Automated water supply Management System

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ABSTRACT: *Water is a most important resource of Human life and all the living organisms. Automation of water supply is about managing and tracking ofwaterusage and watercontrolling at different places. This automated water supply management system for urban areas can be used for equal distribution of water of their daily usage andmonitoringofwaterstoragetankforreducing the water wastage by estimating the flow of water, water level. All of these working operations are connected by programmable interface controller (PIC)with a delay message through GSM module and ease to control the process.*
KEYWORDS: *PIC micro controller, Water level sensor, Relays, Submersible pump, GSM module.*

I. INTRODUCTION

Our Government of India has started project in every city that implementing smart cities. The purpose of smart city is to provide core infrastructure, clean and sustainable environment and upgrade the standard of society through the applications of technology. Our government has chosen 100 cities for this mission in which our Belagavi city is also part of it.

Water is the most important basicnecessity in everyone's life. Due to growing population and urbanization the requirement of water is rising gradually, as few cities are facing water shortage problem, and few cites are getting enough water. So, it's a high time where we must look after the water management system. By looking after the above issues in day-to-day lives our project automated water supply management system provides smart solution for the above problem.

II. EXISTING PROBLEM

The present system is Manually operated that is the employee should go to different areas to switch on/off the valves here the travelling cost is also included, and the time consumption is more. So, itis waste of time. Sometimes there are leakages in the pipes and total water is not supplied to the consumer that is due to the leakage in pipes and water entering drainage, but this problem is not been known by water supply department till the consumercomplainsherethe waterisbeingwasted, until the problemis rectified. In some cases when there is a delay in water supply due to major faults the water supply is cut-off for a particular period, the consumer will not be aware of this and waiting for a water supply as regular, no prior message is provided.

III. METHODOLOGY

i] **Problem solution:** The proposed system is automated. Here human work and travelling time is eliminated. Equal distribution of water supply can be done. Water delay message is given to the consumers by GSM module.The aim of the project is to design and develop wireless control system to operate waterdistribution system. Usually, manpower isemployed for operating the process which is time consumingandlabouroriented. Hencea systemhas been designed from which we can control the water valve from a long distance by using wireless technology. And this project is to design and develop an electronic system that can be employed to conserve, utilise and manage the water distribution automatically by it eliminating the manpower. Our experience and observation show that the presence system of water distribution and management requires manpower for the present work.

ii] BLOCKDIAGRAM
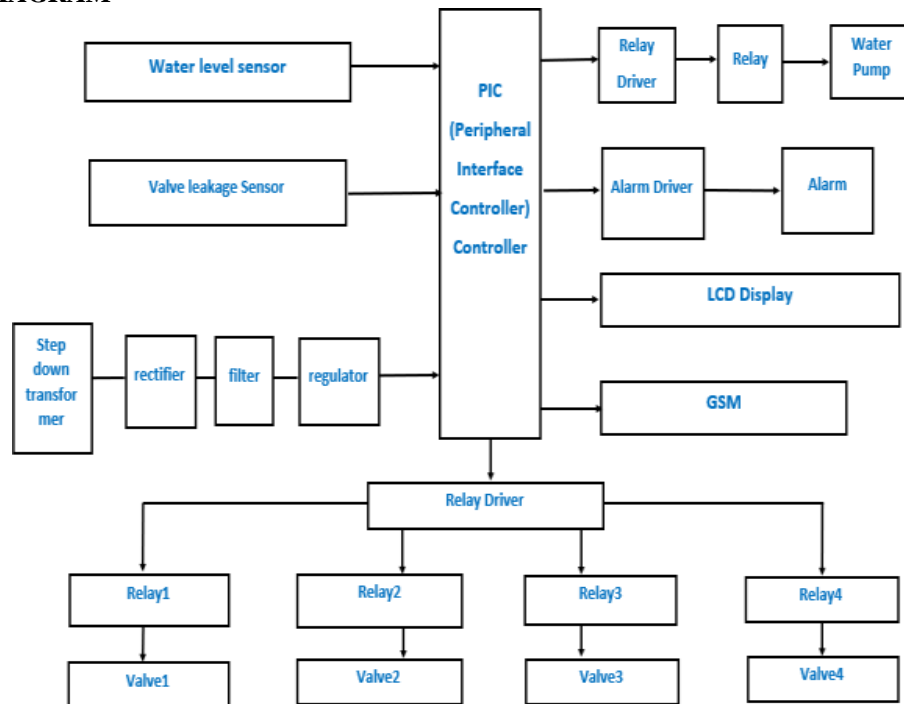
Compared to present system our proposed system is fully automated here need manpower will be reduced and Time will be saved. The submersible pump(valve) turns ON/OFF automatically to stop the water supplywhenever the time gets over for single area and switched into another area. It is more convenient for usage by reducing the manpower which required switching ON/OFF the valve to distribute the water to the area. Thereby, helps in reducing the wastage of water. Here the volume of water will be sensed by the water level sensor depending upon the volume of the water. The system is designed with time slots for a particular area then water will be provided with that time slots for all the areas. Sometimes there are leakages in pipes and the total water is not been supplied to the consumer that is due to the leakage pipes and water entering into drainage, but this problem is not been known by CITY CORPORATION BELAGAVI till the consumer complaints and water is being wasted. A water monitoring system is developed in where the system is interfaced with a GSM module to alert the person-in-charge through short message service (SMS) that is if any water leakage occurs in the pipelines so that it saves the time of worker and easy to detect the leakage and pipes will be repaired as soon as possible. In some cases when there is a delay in water supply due to major faults the water supply is cut-off for a particular period, the consumer will not be aware of this and waiting for a water supply as regular, no prior message is provided. By our proposed system consumers will get the prior message.

IV.   IMPLEMENTATIONANDANALYSIS

a)   Power Supply Unit: The power supply in the circuit is given from which we will get a needed DC voltage to pass the circuit. The voltage we get from the main supply is 230v AC, but few other components of our circuit require 5v DC supply. So, a step-down transformer is used, here230v AC is stepped down to 12v AC supply Now this 12v AC is converted to12v DC by rectifier circuit. The rectifier output holds some ripples even though itis DC signal so, it's called Pulsating DC. To take out these ripples in output voltage the filter circuit is

used. Hence capacitor is used. The 12v DC brought down to 5v by using a positive voltage rectifier chip 705. Therefore, a stable 5v DC voltage is acquired.

b) **Automatic Water Level Control:** In this system smart sensors have been used in the water tank. This sensor senses the level of water in the tank and automatically turn on the pump and whensufficient water is filled in the tank the pump is made automatically.

c) **Valve Leakage Detector:** This sensor is used to detect the leakage in the water valve, this sensor is placed below the water valve the sensor senses the leakage of the valve and send an information signal to the controller and the controller send a signal to the GSM modem. A message is sent to the supervisor phone through GSM modem.

d) **Alert message to area people:** Using this system the supervisor of water authority informs the area people that the water regularity and water shutoff. In this system a panic emergency system is used to accomplish this task. This system is connected to the controller and programmed with a software. The GSM modem is interfaced to the controller which is turn send a to the area people mobile.

• **COMPONENTS**

1. **Sensors:** A sensor is a device that detects and responds to some type of input from the physical environment. In this project we used two types of sensors.

a. **Water level sensor:** Sensors are used to detect the level of substances that can flow. Level quantifying can be done inside the containers or tanks. A float switch P43 is used to sense the volume of the water in the tank.

b. **Leakage sensor:** A sensor that dig out leakage of the water and it detects leakages in valve. Leakage testing is the process of checking a system for leaks.

2. **PIC Controller:** PIC microcontrollers (programmable Interface controllers), are electronic circuits that can be programmed to carry out a vast range of tasks. PIC16F877a is a PIC microcontroller which is programmed with embedded C language. It consists of 40 pins and 5 IT ports in total.

Features of PIC:
- It has a Flash memory (program memory, programmed using MPLAB devices).
- SRAM (data memory).
- EEPROM memory (programmable at run-time).
- Sleep mode (power savings).
- Various crystal or RC oscillator configurations, or an external clock.
- Watchdog timer

3. **Step-down transformer:** A transformers is a static device which are used to change AC voltage levels. Here we are using a step-down transformer. From the main supply we get an 230V AC, but we require a low voltage i.e,5V DC for other components. So, a 230V AC is stepped down to 12V AC which is then converted to 12V DC by a rectifier circuit.

4. **Regulator**: Regulator 7812 stabilizes the voltage to 12V and regulator 7805 is a 5V voltage regulator that restricts the output voltage to5V output for various ranges of input voltage. It acts as an excellent component against input voltage fluctuations for circuits and adds additional space to circuit.

5. **Relay:** A relay is a simple electromechanical switch. Relay acts as switch that connects or disconnects two or more circuits. Relays are used to protect the electrical system. A relay is connected to a relay driver circuit.

6.   Submersible pump: We have used a submersible pump as a valve (automatic).Waterproof closed machine is coupled to the pump body.

7.   GSM Modem: System for mobile communication (GSM). A wireless module with extreme compact and high reliable module. SIMs are used to identify the device to the network. A GSM modem looks like a phone. These devices are easy to use and light weight with low power consumption.

8.   LCD Display: The liquid crystal display (LCD) panel is designed to project on screen information of a microcomputer on to a larger screen. LCD is used for displaying the leakage message. It displays the information about the area on/off. Here we are using a 16*2 LCD display.
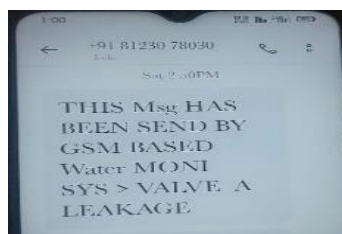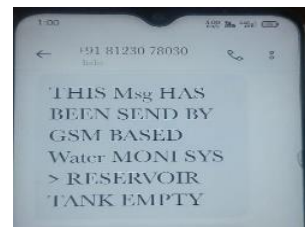
V.   RESULT AND WORKING MODEL
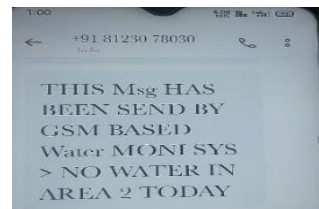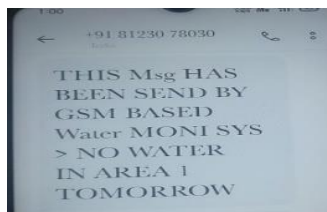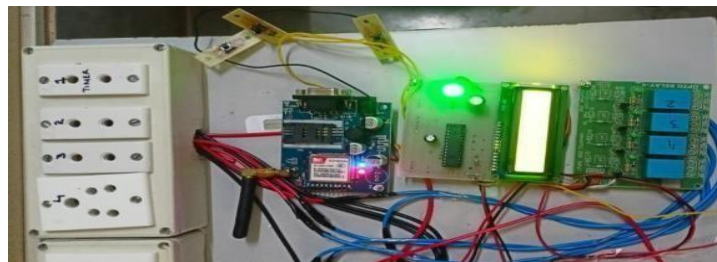
Fig(a)Fig(b)

Figa&bshows the GSMmessagetoconsumer about the water delay.

Fig(c)   **Fig(d)**
Figc&dshowstheGSMmessagetooperator about valve leakage and tank empty.

ADVANTAGES
*   Proper time management.
*   Eliminates the manpower employed for the water distribution.
*   Reduces the water wastages hence the water is conserved.

- Prior delay message is provided.
- The system can be operated by sitting in one place hence operation is simple.
- There will be no water corruption.

APPLICATIONS

- This project can be used in societies, colonies, residential areas where water tanks are used.
- It can be used as a module for water management system in smart city project as they require assortment of data and consumption report.
- Board of water supply can use this system due to which they can get an approximate report of faults.

VI.   CONCLUSION

In our proposed system a prototype an automatic water supply management system is presented.Here automatic valves are provided eliminating the drawback of traditional water distribution system. The implementation of this project willsignificantly contribute to improve the water management of local population regular and continuous supply of water. The automated water supply system helps to avoidwastage of water and reduces the time, also reduces manpower. So, people get equal share of water. This system is connected to the controller.by interfacing a controller & GSM a delay message system is also given. This proposed system is simple and cost effective.

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