SMART TANK APPLICATION

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Abstract: Water level indicators hold a basic role of representing the level of water in the tank, in offices or for domestic purposes. But, with the availability of the technologies like microcontrollers and microprocessors we can exceed the areas and features of these indicators [1]. Thus, we have broaden the aspects of the simple water level indicator to a level where we can not only check the level of water but can switch on, switch off, perform actions either manually or automatically, even if the user is in different location, far from the actual system. The method used for this system integrates GSM module and Wi-Fi module, with relay logic, where the sensors will be sending signals to the microcontroller and the microcontroller will be passing signals further to relays so as to perform a definite action, as per defined by the code and architecture [7][8].

I. INTRODUCTION

In this project we are designing an android based application with a water tank system, which can be used in our daily life and makes it easier to perform the daily routine work. We are designing an android based application named as "SMART TANK" that can be used to control the water inlet and outlet in water tank located at the roof top of residential and commercial buildings. Also providing the basic information such as about the status of current level of water, alarming level of water in the tank (i.e. when the water in the tank is about to finish), error message in case of any unusual behavior in the tank and usage of water per week in terms of full cycle of water. We can use this application in our daily life and perform the task of maintaining the water in our tanks in a much easier and efficient way. The application is easy and compact which makes the user experience ease and comfort. It can be used to monitor the water tank at our home, hotels, colleges, hospitals etc [3]. Our project as a whole is a smart system with an android application.

This system requires the following:

- ELECTRODE SENSOR (Detect the water level in tank).
- MICROCONTROLLER (Sensing input from the real world and controlling devices based on that input).
- Wi-Fi MODULE (A connection between the motor and tank to send the data that is stored in microcontroller).
- WATER TANK (Small prototype model)
- GSM MODULE(For sending messages)
- INTERNET CONNECTIVITY
- MOBILE APPLICATION(For controlling Smart Tank application from any location)

II. DISCUSSION

The system developed takes energy from the domestic electricity via socket and thus converting high voltage to lower required voltage by step down transformer. Entire system comprises of five circuits, sensor circuit, controller circuit, WiFi module circuit, power circuit and relay logic circuit. Also, this entire system is digitally connected to a mobile application, through Wi-Fi module, that shall be sending/receiving signals. This application gives the user an option either to set the system in automatic mode where it takes necessary action by itself as to set the system in manual mode where the user commands particular action as per requirement. Sensors, dipped in tank, sense the level of water and continuously send the signal to the controller system [4] [9]. In automatic mode, when condition appear that the tank is empty, signal are exchanged and finally the relay coils are energized, and the pump gets ON and when the tanks get filled, the system signal relay switch, and pump is set off. In manual mode, every time a particular level is reached by the water, an SMS is send to user, thus providing the flexibility to user either to switch ON or switch OFF the pump [6]. This is done through mobile application, which sends command to system. Figure 1 shows the block diagram of the system.

A. **Sensor Circuit:** The use of conductive sensor has been made in order to sense the water level. Sensors are kept in tank, at different levels, hence four levels are checked. This circuit is fed a voltage Vcc provided by the power circuit. Figure 2 shows the sensor circuit diagram.

B. **Controller circuit**: The microcontroller used is Adriano and the program was developed in arduino development environment. Serial pins 3, 4, 5, 6, 7 and 8 are used for connecting LCD. Pins 11, 12, 13 and 14 are used for the sensors. The WiFi module is connected to pins 9 and 10.Pin 15 is dedicated to relay circuit.

C. **WiFi module**: We are using ESP8266 WiFi module here. This is connected to Pin number 9 and 10 .It helps in Figure 2 shows the Wi-Fi module connectivity to the arduino. We are using it for operating the mobile application from anywhere which makes the whole project more flexible and useful.

D. **Power Circuit**: This circuit employs a step-down transformer for lowering down the voltage to 12 AC. This AC voltage is fed to a bridge rectifier for ac to dc conversion. IC 7805 is also used in order to regulate the voltage to 5 volt, DC. Hence we obtain Vcc at the output.

III. FLOW CHART

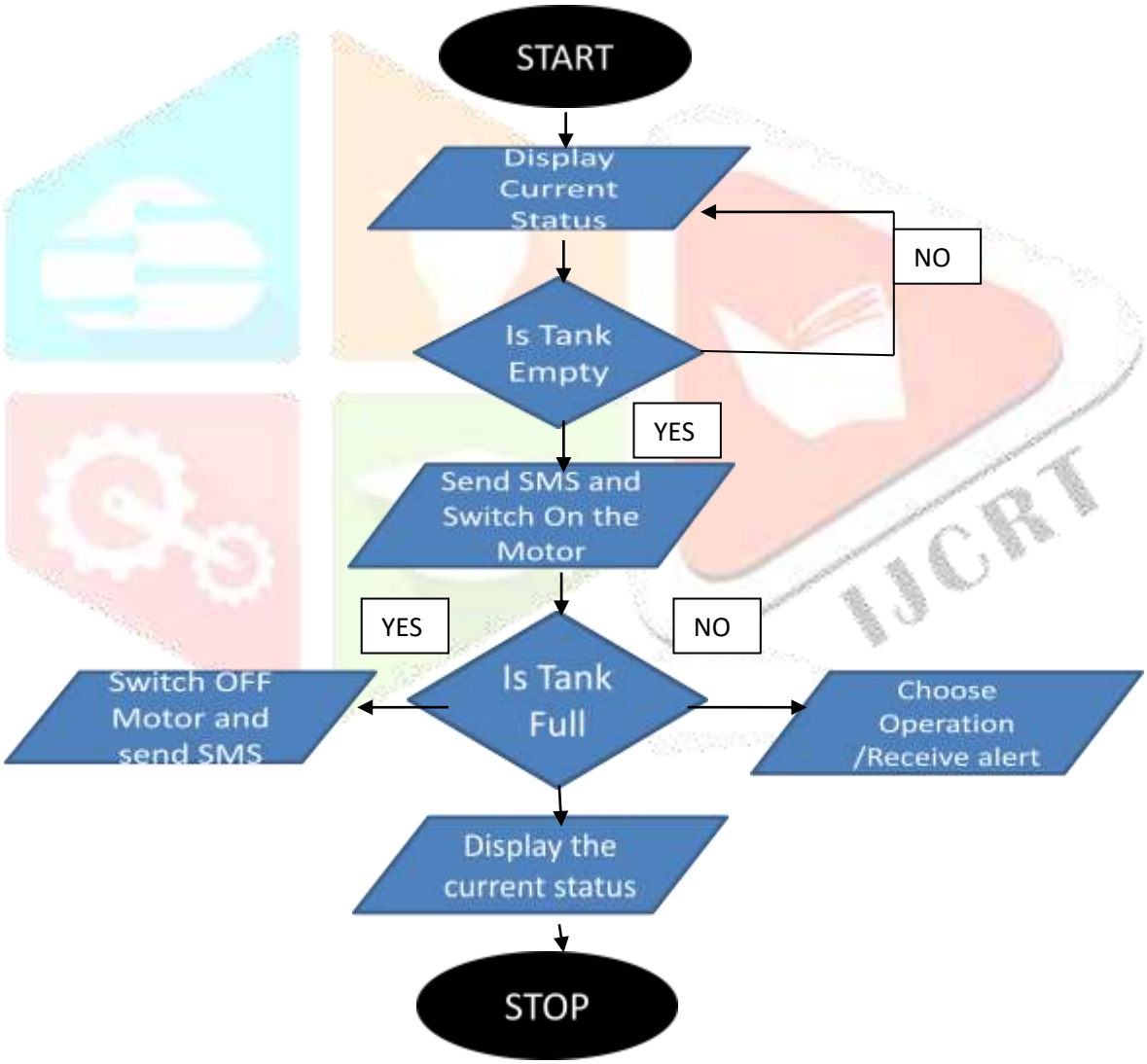

Figure: Flow chart

IV. BLOCK DIAGRAM

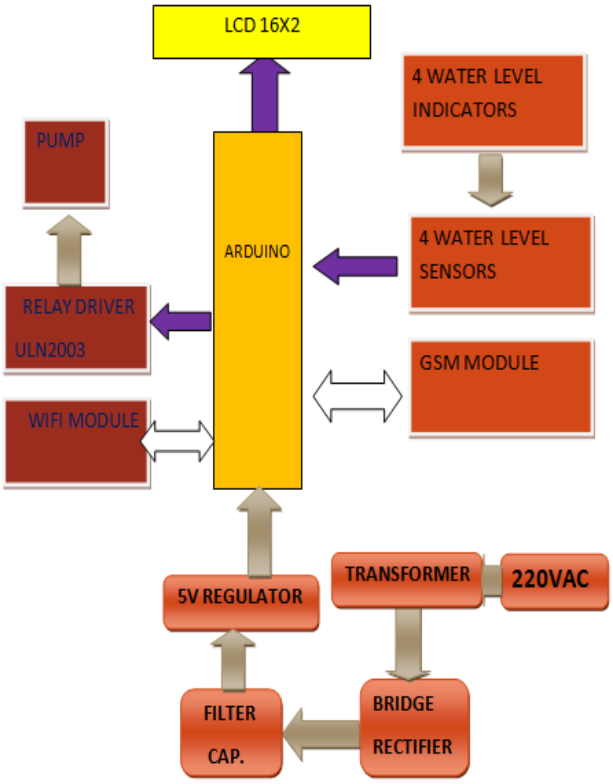

Figure: Block Diagram

V. CIRCUIT DIAGRAM

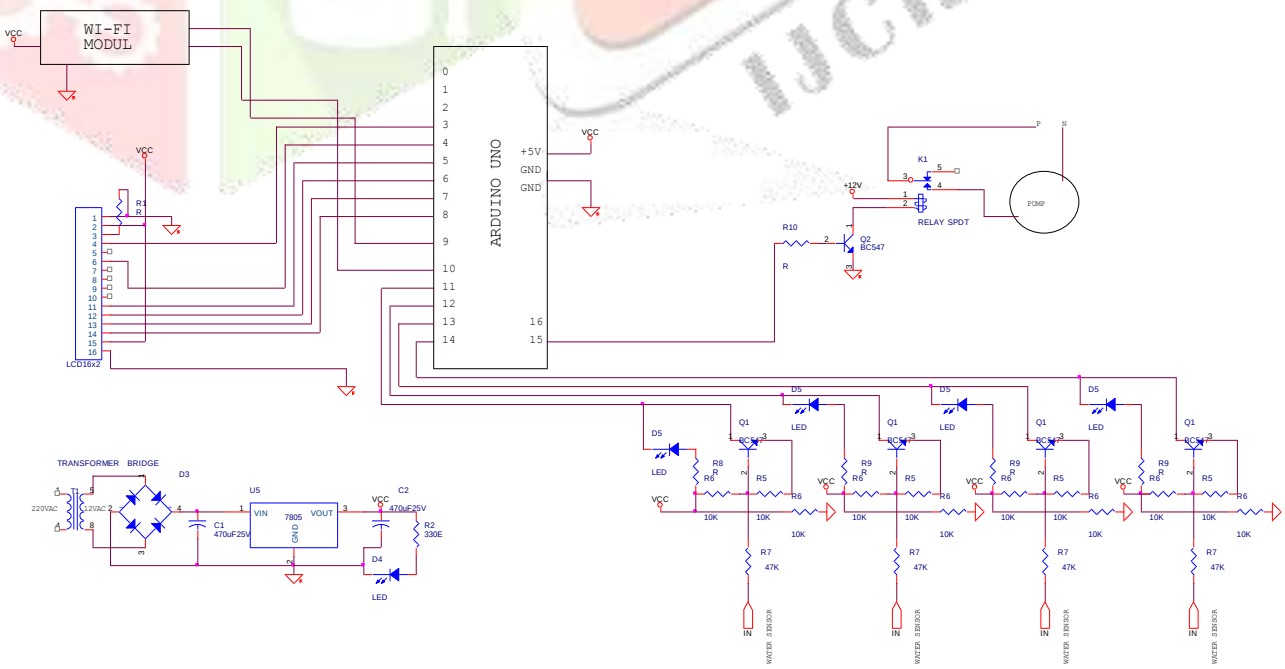

Figure: Circuit Diagram

VI. CONCLUSION

The system developed is working in both manual and automatic mode, with continuous updates by the controller, to the user, via GSM and the commands, from the user, are signalled back to controller via Wi-Fi. The switching system is absolute and effective and the circuits are noise free. The area of applications of this system can be widen to the other scopes like industrial uses, swimming pools, malls, offices etc. System could be modified to control several tanks instead of one and also different liquids could be checked, not limiting the scope only to water. There could be more improvements, modifications and adjustments in the system as per the requirements and objective of the user.

VII. REFERENCES

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