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An Ultrasonic & Gsm Module Based Water Level Monitoring System via Iot

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ABSTRACT : *Water is one of the natural resources that is important to our survival as humans. Since water is used by human for day to day activities, it is necessary to monitor the water level to make it available and avoid wastage. To achieve a power efficient and simple solution to home water level monitoring, a system that can sense the water level and transferring the data via a GSM module was developed. The data transferred are analyzed in real time using Arduino and transferred to a Graphic User Interface. GUI is used at any location to interact with the electronic device which senses the water level through graphical icons and visual indicators.*
KEYWORDS – *Internet of Things, Ultrasonic sensor, Water level, Arduino.*

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I. INTRODUCTION

Water is one of the natural resources that is most important to our survival as humans, it is used for different purposes at home such as for drinking, washing and bathing, in Agriculture it is used for irrigation, in the field of electrical Engineering it is used in hydro power plants and Nuclear power plants for power generation, it is also used in the industries for different manufacturing needs. Its vast usage to our day to day activities highlights the need for proper management this natural resource [1], [2], [3].

The common method of water level control for most homes is simply to start the feed pump at a low level and allow it to run until a higher water level is reached in the water tank [3]. This is not properly supported for adequate control system. Usually, this kind of system provides visual multi-level as well as continuous level indicator. Audio visual alarms at desired levels and automatic control of pumps based on user's requirements can be included in this management system [4], [5].

Most of the buildings these days have overhead tank for water storage. Unfortunately, most users find it tedious and difficult to know the level of water in their water tanks due to energy and time required to climb an overhead tank and the absence of water level indicator. Because of this, there is wastage of large volume of water. The solution to these problems is catered in our project, designing an automatic water level monitoring and control device. This device has a sensor which sense the level of water in the water tank, the control unit which controls, switching unit to avoid over flow of water into the tank, and a GUI to monitor and control the device from any remote location [6], [7], [8], [9].

II. DEVELOPMENT OF BLOCK DIAGRAM

The block diagram of the GSM-Based water level monitoring system is shown in Fig. 1 and Fig. 2.

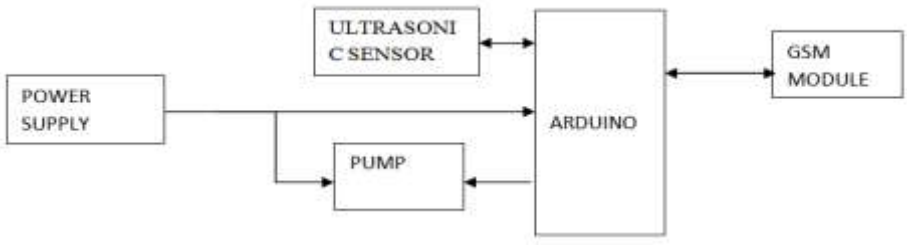

Figure 1: Block diagram of transmitter

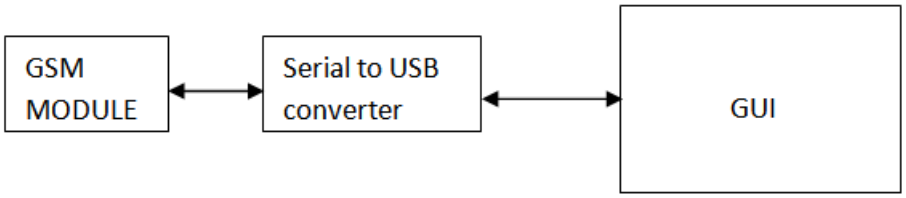

Figure 2: Block diagram of a receiver

The GSM-Based water level monitoring system with GUI capabilities, focuses on the use of an automated method of water level detection, monitoring and control. Ultrasonic sensor senses the level of water in the water tank, send the information to a microcontroller, the microcontroller converts the information into digital data, the data is transmitted using IOT technology to a GUI for control and monitoring. This approach was successful by programming of the microcontroller with codes based on automation while the GSM module was used to enhance GSM communication using IOT based platform [10].

III. MATERIALS AND METHOD

1. Proposed system design

The complete circuit diagram of the proposed system is given in Fig. 3 and Fig. 4.

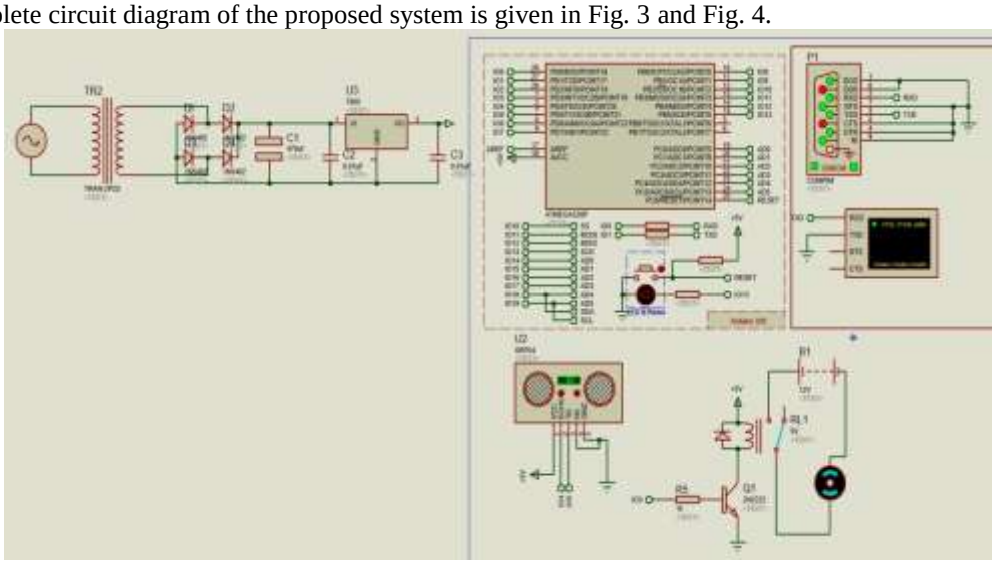

Figure 3: Circuit diagram of the transmitting unit.

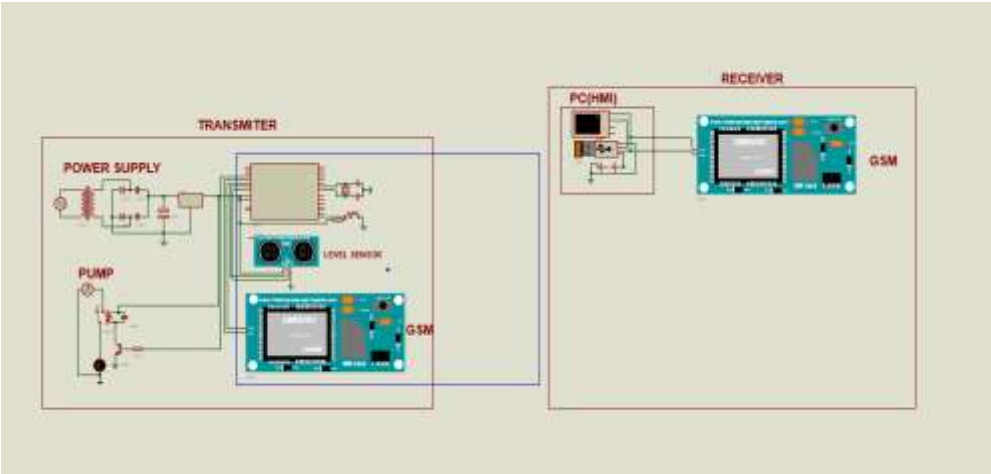

Figure 4: Block diagram of the entire system showing the circuit.

IV. SYSTEM FLOW CHART

The flowchart used for the development of the system's firmware is shown in Fig. 5.

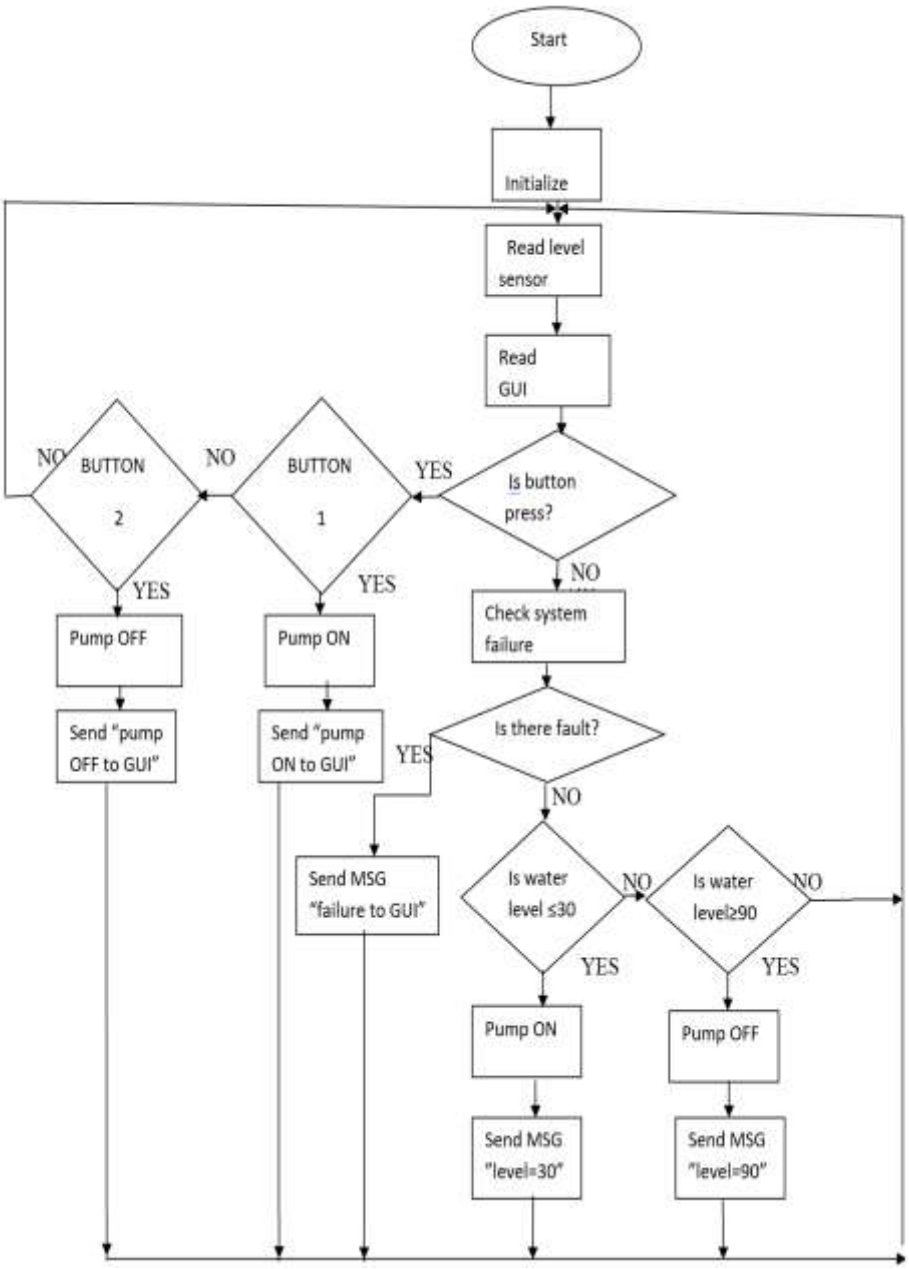

Figure 5: Flow chart of water level monitoring system

V. RESULTS AND DISCUSSION

This circuit was simulated using the Proteus professional environment. When the water level is below 30 percent, the pump turns on. The pump continues to operate until the water level reaches 90 percent and automatically turns off. The pump can be switched off remotely from the GUI when the automatic part fails to operate. Fig. 6 shows when the pump is on at a level below 30 percent, Fig. 7 and Fig. 8 displays when the water level reaches 90 percent and when the pump turns off.

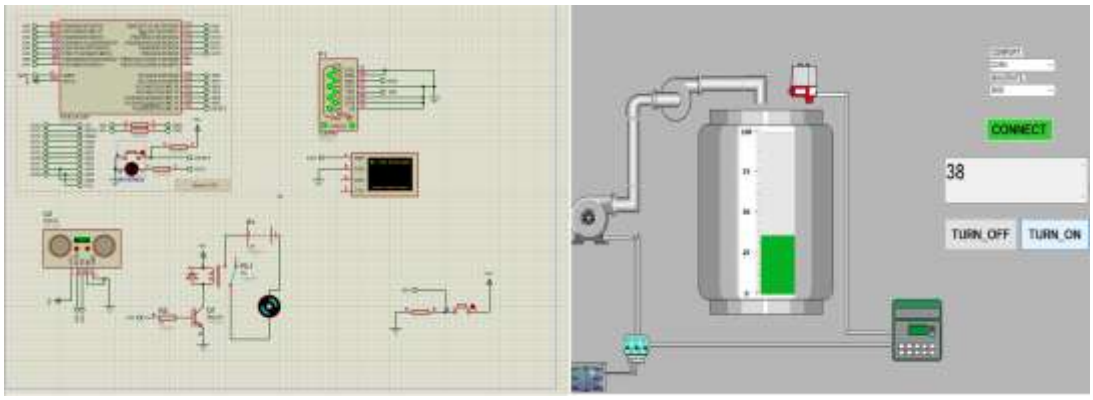

Figure 6: Showing when the pump turns on

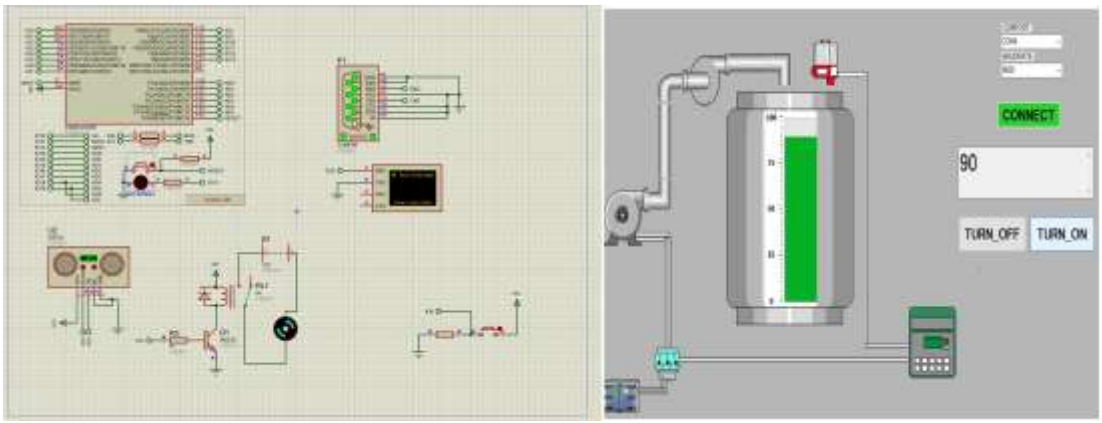

Figure 7: Showing when the water level reaches 90 percent.

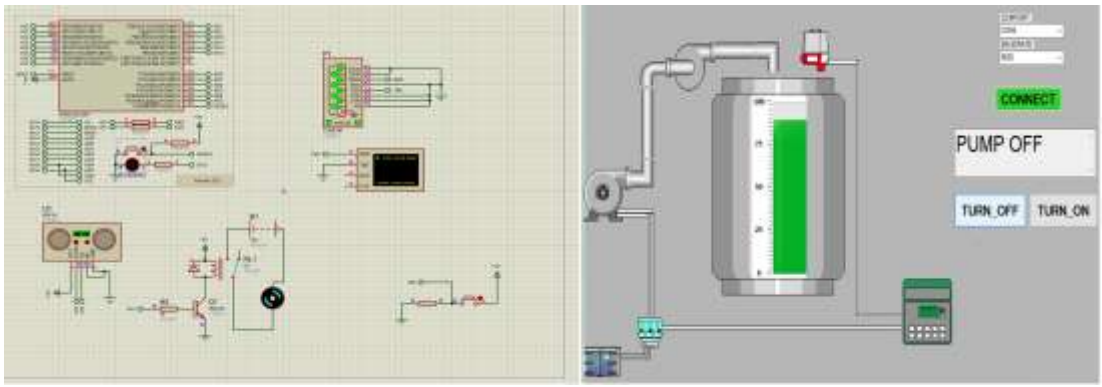

Figure 8: Displays when the pump turns off.

VI. CONCLUSION

In this project, we focused on the problem of water wastage through the overflow of the water tanks. The GUI monitors and control the change in the water level both automatically and remotely using the GSM module to communicate with the system. The system would provide home owners and organizations a reliable way of managing water levels in tanks without any hassle. This system has an advantage because it utilizes the GSM technology which eliminates the cost of network usage. Also, the system is scalable and allows any number of different devices to be added with no major changes in its core.

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