Automated Water Management and Distribution System using DTMF

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ABSTRACT

Water shortage is a genuine issue in major cities. One of the foremost critical viewpoints of any town administration includes water management. It may be a pivotal perspective as nowadays water assets are exceptionally constrained and nobody can bear its wastage. This project deals with approximate mechanization within the water conveyance and administration with specialized advances. In this system, water volume will be detected by the water level sensor. As the water volume drops the motor is automatically turned on. The supply of water to diverse regions computerized through the utilize of DTMF. Different Solenoid valves are controlled by using the microcontroller for the conveyance of water. Motor speed is controlled with respect to tank water level. This extends deals around the versatile controlled water dispersion totally different zones and conveyance of water.

KEYWORDS: *DTMF, Pump, LCD, PIC, Ultrasonic, Relay*

I. INTRODUCTION

Water shortage is a genuine issue in major cities. One of the foremost critical viewpoints of any town administration includes water management. It may be a pivotal perspective as nowadays water assets are exceptionally constrained and nobody can bear its wastage. Maintainability of accessible water assets in numerous locales in the world is presently a prevailing issue. This issue is quietly related to destitute water allotment, wasteful utilize, and need for satisfactory and coordinates water administration. Water is commonly utilized for horticulture, industry, and residential utilization. Hence, productive utilization and keep track of water usage are loop holes for domestic or office water administration frameworks. Within the final few decades, a few monitoring systems coordinates with water level location have been acknowledged. Measuring water volume is a basic assignment for the government and home point of view. It would be conceivable to track the genuine execution of such activities with the integration of different controlling exercises. In this manner, the water controlling framework execution makes potential significance in domestic applications.

Most urban municipalities in India are water worried, with no city having a day in and day out water gracefully. As per the Ministry of Urban Development (MoUD), 182 urban communities require quick consideration with respect to legitimate water and wastewater the board. As per official measurements, the inclusion of sanitation has expanded however asset manageability and slippages are regular in that inclusion.

Besides, in urban communities with above one million individuals, the official water flexibly after 35% misfortune in spillages is only 125 liters/day per capita which is impressively lower than the interest of 210 liters/day per capita. Framework improvement and guidelines have not stayed up with populace development and urbanization and therefore wastewater the board has become a significant test.

II. OVERVIEW
A. Related Work

The water supply frameworks are a portion of the urban infrastructure which must guarantee the coherence of the water distribution, the water quality control and the checking and control of the mechanical prepare parameters, and deal with the confinements forced by the water accessibility, hydrological conditions, the capacity of the tanks and water towers and the expanding differences of water utilization. In the existing system, urban water is provided to the domestic with the assistance of a few man control. The individual in charge will go to the place and after that open the valve to that specific zone. Once the time is over the individual will go again to that place and near the valve. This sort of operation needs man control. Typically waste of time to go to that place and come back regularly.

The time operator takes is exceptionally much to go to the tank each time to turn ON and OFF which comes about in a loss or wastage of water on a huge scale.

B. Need of Project.
➢ Usually the operator personally goes and switches on and off the water valve.
➢ He has to go long distances to switch on and off the valves.
➢ There are no water level management systems to monitor water level.
➢ Poor water management leads to wastage of water that can't be compromised.
➢ No long-distance communication is present which can activate the valve or for feedback of the water which is present in the tank.
➢ If any maintenance is needed no safety valves or mechanisms are present.

III. SYSTEM DESIGN
A. Block Diagram
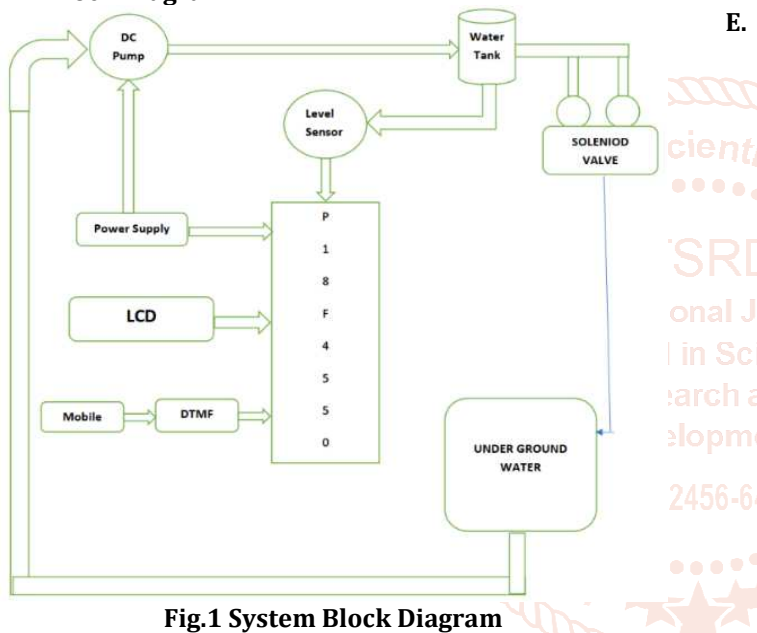
Fig.1 System Block Diagram

B. Block Diagram Description
➢ This project is built around the PIC18F4550 microcontroller.
➢ The main tank on the top provides water supply to the solenoid valve which in turn provides further water to the town and area below it.
➢ Ultrasonic level sensor faculties the volume of water within the primary tank.
➢ The real-time water level is shown on the LCD display.
➢ The LCD displays the valves status.
➢ DC pump is used to pump water from the ground water level.
➢ Power supply is used to supply power to all the systems on the PCB.
➢ DTMF is used to convert the frequencies which is given as input to the DTMF circuit which converts the frequencies to binary numbers.
➢ Mobile is used to provide DTMF frequencies to DTMF circuit.
➢ Solenoid valve is used to control the flow of water.

C. Features
➢ Cell phone control.

➢ Energy Efficient Design.
➢ Easy to use.
➢ Real time status of operation.
➢ Fully automated working.
➢ Easy to maintain.
➢ Minimum or no wastage of water.

D. Algorithm
➢ Initialize the system.
➢ Measure water level.
➢ If water level is less than 30% then switch ON the pump.
➢ If water level is more than 70% then switch OFF the pump.
➢ Wait for DTMF signal
➢ When DTMF Signal containing binary 4 is received turn on the solenoid valve.
➢ When DTMF Signal containing binary 5 is received solenoid valve.
➢ Continuously monitor the water level during the whole process.

E. Flow Chart
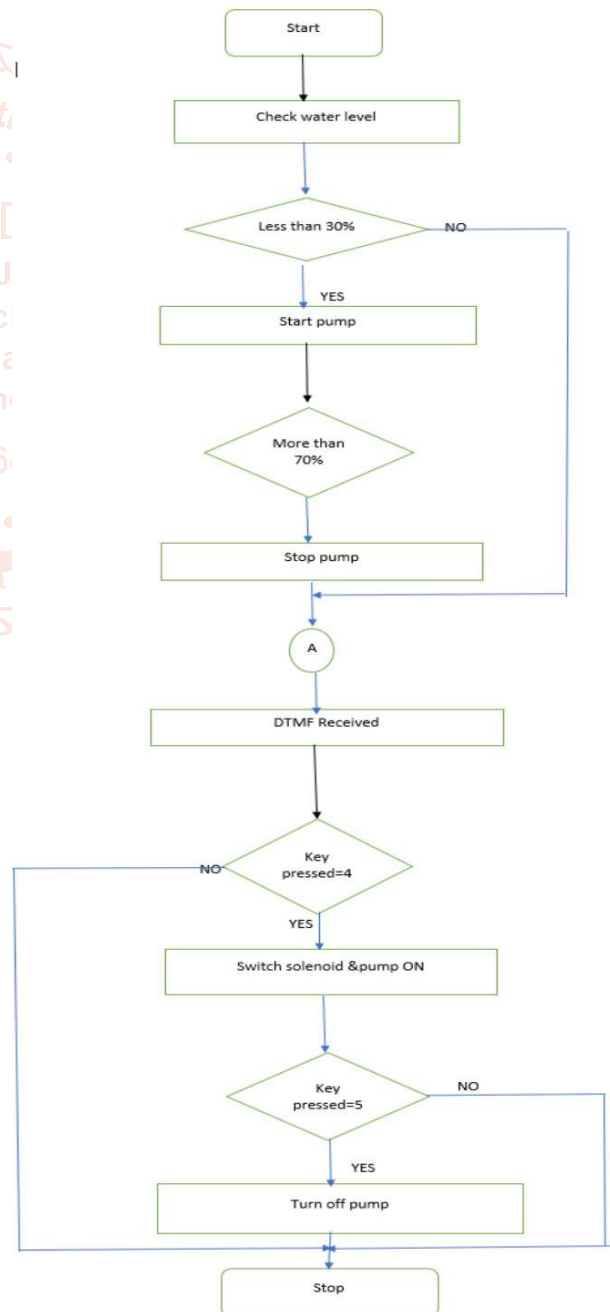
Fig. 2 System flow chart

IV.   IMPLEMENTATION

A.   Hardware

PIC18F4550 is the microcontroller used in the system. It is the main brain behind the whole system. It has several I/O s. It gets input from DTMF circuit this circuit uses MT8870 as a digital decoder which receives DTM frequencies from the mobile phone and converts those frequencies to binary digit. These binary digits are fed to microcontroller as input. Ultrasonic is another sensor which provides the water volume present inside the upper tank. The outputs interfaced to the microcontroller are GLCD display to give visual information about the water level and about the valve condition. Relays are also connected to output of microcontroller. Relays control both pump and the solenoid valve. Depending on the water level and DTMF input.
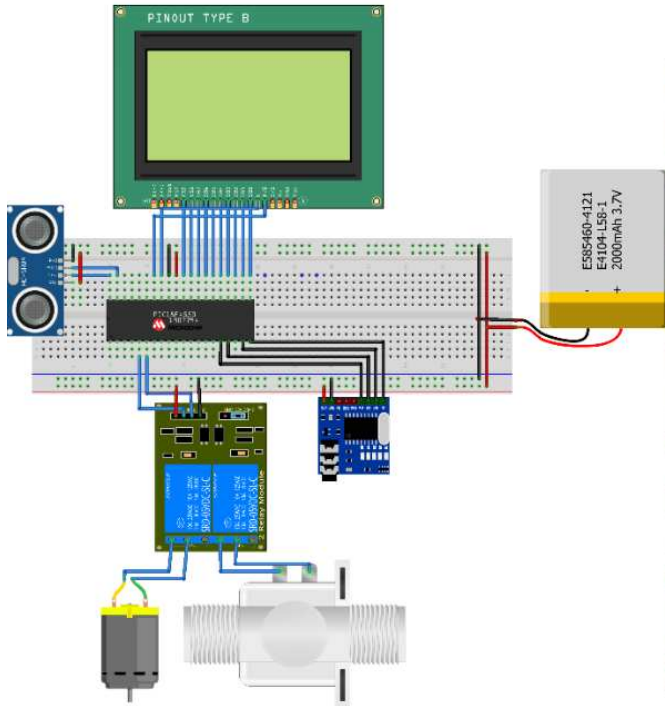
Fig. 3 System Connection Diagram

B.   Software

Embedded C programming language is utilized to program the PIC18 microcontroller utilizing MPLAB IDE 8.89. Microcontroller is programmed using an FTDI module which converts USB to serial and connects with TX and RX pins. PCB is an integral and vital view point of the system PCB as it contains all the components on the system. This PCB design is done utilizing the Eagle PCB designing software. Flash magic software is utilized to burn Program HEX file on to the microcontroller.
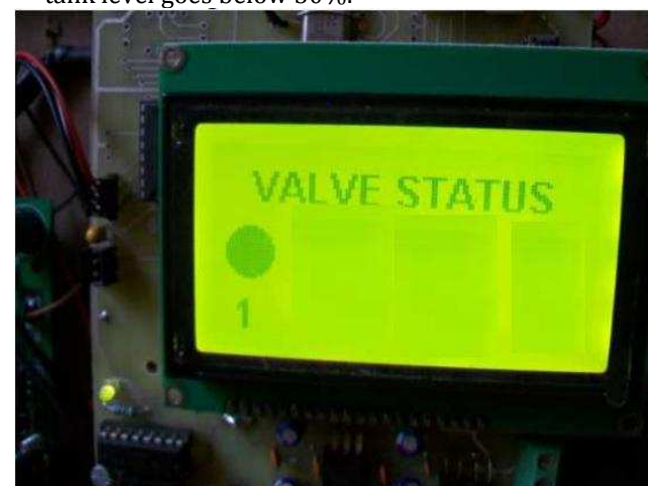
V.   RESULTS

➢   Project Setup with upper tank and lower sump supplying water to the town using a solenoid valve.
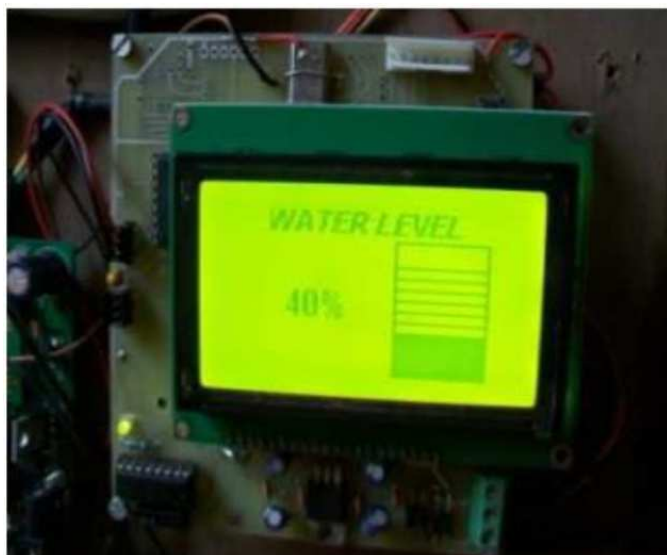
➢   Valve status showing valve 1 OFF.

➢   Valve status showing valve status ON as soon as upper tank level goes below 30%.

➢ Display showing real time water level inside of upper tank.

VI. CONCLUSION

In this Project, we have clarified the plan of a cost-effective simple strategy to control the water amount in the tank Wirelessly and automatically. As per our design, it is best implementable for little towns and particular zones. The range coverable is as it were up to residential and office areas. It is watched that residential and workplaces are one of the crucial regions of water surveying. So, actualizing the low fetched simple viable remote framework are arranged. It has no issue such as breakage of wire emerging after establishment. But the same thought can be amplified to the expansive scope zone and can be executed in businesses. Conjointly, for water system purposes. The wired sensors can be supplanted by remote and the scope zone can be expanded. The remote strategy of detecting can moreover be connected for water spillage discovery.

This extends when created on a bigger scale can be for all used and actualized in the municipal organization of any town, town, or city. We are able to utilize can transport to exchange the information to the pc and can store the information on pc without the interface of EEPROM. The software can be utilized to store information and send it to anybody through the web it can also plot charts and allow a nitty gritty audit of water utilization of a specific area.

Stream meters can be utilized to check leaks. Weight sensors can be utilized.

VII. REFERENCES

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