REAL TIME WATER QUALITY TRACKING SYSTEM

[1]Rohit Mishra, [2]Gangotri Lingade, [3]Shweta Singh ,[4]Apoorva Verma and [5]Prof.Priyanka Kedar

[1,2,3,4]UG Student, [5]Assistant Professor

[1]Department Of Computer Engineering,

[1]Dhole Patil College Of Engineering, Pune, India.

Abstract : Water is indispensable for life and more so for man.As we are moving towards modern civilization there is a surge in water consumption,per capita consumption has increased from a few liters in the stone age to as much as 600 liters in developing countries today.The demand for water for irrigation and industrial complexes also increased correspondingly to meet the requirements of growing population.

This paper uses IoT as the emerging domain that offers new solutions in water management[1]. IoT based sensors are used to check the water parameters continuously working in real time.This data is working under maintenance area of societies that is keeping a regular check on water helping to maintain the quality of drinkable water.It provides transparency on consumption,improving customer satisfaction and experience.The proposed system consists of sensors that will collect the data and provide it to microcontroller where data is analyzed and compared with the standard values.

From there they move to server displaying and alerting the users on our system application.This gives the users real time monitoring information as per their requirements.

Index Terms - IoT device, Sensors, Real Time Monitoring, Microcontroller, WIFI Module.

I.INTRODUCTION

Emerging technologies such as Internet of Things, Machine Learning, Artificial Intelligence have led humans towards sustainable development of the society. Sustainable development focuses on the consumption of resources in a way that it does not lead to the exploitation of the resources. If we consider the case of water, it is one of the most important resources gifted to mankind.

Out of a total, 71% of water on Earth, only 0.08% can be utilized and can be used for the life processes.Hence, it is our moral responsibility to use water carefully. But the rapid development of the society and numerous human activities speeded up the contamination and deteriorated the water resources. In case of urban areas, there is a strict necessity to monitor the consumption of water as well as manage it. The management of water should be in a way that quantity as well as quality can be monitored. Traditional methods of testing drinking water quality parameters like, turbidity, pH, conductivity and temperature etc. may consume time because samples are tested manually in the laboratory. To change this traditional method, we have proposed a low-cost system water quality monitoring system which will provide the consumer with water quality parameters in real time such as pH, Turbidity, Temperature, Water Level, TDS.

This System will help spread awareness in people regarding the quality of water they are drinking. Usage of Unnecessary Water Filtration techniques such as RO (Reverse Osmosis),UV(Ultraviolet),UF(Ultrafiltration),NF without checking the necessity have increased. The project will help the consumer determine which type of filtration technique may be more effective and will also facilitate the concerned authorities to take adequate actions which will be required if the quantity of water decreases from a particular threshold.

II. HARDWARE AND SOFTWARE REQUIREMENTS

Hardware Used :

1.LPC2148 Microcontroller [2] -

LPC2148 is an advancement stage dependent on LPC2148 ARM7TDMI microcontroller which is powerful and with 512K on-chip memory. This board doesn't bother with outside power supply, it is powered by USB port . For applications including fast remote correspondence (WiFi/Bluetooth/Zigbee), constant information observing, USB based information logging and intuitive control boards, this improvement board is perfect . With direct fast interface to a PC/workstation with on-chip USB controller gives accelerates to 12Mb/s. The UART boot loader enables you to program utilizing sequential port and dispenses with the need of an extra developer. SD/MMC card interface, USB2.0 interface, Xbee/Bluetooth/WiFi remote module interface, 4Kbit 12C EEPROM, L293d DC engine controller are a portion of the on board peripherals.

2.GSM/ESP8266 Module -

The ESP8266 is an ease Wi-Fi microchip with full TCP/IP stack and microcontroller .This little module enables microcontrollers to interface with a Wi-Fi system and make basic TCP/IP associations utilizing Hayes-style directions.The ESP8266 WiFi Module is an independent SOC with coordinated TCP/IP convention stack that can give any microcontroller access to your WiFi arrange. The ESP8266 is able to do either facilitating an application or offloading all Wi-Fi systems administration capacities from another application processor.Nonetheless, from the outset there was no English-language documentation on the chip and the directions it accepted.The exceptionally low cost and the way that there were not very many outside segments on the module, which recommended that it could inevitably be economical in volume, pulled in numerous programmers to investigate the module, chip, and the product on it.

Sensors Used :
1.PH Sensor -
PH is the numeric portrayal of gram-proportional per liter of hydrogen particle fixation in any arrangement. It fluctuates between 0 to14. It is the logarithmic estimation of moles of hydrogen particles per liter of arrangement. The arrangements having pH esteem between 0 to 7 are acidic arrangements with huge centralization of hydrogen particles though arrangements having pH esteem between 8 to 14 are fundamental arrangements with little hydrogen fixation. The arrangements having pH estimation of 7 are impartial arrangements. Estimating the pH gives the proportion of alkalinity or sharpness of an answer.

2.TDS Sensor -
Total Dissolved Solids (TDS) are the aggregate sum of versatile charged particles, including minerals, salts or metals disintegrated in a given volume of water, communicated in units of mg per unit volume of water (mg/L), additionally alluded to as parts per million (ppm). TDS is straightforwardly identified with the immaculateness of water and the nature of water decontamination frameworks and influences everything that devours, lives in, or utilizations water, regardless of whether natural or inorganic, whether for better or in negative ways.

3.Temperature Sensor -
A temperature sensor is a gadget, regularly, a thermocouple or RTD, that accommodates temperature estimation through an electrical sign. A thermocouple (T/C) is produced using two different metals that create electrical voltage in direct extent to changes in temperature. A RTD (Resistance Temperature Detector) is a variable resistor that will change its electrical opposition in direct extent to changes in temperature in an exact, repeatable and about straight manner.Temperature sensors are coordinated circuit which gives yield voltage direct to the Celsius (Centigrade) temperature. It has a preferred position over temperature sensors adjusted in Kelvin, as manual subtraction of a consistent from its yield isn't required.

4.Ultrasonic Sensor -
An Ultrasonic sensor is a gadget that can measure the distance to an item by utilizing sound waves. It measures distance by sending a sound wave at a particular recurrence and tuning in for that sound wave to skip back. By chronicle the slipped by time between the sound wave being created and the sound wave ricocheting back, it is conceivable to compute the separation between the sonar sensor and the article.To find the distance to the object, simply divide the round-trip distance in half [distance = speed*time /2].

SOFTWARE REQUIREMENT :

1. Android development tools -
Android Software Development Kit (SDK) is a device set that empowers designers to make applications for Android OS. Significant direction line devices for Android application improvement are gathered into three bundles: the as of now referenced SDK instruments, Platform devices and the Android Emulator.An Android gadget is a gadget that keeps running on the Android working framework. Android is a variety of programming expected for cell phones that highlights a working framework, center applications and middleware.

2. Web development tools -
Web advancement is the work engaged with building up a site for the Internet (World Wide Web) or an intranet (a private system). Among web experts, "web improvement" more often than not alludes to the primary non-structure parts of structure sites: composing markup and coding.Web improvement essentially alludes to the creation and altering of sites, similar to those you regularly experience while perusing the World Wide Web (the Internet).

III. PROPOSED SYSTEM

Considering the present manual activity in housing societies for water treatment, we have automated the process by giving the level and the purity of water. The individuals from the social orders can be informed the degree/level of water accessible in the water tanks and the virtue of water by its parameters.
The proposed system is partitioned into three stages :-
1.Data acquisition -
The System will accumulate different parameters of water utilizing the connected sensors.Data acquisition is a procedure of naturally acquiring information from sensors or transducers legitimately into the PC system.
2.Data Analysis -
The accumulated information from the sensors will be received by the microcontroller and changed over from analog signals to digital signals and afterward displayed on the LCD unit and transmitted on the wifi module.
3.Display -
The assembled analysed information is transmitted on the server and after that showed on the android and web module with appropriate factual pictured way.
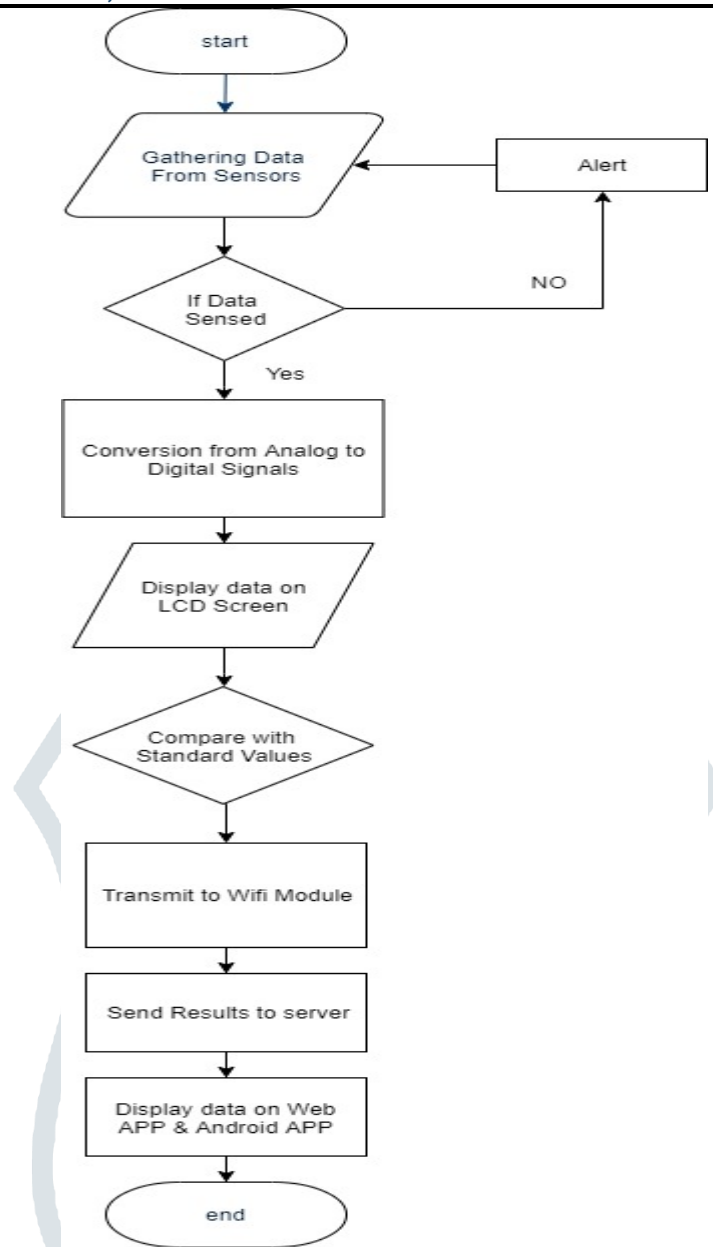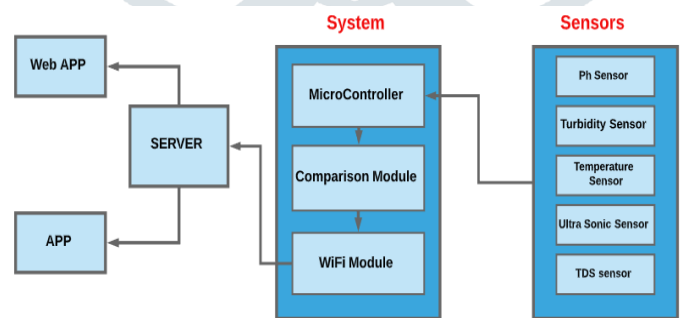
Figure1: Flow Chart

IV. SYSTEM ARCHITECTURE

Figure2: System Architecture

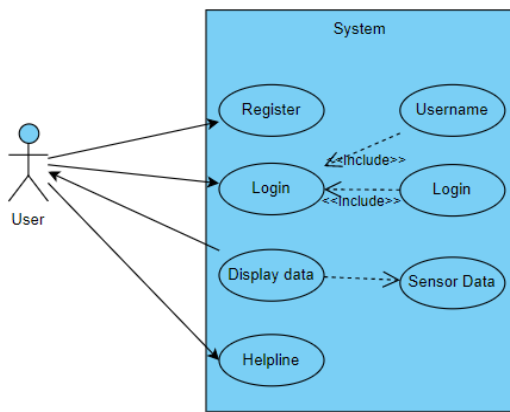## V. USE CASE DIAGRAMS
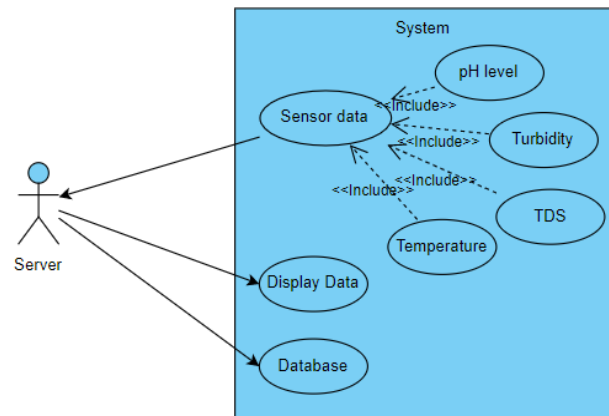

Figure3: User Use Case Diagram   Figure4: Server Use Case Diagram

VI. APPLICATIONS [2] -

1. Private Sector (Residential society) -
We realize that these days corporations and government set their water quality monitoring and treatment plants on water tanks. But, it is very rare that we see monitoring system in residential societies. So our system is very economical and adaptable to place system in societies.

2. Medical Clinics -
In the Hospitals and Medical centers it is critical to serve quality and unadulterated water to patients and visiting individuals. In our plan we characterize a few parameters to check water quality like turbidity, PH it is important to keep up turbidity level and Ph level of water.

3. Small Scale Industry-
Many Small Scale Industries have the requirement of checking the water quality before using it.These industries have laboratories where water quality is measured on regular basis considering various parameters such as pH,Turbidity,Taste,Color. Our System will help in determining the parameters without the use of manual work and also increase efficiency in production.

4. Water Relay System-
Water quality monitoring system can be equipped with relay system ,this system will continuously keep a check on the quality of water and as soon as the parameter value cross the limit of standard values the water flow will be shut and authorities will be informed for immediate action.

VII. CONCLUSION & FUTURE SCOPE -

In our proposed system, water quality can be monitored continuously from anywhere using android & web application, as soon as the quality degrades authorities can be informed for adequate action.This project will increase the convenience for the residents by enabling them to monitor and control the water quality remotely using a smartphone.

It is a reliable system & compact in size.This device can be used at private level. It can be implemented in a societies, industries or hospitals. In these places it can be used to keep a check on the parameter . As the parameters change notifications will be sent to the authorized person.
This System can be implemented near river banks to keep a check on the parameter of water so, NGOs and govt can keep a check increasing pollution in the rivers so that adequate actions such as clean up drives can be initiated .

VIII. REFERENCES

[1] Silva, S., Hoang Nghia Nguyen, Tiporlini, V., & Alameh, K."Smart Water Management in Housing Societies using IoT",Proceedings of the 2nd International Conference on Inventive Communication and Computational Technologies (ICICCT 2018) IEEE Xplore Compliant - Part Number: CFP18BAC-ART; ISBN:978-1-5386-1974-2 , 2018.
[2] Sujay Dandekar,Shashank S Kadam,Ria N Choudhary(BE, Electronics,Datta Meghe College of Engineering,Mumbai University, India),Sarthak S Vaidya,Vipul S Rajderkar(B Tech, Electronics and Telecommunication, K.J. Somaiya College of Engineering, India),"IOT based Real Time Water Grade Tracking System using Solar Energy"Proceedings of the International Conference on Communication and Electronics Systems (ICCES 2018)
IEEE Xplore,2018
[3] P.Verma , A.Kumar , N.Rathod , P.Jain, S.Mallikarjun , R.Subramanian, B.Amrutur and R.Sundaresan. "Towards an IoT based Water Management System for a Campus". IEEE First International Smart Cities Conference (ISC2), 2015.

[4] Kaushik Gupta Mandar , Kulkarni Manas Magdum ,Yash Baldawa 4 and Prof. Shivprasad Patil."Web Based Water Quality Monitoring with Sensor Network Employing ZigBee and WiMax Technologies",1 Electron Science Research Institute, Edith Cowan University, 270 Joondalup Dr, Joondalup, WA 6027, Australia,2011.

[5] Ian F. Akyildiz, Weilian Su, Yogesh Sankarasubramaniam, and Erdal Cayirc."Single Window Monitoring Solution with Predictive Analysis for IOT: A Survey ",Department of Computer Science and Engineering BMS College of Engineering, Bangalore.2002.

[6] Jiang Peng, Huang Qingbo, Wang Jianzhong Research on 'Wireless Sensor Networks Routing Protocol for Water Environment Monitoring" 0-7695-2616-0/06 2006 IEEE