Automatic water supply system

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Abstract*: water is one of the major problems facing major cities of the world and wastage during transmission has been identified as a major culprit; this is one of the motivations for this research, to deploy computing techniques in creating a barrier to wastage in order to not only provide more financial gains and energy saving, but also help the environment and water cycle which is turn ensures that we save water for our future. We presented our research embedding a control system into automatic water pump through the use of different technologies in its design, development, and implementation. The used microcontroller to automate the process of water pumping in an overhead tank storage system and has the ability detect the level of water in a tank, switch on/off the pump accordingly and display the status on an LED screen. This research has successfully provided an improvement on existing water level controllers by its use of calibrated circuit to indicate the water level and use of ac power supply there by eliminating risk of electrocution.*

Key words **– LED display, water level sensor, solenoid valve, zigbee.**

1. INTRODUCTION :

Water supply is the provision of water by public utilities, commercial organizations, community endeavours or by individuals, usually via a system of pumps and pipes. Municipal Water System Demands The demand for water supplied by a municipal water system has two driving components: 1) consumer consumption: the amount of water in gpm or gallons per day that is used by all of the taps on the water mains to supply single-family homes, multiple-family residences of all types, health care facilities, schools at all levels of education, commercial enterprises, industrial complexes, and adjunct uses (street cleaning; water fountains; watering public grass areas; shrubs, trees, and flowers; parks and recreation including swimming pools; and the sale of water to contractors for building roads, structures, etc.) and 2) an adequate and reliable water supply for fire protection. Each of these topics is considered in length in future chapters. However, some important terms associated with water demand need to be identified and operationally defined at this time because these terms will be used throughout both the Concepts Manual and the Evaluation Manual on Municipal Water Supply Systems. Consumer consumption: Consumer consumption is assessed by determining the amount of water that actually is used by consumers, based on three levels of usage as follows: 1) Average daily consumption (ADC): Each municipal water system services a defined population as determined by census figures. For example, assume that the municipality in question has a population of 22,570. It was determined from water meter readings that the average daily consumption was 137 gallons per person per day or the community consumed 22,570 × 137 gallons = 3,092,090 gallons. This means that on an average day, the water supply works need to have available nearly 3.1 million gallons of water over a 24-hour period, or an average delivery rate of 2,147 gpm of finished water delivered into the water supply distribution system. An ADC rate of 137 gallons per day per person is just below the 2003 American Water Works Association (AWWA) average of 141 gallons per day per person. The number reflects the total amount of water used in a day by the population and does not consider usage by different classes of occupancy including commerce and industry. AWWA reports this figure varies considerably by State and region.

2. OBJECTIVES :

- To improve not only performance but also proper distrubation of water with minimum human efforts.
- Complete monitoring and control over the entire water management operation.
- Automated water keckage detection.

3. LITERATURE REVIEW :

4. **Zulhanirasin:** at all in their paper elaborate the Zigbee network for water irrigation control monitoring system. They had used a various sensor node to detect the water level in the reservoir and it is based on the signal from the sensors, and a simple electronic circuit either open or close the gate controlling the flow of water. In their paper it is important to

mentioned here, the circuit present in their project is on a conceptual scale and not yet in the form than can be directly applied to the available water irrigation controlling gate. The disadvantage of this paper that the battery needed in this project is operated only for 12 hours and require more human effort.

NunoBrito: at all in their paper has implemented control of water level in two tank without interaction. They had performed in a remote collaborative method. In this paper the system includes two tanks made in acrylic, a pump to circulate the water from the lower part of tank to the upper tank, two ultrasonic sensors was used for measuring both tank levels, and electronic valve to stop the flow of water between the upper level tank and the lower level tank and a manual valve for security purposes. The disadvantage of this system it is not available with local or remote control configuration for demo purposes.

Zhang Zhi: at allin their research paper elaborate the control and monitoring of water level in nuclear power plant. In this paper the Steam generator was used for water level control system which was the most important components of the nuclear power plant. In this paper it develop the performance assessment method for a class of SG level of water control systems, two PI controller system. A major contribution of this paper was to take the performance assessment technology into an industrial area, SG water level control in NPPs, where not much work has been done before.

5. APPLICATIONS :

- Applicable for reducing human efforts and water wastage.
- It is used for oil li(quid) transporting system.

6. DESIGN :

In our Country Water crises are the prime issue which is rarely seen in summer seasons which is not a reliable storage of water, so there is a need for an automatic Water Distribution system in the country which can provide water to the Public Areas according to their need and types types. Modern Water Distribution system is today's need because water resources and storages are very limited, diminishing day by day and most of them depend upon monsoons. The one and only one solution to this problem is automated Water Distribution system. In the field of public living areas, use of proper method of water distribution is important and it is well known that water supply by Distribution system is very economical and efficient. In the conventional water Distribution system, the operator has to follow a schedule for watering, which is different for different areas. In the automatic microcontroller and Xbee based Water Distribution system, distribution of water will take place only when there will be intense requirement of water. A variety of distribution methods have been proposed, but most of them have been found to be very expensive and complicated to use. In future each and every public places, whether poor or uneducated might wake up in need of such a system, therefore the proposed applications targeting an automatic Water Distribution system with minimal cost, time and human-computer interaction.

figure1: Design of system

7. METHODOLOGY :

figure shows the block diagram of our designed automatic water level system, It shows how the system works, it also shows the main component of the system and the parameters controlling the system.

In this paperwork, overall steps that are taken to be carried out to successfully achieve the objectives are:

i. Testing and configuring ZigBee module.
ii. Choosing a microcontroller.
iii. Testing of water level indicator.
iv. Testing the solenoid valve.
v. Testing of relays for water motor control
vi. Testing of switches control over system.
vii. Testing of L.C.D with microcontroller.
viii. Power supply unit.
ix. Software design.

The main objective of this research is to investigate the development of a low cost water distribution system, which can be used in a ZigBee mesh network. ZigBee is a new mesh networking standard, which places emphasis on low cost sensor networks and energy conservation. The development focus for ZigBee is remote monitoring and control applications. This research has successfully achieved its objectives and identifies areas for future development.

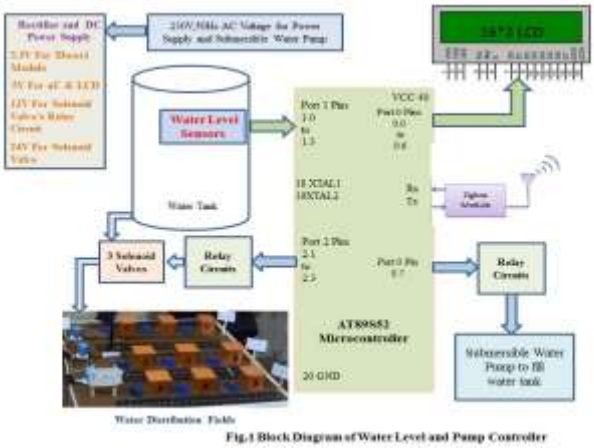


Fig.1 Block Diagram of Water Level and Pump Controller

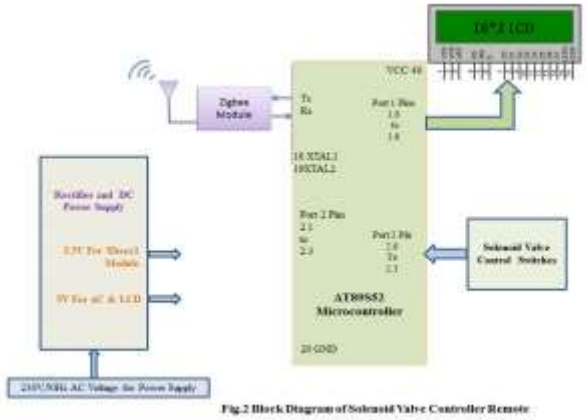


Fig.2 Block Diagram of Solenoid Valve Controller Remote

Fig: Block diagram of water level pump controller

Fig: Block daigramof solenoid valve remote controller

8. SIMULATION:

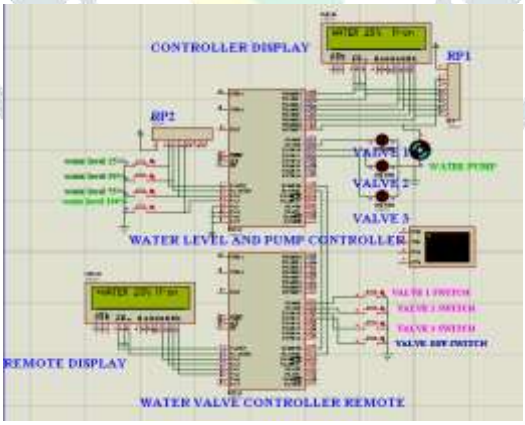
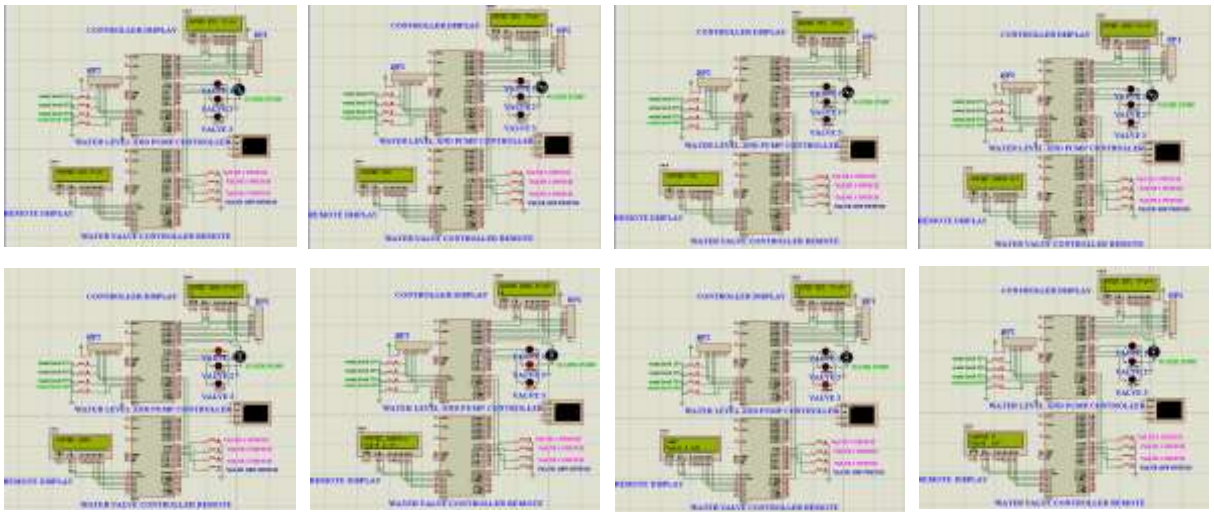


Fig: Simulation diagram

9. SIMULATION RESULTS:



10. FEATURES :

- Display for displaying various instructions/errors.
- Easy operation.
- Low power consumption.
- Organic fertilizer from waste material.

11. CONCLUSION :

This research work have designed and developed "Automatic Water Supply System." The automation of water distrubation system eliminates not only water but also provides continuous water flow according to the set point. This project is automatic so it reduces lots of man power. The automatic water supply system ensures to avoid wastage of water and reduces time.

12. FUTURE SCOPE :

This project when developed on a larger scale can be practically implemented in a municipal corporation of any village, town or city.

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