and savings is accompanied. We had created a web page. From this we know the monthly consumption of cost and water per liters and PH value . And also motor ON and OFF operation is created in same homepage.

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