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Smart Water Bill Generation System Based on Android App

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ABSTRACT

Water is the most important factor that contributes to the survival as well as the well-being of mankind. Keeping in mind the current scenario, a lot of water is used by household even in places where less water can work. This in turn leads to shortage of water making water cut necessary. The water bill that every owner receives is a constant one included in Maintenance Bill. Our idea is to detect the usage of water by individual flats and bill them accordingly using IOT sensors. Also the owner will be kept updated in real time about their water usage via an android app. Thus they can track their usage and avoid wastage of water to reduce their bill.

Keywords: Water management, Flow sensor, Solenoid Valve, Wifi-Module, Notification.

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I. INTRODUCTION

Water is one of the most important basic needs for all living beings, but unfortunately, a huge amount of water is being wasted because of uncontrolled use and exploitation of water resource. Kerala averages rainfall of 3,000 mm a year. The general impression was that among all the states in India, Kerala had ample drinking water, but it's not the case. There are 1,164 problem villages without the adequate supply of drinking water. Even though Kerala has 44 rivers spanning its lush green landscape. Together, they contribute an annual discharge of 72, 00 million cubic meters of water which is unused to the Arabian Sea. One of the main reasons for the shortage is poor management of water. Overflowing water tanks in residence, schools, colleges, Municipal overhead tanks, Hospitals etc. can contribute to the massive amount of water wastage.

If we can control this we can save large amounts of water. Conventional water tanks can neither monitor nor control the water level in the tank. As of now, the water level has to be manually checked and refilled according to the requirements. So in this paper, we solve all the above mention problems with automatic water level detection and refilling of water storage system with the help of Internet of Things (IoT).

II. LITERATURE SURVEY

[1] Monitoring system as a tool for risk evslution in water distribution system AlicjaBalut, Andrzej Urbaniak, 2018, In this paper, we monitor the quality of water and get the result on IOT. And we distribute the water by connecting the flow sensor.

[2] Real-time clustering for priority evaluation in a water distribution system AlexandruPredescu, CatalinNegru, Mariana Mocanu, CiprianLupu, 2018, Nowadays with the development of smart infrastructure for water resource management, there is an increased need for efficient operation and management of water distribution infrastructures. In this paper, we propose a system for real-time clustering system priority evaluation in a water distribution system.

[3] Optimal Demand Response Scheduling for Water Distribution Systems Konstantinos Oikonomou, Roohallah Khatami, 2018, As energy intensive infrastructures, water distribution systems (WDSs) are promising candidates for providing demand response (DR) and frequency regulation services in power systems operation. However, models that tap the full flexibility of WDSs to provide the services while respecting the operational constraints of water networks are remained scarce.

[4] Smart Water Distribution Management System Architecture Based on Internet of Things and Cloud Computing Sawsan Alshattnawi, Irbid Jordan2017, The fast population growth needs to provide clean and affordable water that meet the human requirements. The water faces a problem in the future because of global climate change. An efficient water management and treatment is necessary to keep water quality and availability.

[5] A Novel Smart Water-Meter based on IoT and Smartphone App for City Distribution ManagementM Suresh, U. Muthukumar, Jacob Chandapillai, 2017, A novel approach to performing automated water-meter reading for update of consumption information from field to the Utilityoffice is described in this paper. The smart metering approach proposed differs from existing commercial methodologies by making use of low cost IoT hardware and smartphone app.

[6] Feasibility Study on Wireless Passive SAW Sensor in IoT enabled Water Distribution System Zhaozhao Tang, Wenyan Wu, Jinliang Gao, Po Yang 2017, Internet of Things (IoT) technology has recently been widely utilized into a variety of industrial applications. Wireless Passive Surface Acoustic Wave (SAW) sensors have attracted great attention in numerous IoT enabled applications. The sensor nodes are not directly supplied by the power supply as it absorbs the energy from the interrogating Radio Frequency (RF) pulses to excite the SAW.

[7] Research on placement of water quality in water sensor in water distribution systems, Chengyu Hu 2017, In this paper, we use turbity sensor, ultrasonic sensor, Ph sensor and flow sensor for monitor and distribution of water.

[8] Design and realization of water quality information management system Dongling Ma, Jian Cuil2017, In this paper, we make the water quality monitoring system and distribution. We distribute the water by using flow sensor. And check by using turbity sensor and ph sensor.

[9] Temperature dynamics and water quality in distribution systems B. J. Eck, Saito S. A. McKenna 2016, Quality assurance strategies for water distribution systems often include the application of chemical disinfectants to limit the growth and transmission of pathogens. Characteristics of water quality in individual systems, and the type of disinfectant employed, create significant complexity in understanding and quantifying the impact of disinfectants in different networks. An additional challenge is that disinfection by products (DBPs),created through the breakdown of disinfectants, can bedetrimental to human health.

III. BLOCK DIGRAM

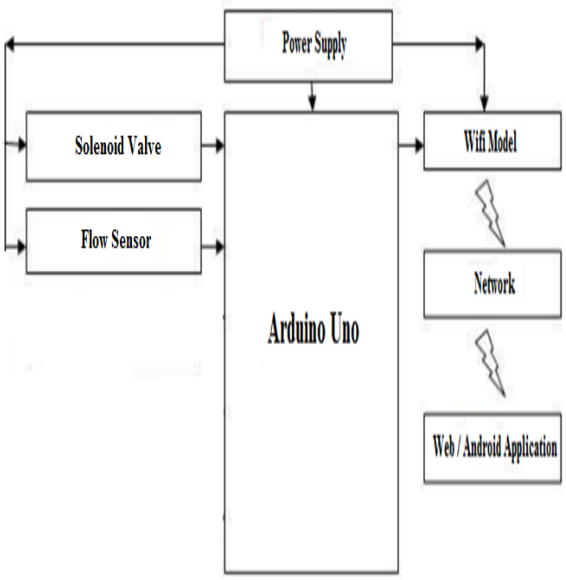

Fig 1. System block diagram

In the proposed smart android framework, a reconfigurable shrewd sensor interface gadget that coordinates information gathering, information preparing, and remote transmission is outlined. The equipment of remote water flow checking framework contains the accompanying parts:

A. Hardware Description:

ESP8266 WI-FI MODEL:

Fig 2. ESP8266 wifi model

Feature:

- Voltage:3.3V.
- Wi-Fi Direct (P2P), soft-AP.
- Current consumption: 10uA~170mA.
- Flash memory attachable: 16MB max (512K normal).
- Integrated TCP/IP protocol stack.
- Processor: Tensilica L106 32-bit.
- Processor speed: 80~160MHz.
- RAM: 32K + 80K. • GPIOs: 17 (multiplexed with other functions).

Flow sensor:

Fig 3. Flow sensor

Features :

Operating Voltage: 5 to 18V DC (min tested working voltage 4.5V)
Max current draw: 15mA @ 5V
Output Type: 5V TTL
Working Flow Rate: 1 to 30 Liters/Minute
Working Temperature range: -25 to +80C
Working Humidity Range: 35%-80% RH
Maximum water pressure: 2.0 MPa
Output duty cycle: 50% +-10%
Output rise time: 0.04us
Flow rate pulse characteristics: Frequency (Hz) = 7.5 * Flow rate (L/min)

Solenoid Valve:

Fig 4. Solenoid Sensor

Features:
Voltage: DC12V
Operation mode: normally close
Pressure: 0.02-0.8Mpa
Rated power: 4.8W
Usage: water and low viscosity fluids

IV. MATHEMATICAL MODEL

Mathematical Model:
Mathematical Model:
U= {I, O, f, S, F, D, NDD}
Where,
I= {I1, I2,I3}
I1= {l1,l2..... ln} where n size of tank and n>0
I2= f1 i.e. pulse counted using flow sensor
I3=pn i.e. size of pipe

O= {O1,O2}
O1=water consumed by user
O2 = bill generated

f= {f1,f2,f3,f4}
f1=QUANTITY (n, I1)
f2 =FLOW_RATE (I2,I3, O2)
f3 =CONNECT ()
f4 =REP_GEN (f1, f2)

S: Success:
Data send successfully and Report generated or not
F: Failure:
Sensors not working properly and Connection failure.

V. RESULT

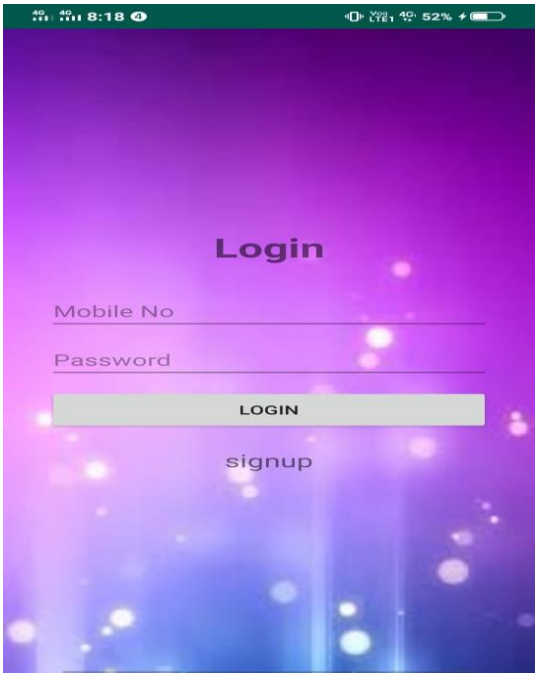

Fig 5. Login Page

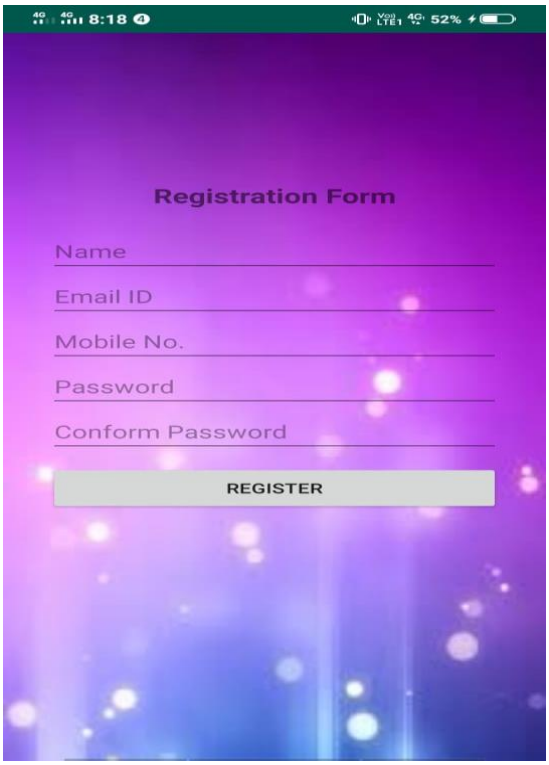

Fig 6. Register page

Fig 7. Sensors Values page

VI. CONCLUSION

An electronic water management system for flats and apartments is designed to control and monitor the usage of water by a single flat. The bill of water is generated according to the usage. The system is designed to automatically display as well as control the water flow. The proposed system eliminates manual monitoring and controlling for domestic users. The system achieves proper water management and enhances productivity with the help of automation.

VII. ACKNOWLEDGEMENT

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REFERENCES

[1] Kumar R, Singh R D and Sharma K D, 2005.Water resources of India; Curr. Sci. 89 794–811.
[2] Jain SK, Agarwal PK and Singh VP 2007. Hydrology and water resources of India (Dordrecht, Netherlands: Springer), 1258p.
[3] Postel SL, Daily GC and Ehrlich PR. 1996. Human appropriation of renewable freshwater. Science, 271: 785-788.
[4] Gosain AK, Rao S and Basuroy D. 2006. Climate change Impact assessment on hydrology of Indian River basin.Curr. Sci.,.90(3).,346-353.
[5] Lal M. 2001. Climate change-Implications for Indias water resources. J.India Water Res. Soc.,21, 101-119.
[6] Kumar R, Singh RD and Sharma KD.2005. Water resources of India.,Curr .Sci .89(5).,794-811. International Journal of Scientific and Research Publications, Volume 5, Issue 12, December 2015 356 ISSN 2250-3153 www.ijsrp.org
[7] Sharma, R. Climate and water resources of India,Curr.Sci..,2005,89,818- 824.
[8] National Water Policy.Ministry of Water Resources,New Delhi,2002.
[9] Central Water Commission, 1988. Water Resources of India, Publication No.30/38. New Delhi.
[10] Peder Hjorth and Nguyen Thi Dan, 1994, Water management options for urban areas in Asia. Cities 11(2): 125-130.

