SMART DIGITAL WATER FLOW SURVEILLANCE SYSTEM USING IOT

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Abstract: *The idea of a Smart digital water flow surveillance system is for the Smart buildings, Colleges, Hospitals, Industries, and Homes. In our day to day life, we see our cities facing many problems with water wastage, which leads to water scarcity and water pollution due to the overflow of water along roadsides. The main process is to save the water and monitor the usage of water. The wastage of water will also affect the environment and can cause water pollution due to the addition of oils and pesticides around the land. The most important need for having a smart way of life is by saving water. The Smart digital water flow surveillance system is a new idea to save water. It can send information through IoT to an android application of the user about the filling and empty water tank and it can also detect the water flow from the public water line. This system also used to measure the usage of water by the user using the water flow meter. Every process of the system is updated in an android application for user convenience.*

Index Terms **- PIC16F877A, Moisture sensor, Floating sensor, Wi-Fi module, Water flow sensor, Solenoid valve.**

I.INTRODUCTION

The world is getting automated more day by day and hence an eco-friendly technique is essentially required. Water management is the most required process around the world. Water usage can be estimated by monitoring and measuring the water utilized by a person. So far, the technology is much developed but there is a need for innovation. The concept provides a plan for reducing the wastage of water[4]. Nowadays, most of the industries are given rebirth with automation but, the local is still backward in automation. It is also equally important to have a low cost, robust and simple system to monitor the water consumption in the residence using an automated system.

The implementation of concept may differ among countries; insufficient water is a major issue among most developing nations. Since, less water usage is always welcomed wide over the world. Water management has an important commitment to ensure water consumption awareness and to avail of the measurement to the consumers. Mostly, the usage is unlimited due to the lack of measurement. In some cases, consumer involvement is necessary to save water but the concept must result in a system that combines both measurement and monitoring without the presence or any manual interruption of the consumer. The smart digital water flow surveillance system is presented in this paper. This system is available to measure and manage water consumption. The processed results will be published with the help of a Wi-Fi module for and displayed in the smartphone with the help of an android application [6]. The android application is used for the quick access and control of the device from anywhere. These can be supported in all versions and it can be updated and new supports can be added when it is needed. The smart digital water flow surveillance system can reduce the cost of the system. This system uses IoT for fast sharing of information to the user.

1.1Related Work

Nihil R, Riya Rajan, Rangit Varghese [2019]
Proposed the Water Quality Monitoring System is a real-time water quality measurement system focused on GSM. The system is incredibly robust and cost-effective. This machine tests various criteria relating to the water and sends them to the control center. It can automatically track the quality of water and is low in cost and does not require duty staff. Authorized users can access the data by logging in to the Thing Speak website. By entering the registered user ID and password, it will be led to the web page where the parameters will be shown in real-time in the form of plots. [1]

ImranB, Shakir Ahmed Sha KS, PavethraM, Siva Sankari k, Kavitha [2018]
Proposed a research that helped to designed and managed by a Wireless Sensor Network (WSN) which helps to track the quality of water with the aid of information sensed by sensors immersed in water, in order to keep the water resource within the norm defined for domestic use and to be able to take the necessary measures to restore the health of the deteriorated water body. The introduction of industrial process regulation is made possible through the use of the Internet. [5]

GowthamyJ, ChintaRohith Reddy, PijushMeher, SaranshShrivastava, Guddu Kumar [2018]
Proposed a study by installing this device in the smart city, it will be able to collect and evaluate the trends of residents ' water usage and save a lot of water from waste. The Internet of Things (IoT) is a revolutionary concept, that has the potential to turn almost anything into a smart thing. IoT provides an interface to track and work remotely from anywhere and at any time. Existing liquid level control systems are commonly used for controlling liquid levels, reservoirs, silos and dams, etc. The device suggested is used for the home/office. [3]

M.B. Kawarkhe1, Sanjay Agrawal [2019]
Proposedthis system, which helps to check the quality of water and air in different areas. This system will help to measure PH, turbidity, temperature, and carbon monoxide levels. This system will be used in a variety of areas, such as rivers, lakes and water-related sites. This will also be useful in the areas of health care, agriculture and fisheries by checking the quality of water. The input sensors are stored in the data logger and sent to the clouds of the Internet. Using the data collected, we may be able to say that the water is drinkable or not as an acidic foundation. [2]

II. PROPOSEDMETHODOLOGY

2.1Design and Development

Initially, the water comes through the inlet pipe and then flows through the moisture sensor 1 which indicates the flow of water through the pipe then it is passed through the water flow sensor 1 and water flow sensor 2. Two water flow sensors were kept in a distance so water flow differs from point to point that can be and value differs for each sensor by taking the average of the sensors will give more accuracy of water flow than one.

At the outlet of the pipe solenoid valve is connected for the automatic open and close systems. In the lower tank, 2 floating sensors connected at the low level and high level to indicate the level of water in the tank. The upper tank contains a floating sensor at the required top-level a water pump and Wi-Fi Module ESP 8266 is connected to the microcontroller.

The moisture sensor and floating sensor F1 are ON the solenoid valve gets open when anyone is OFF the solenoid valve will close. when the upper tank sensor F3 is ON water pump will start to pump the water when F3 is OFF the water pump stops pumping the water. As such the floating sensor F2 in the lower level of the lower tank gets ON the water pump will not pump the water.

Every single process mentioned above and also the value from the water flow meter on water usage will be updated in an android application of the users through Wi-Fi Module ESP 8266.

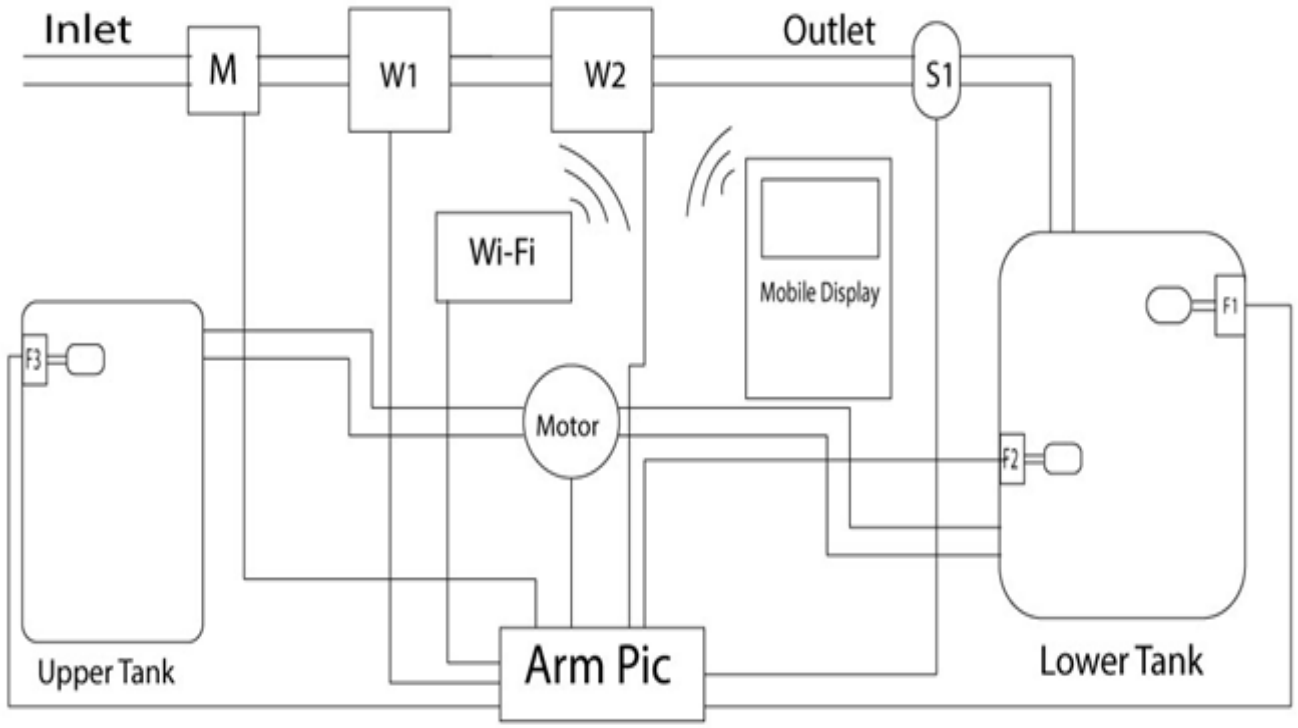

Fig.1: Block diagram of the Smart Digital Water Flow Surveillance System

2.2Abbreviations and Acronyms

- ✓ **WI-FI MODULE** - ESP8266
- ✓ **PIC** -Peripheral Interface Controller
- ✓ **F1,F2, F3**-Floating sensors
- ✓ **S**-Solenoidal valve
- ✓ **M**-Moisture sensor

III.HARDWARE DESCRIPTION

3.1 PIC Controller

The PIC controller is used as a major part of this project. It is used to control all other elements. It has eight Analog pins and more memory space which is used for garden automation. It also has a UART for efficient communication. The power required for this controller is given by the internal power supply.

3.2 Wi-Fi Module ESP8266

The ESP 8266 Wi-Fi Module is compatible with most of the microcontroller.The ESP 8266 Wi-Fi Module will provide Wi-Fi access to microcontroller. It is a cost-effective board with huge advantages.The ESP 8266 Wi-Fi Module contains self-calibrated RF there is no use of external RF parts.

3.3 Water Flow Sensor

The water flow detector consists of a body of plastic tube, a water rotor and a sensor for hall effect. Pipe rolls as the liquid passes through the pipe. Its velocity changes with different flow rates. The pulse signal is displayed by the hall-effect sensor. This isideal for detecting flow in a coffee machine or water dispenser.

3.4 Solenoid Valve

Solenoids are basic electrical components and have a huge effect on daily life. The main advantage of the solenoid is that the reaction of the solenoid is immediate if electricity is used. Solenoid valve work involves either opening or closing the orifice in the valve body, which either allows or prevents flow through the valve. The plunger opens or closes the orifice by raising or lowering the sleeve tube by energizing the coil. Solenoid valves are made of a wire, a plunger and, a sleeve assembly.

3.5 Pumping Motor

A water pump is a mechanism used to raise the water pressure in order to move it from one point to another. Modern water pumps are used throughout the world to supply water for urban, commercial, agricultural and residential use. Water pumps are also used to transfer wastewater in wastewater treatment plants.

3.6 Mobile Phones

Mobile phones belonging to the Global Mobile Communications System networks are capable of sending and receiving the information.A mobile phone with advanced features similar to a computer is called a smartphone, while a standard mobile phone is known as a smartphone.Mobile phones can be used to connect over long distances without wires. It operates by connecting with a nearby base station that links it to the main telephone network.

3.7 Floating Sensor

A float switch is a type of level sensor used to detect the amount of liquid within the tank. Another design uses a reed do or mounted in a tube; float, holding a magnet, surrounds and directs the tube. When the float raises the magnet to the reed switch, it locks. The aim of a float switch is to open or close the circuit as the liquid level rises or falls. The majority of the float switches are "normally closed," meaning that the two wires coming from the top of the switch complete the circuit when the float is at its low point, resting on its bottom film.

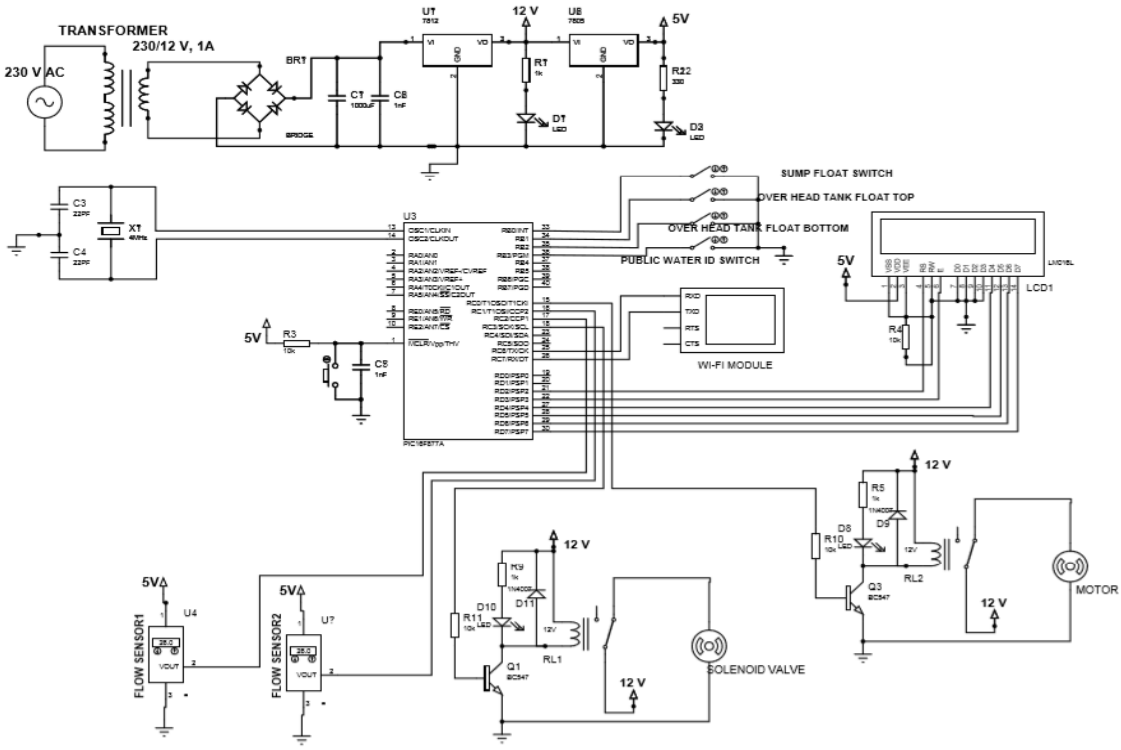

Fig.2: Schematic diagram using Proteus

IV. RESULTS AND DISCUSS

The results of the experiment in the smart digital water flow surveillance system using IoT are discussed above. The proposed project includes PIC16F877A, moisture sensor, ESP 8266 Wi-Fi Module, Water flow sensor, Floating sensors, Solenoid valve. The microcontroller can be coded in Embedded C to control the entire smart digital water surveillance. The coding is done using the IDE MPLAB. The android application is code in python language with the help of Android Studio IDE.

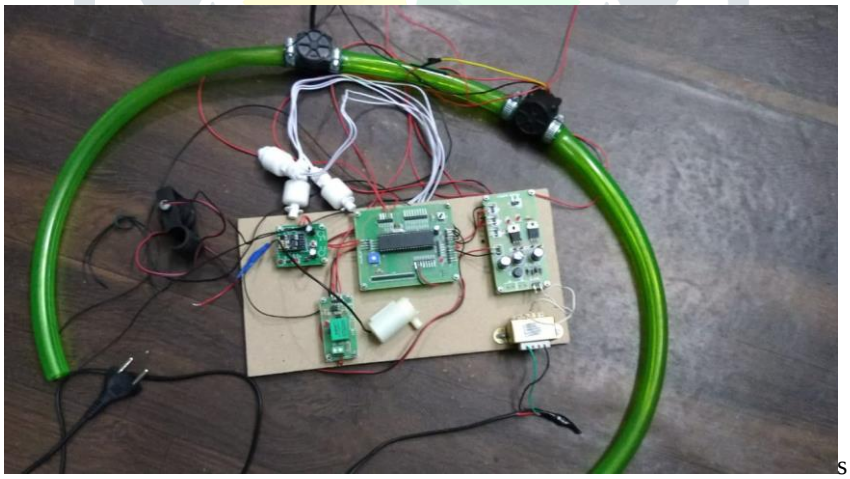

Fig.3: Prototype of Smart digital water surveillance

V. REFERENCES

[1] ThinagaranPerumal, Md Nasir Sulaiman, Leong.C. Y, "Internet of Things (IoT) Enabled Water Monitoring System", Global Conference on Consumer Electronics (GCCE), IEEE, 2015.

[2] Nihil R, Riya Rajan, Rangit Varghese, "IoT Based Real-Time Water Quality System", © IJEDR 2019.

[3] Imran.B, Shakir Ahmed Sha KS, Pavethra.M, Siva Sankari k, Kavitha,"Smart Tank Water Monitoring System using IOT Cloud Server at Home/Office", International Journal of Engineering Science and Computing, April 2018.

[4] M.B. Kawarkhe, Sanjay Agrawal,"Smart Water Monitoring System Using IOT at Home", IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727, Jan - Feb 2019.

[5] Gowthamy.J, ChintaRohith Reddy, PijushMeher, SaranshShrivastava, Guddu Kumar, "Smart Water Monitoring System using Io", International Research Journal of Engineering and Technology (IRJET), © 2018.

[6] PravinPachorkar, VidhiDholu, PritamSanghavi, PranitMutha, YatinSuryawanshi, "Real-Time Water MonitoringSystem using IOT", International Journal for Modern Trends in Science and Technology, October 2018.

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