WATER LEVEL AND QUALITY MONITORING WITH PREDICTIVE DATA ANALYSIS

Yash Maniar, Abhishek Pandya

Student, Student
Information Technology, Information Technology
Universal College Of Engineering, Vasai, India

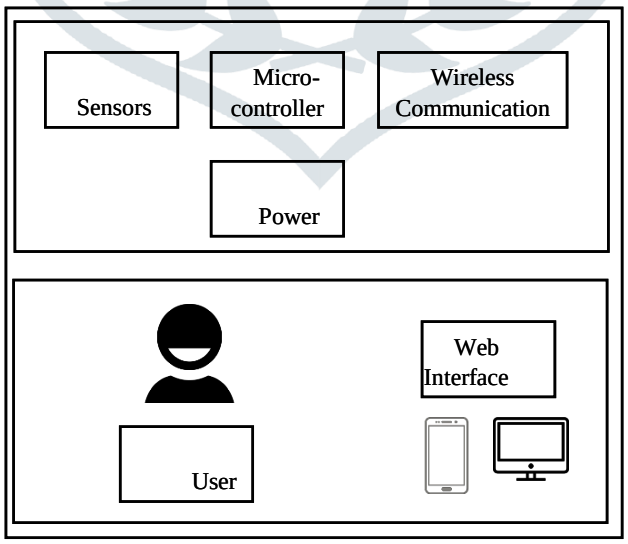
Abstract : Internet of Things (IoT) has become a good part of human life where almost all of the things are becoming smart which is being used in our day-to-day life. We can see multiple examples of smart system like Smart TV, Smart Car, etc. Nowadays, we are making most of the process automated by collecting the essential information of the system and processing that information on cloud based system. Water is one of the key part of human life and out of 70% water available on earth only 2.5% is fresh which can be used for drinking and daily chores etc. So if we use our water smartly we will save a lot. Based on the statement, we are proposing our idea of differentiating the water based on quality so that we can use non-drinkable water in toilets, cleaning clothes based on the category of quality. We are making this system smarter by also detecting the level of water available in the tank and then predicting through data analysis when the tank will be emptied. We are using Ultrasonic sensor for detecting the water level which calculates distance by measuring the time taken by waves to travel back. For measuring the quality of water, we are using pH sensor and turbidity sensor. All these parameter are sent to micron-controller for processing and then this data is sent to cloud using Wi-Fi and on mobile/web server we can see the water level and quality. Real-time analytics is done for predicting the time when tank will be empty.

I. INTRODUCTION

The Project *"Water Level and Quality Monitoring with Predictive Data Analysis"* is a very innovative system which informs users about the water level and quality of the water inside the tank. It also provides has the predictive analysis feature which tells user the expected time it will take to reach the critical water level. User can see the complete data on a web based user friendly interface which user can access from anywhere through internet.

To demonstrate the working of the project, we will have 2 water containers with one good quality water and other with bad quality water for differentiating between qualities of water between these two containers. The ultra-sonic sensor output will be given to micro- controller (Atmega2560) for analysis and after that uC will send data to web based interface through Wi-Fi module. The system will start recording the data on web based server which will be then used for predictive analysis. A mobile interface is provided to user for monitoring the water level in the tank and quality of water present in the tank. Real-time data prediction algorithm runs to predict the water consumption rate and also informs how much time it will take tank to empty.

Figure 1: Smart Water Level and Quality Monitoring System



The above figure contains the block level aspect of the project:

1. Sensors: Contains water level and water quality sensor
2. Micro-controller: We are using Arduino Uno ATMEGA 2560
3. Wireless Communication: We are using Wi-Fi for wireless communication
4. Power: We will be using 5V Adapter for powering the sensors, micro-controller and modules.
5. Web Interface: Interface where user can see all the data and monitor.

II. PROGRAM DEFINITION

Water quality plays an important role in the conservation of water. The current system available in market only provides the water level and quality but does not provide how much time it will take for the tank to empty. In this system, data prediction algorithm helps user to know the time it will take for tank to empty and also provides indication on Mobile/Web Server when critical water level reached. The data is sent real-time using Wi-Fi which makes system more reliable and accurate.

III. PROPOSED SYSTEM

We are proposing a system which can be attached to any water tank and it will provide water level and quality of water present inside tank. It will also predict the time it will take for water to completely drain from the tank. It will provide user an indication when water level is critical. All the information will be shown on a mobile application or web server which will be real-time and accurate.

Stages of the project:

1. Acquiring the water level sensor data through Arduino.
2. Interfacing with Wi-Fi module with Arduino.
3. Sending the sensor data to web based interface.
4. Integrating the water quality sensors data to Arduino.
5. Fusing the data from all the sensors and send to web based interface.
6. Predictive data analysis for water consumption and critical water level

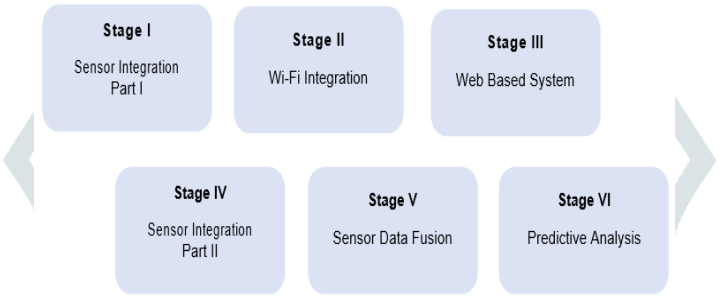


Figure 2 Stages of the System

Key Features of the Project:

1. Water Level and Quality Monitoring.
2. Access of data from anywhere (Web Interface).
3. Smart assistance for critical water level.
4. Accurate prediction of consumption rate and critical level timing.
5. Block based design for ease in addition of multiple sensor nodes.

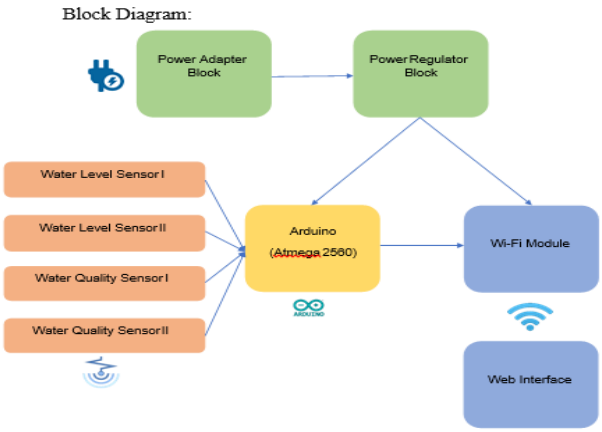


Figure 3 Block Architecture

IV. CONCLUSION

The purpose of the project is to develop smart system for water where on web interface user will monitor the quality and level of water present in the tank. The system also predicts when the tank will empty and accordingly alerts user on the interface. It provides all the parameter real-time which can be accessed from anywhere. The interface will be on Mobile application/Web Server.

V. ACKNOWLEDGMENT

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