

GSM BASED WATER TANK LEVEL MONITORING AND PUMP CONTROL SYSTEM

¹B.Dhivyapriya, C.Gulabsha, S.P.Maniprabha,G.Kandasamy,²Dr.V.CHANDRASEKARAN

¹ UG students,²Association professor,
Department of Electronics and Communication Engineering, Velalar College of Engineering
and Technology, Erode-12.

Mail Id:¹dhivyabalu777@gmail.com,gulabshaosella@gmail.com,maniprabhasp@gmail.com,
Kandasamy022@gmail.com,²chandrasekaran@velalarengg.ac.in

ABSTRACT- Water levels are measured in a variety of applications, and are often measured manually, which can be time-consuming and labour-intensive. The availability of water in space and time under conditions of ever increasing pressures has caused the designing of modern water management techniques. Achieving effective and efficient management of water are the key to human survival and the development has emerged as the global concern. Rapid advances in electronic technologies have made available a variety of inexpensive sensing, monitoring, and control capabilities. A monitoring system was developed for measurement of water levels, and it is composed of ultrasonic sensor, PIC microcontroller, and GSM module. The ultrasonic sensor measures the distance from the sensor to the liquid surface. This system presents the development of water level monitoring system with an integration of GSM module to alert the person-in-charge through Short Message Service (SMS) when the water has reached the critical level and it will automatically turn OFF the pump. It is possible to monitor the level of water whenever required. This is used to reduce the risk of unexpected shortage of water supply especially in dense population such as in hostels where the water supply at the hostels is usually drawn from tank at the top of the building.

Index Terms-Water tank, GSM Network, SMS,ultrasonic sensor.

I. INTRODUCTION

Water is a limited resource and is essential for agriculture, industry and for creature's existence on earth including human beings. Lots of people don't realize the true importance of drinking enough water every day. More water are wasted by many uncontrolled way. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Therefore, efficient use and water monitoring are potential constraint for home or office water management system.

Tank Water Level Monitoring, is used to avoid overflowing and intimate level of water in the tank. Water controlling system implementation makes potential significance in home applications. The existing automated method of level detection is described and that can be used to make a device on/off. Moreover, the common method of level control for home appliance 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. This is not properly supported for adequate controlling system. Besides this, liquid level control systems are widely used for monitoring of liquid levels, reservoirs, silos, and dams etc. Hence, a monitoring system to monitor the tankwater level has to be developed and eventually able to alert the person in-charge or technician on the current status of the tank. The system consists of water level detector circuitry integrated with GSM module. Upon reaching the critical water level in the tank, an SMS is sent through GSM module to the technician and the motor is turned OFF.

II. EXISTING METHODOLOGY

In older system, a contact type sensor is used and it will affect the quality of the water. The actual status of the level of water remains unavailable as there is no provision for monitoring the status of the level of the water in the water tank. There is a considerable amount of wastage of water and energy due to frequent overflow conditions and excessive use of pumps. The pump operation is done manually. Pump operating staff are required to do the pump operation [6].

III. PROPOSED METHODOLOGY

A new technique is proposed to continuously monitor the water level of water systems such as water tanks. The user can send the message to the system to know the water level details of the tank. This can also be used to control the working of pump automatically by turning OFF the pump when the critical level of water in tank is reached and send the message to the user that the water in the tank is full. This is designed to monitor the water level with the help of ultrasonic sensor and GSM technology [1].

IV. OBJECTIVE

To monitor the level of water in water tank whenever required and to control the working of pump operation automatically i.e. when the water has reached the critical level the motor will be turned OFF.

V. BLOCK DIAGRAM

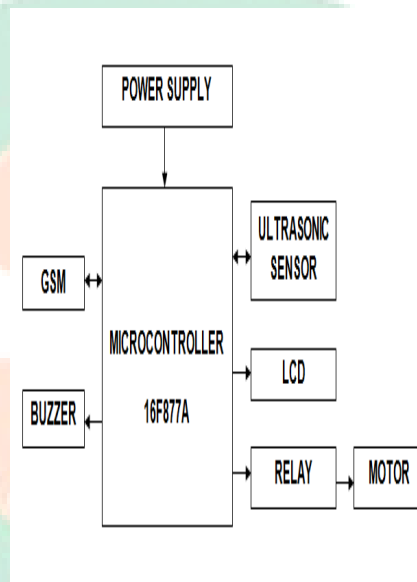


Figure 1

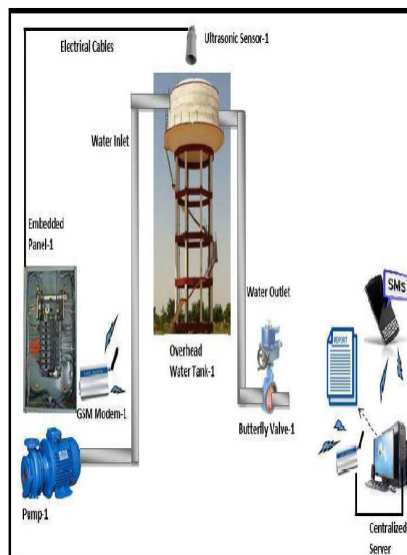


Figure 2

VI. ARCHITECTURE



Figure 3

VII. HARDWARE DESCRIPTION

7.aMICROCONTROLLERMicrocontroller can be termed as a single on chip computer which includes number of peripherals like RAM, EEPROM, Timers etc., required to perform some predefined task. AVR is an 8-bit microcontroller belonging to the family of Reduced Instruction Set Computer (RISC). In RISC architecture the instruction set of the computer are not only fewer in number but also simpler and faster in operation. AVR microcontroller executes most of the instructions in single execution cycle. AVR's are about 4 times faster than PICs; they consume less power and can be operated in different power saving modes. Let's do the comparison between the three most commonly used families of microcontrollers. AVR follows Harvard Architecture format in which the processor is equipped with separate memories and buses for Program and the Data information. Here the proposed system uses the PIC microcontroller[2].

7.bULTRASONICSENSORUltrasonic level sensors are used for non-contact level sensing of highly viscous liquids, as well as bulk solids. They are also widely used in water treatment applications for pump control and open channel flow measurement. Ultrasonic sensors generate high-frequency sound waves and evaluate the echo which is received back by the sensor. By measuring the time interval between sending signal and receiving echo, the distance to an object can be determined.

7.cLCDA liquid crystal display (LCD) is a flat panel display, electronic visual display, video display that uses the light modulating properties of liquid crystals (LCs). LCs does not emit light directly. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. LCDs have displaced cathode ray tube (CRT) displays in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in.

7.d GSM MODEM

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. The MODEM is the soul of such modules[1].

7.e RELAY

A relay is an electrical switch that opens and closes under the control of another electrical circuit. It is operated by an electromagnet to open or close one or many set of contacts. Motor can be turned ON or OFF by using relay. A relay is usually an electromechanical device that is actuated by an electrical current. The current flowing in one circuit causes the opening or closing of another circuit. Relays are like remote controls switches and are used in many applications because of their relative simplicity, long life, and proven high reliability. Relays are used in a wide variety of applications throughout industry, such as in telephone exchanges, digital computers and automation systems

7.f BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. . Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder like a Sonalert which makes a high-pitched tone. Usually these were hooked up to "driver" circuits which varied the pitch of the sound or pulsed the sound on and off.

VIII. CONCLUSION

This paper has achieved its objectives and provides a system that could monitor the tank water level and report its level via SMS notification using GSM technology. It is developed with a capability to detect low level of the water in the tank and notify GSM modem to send SMS to the intended user hand phone or person in-charge. The microcontroller as central processor is connected to the modem using MAX232 to interface with HyperTerminal to check the microcontroller operation. A series of tests were conducted and found that the system was functioning well.

REFERENCES

1. Ayob Johari, Mohd Helmy Abd Wahab, "Tank Water Level Monitoring System using GSM Network", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 2 (3) , 2011, 1114-1120.
2. T. Deepiga, A. Sivasankari, "Smart Water Monitoring System Using Wireless Sensor Network at Home/Office", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 02 Issue: 04 | July-2015 www.irjet.net p-ISSN: 2395-0072.
3. Islam, N.S. Wasi-ur-Rahman, M. An intelligent SMS-based remote Water Metering System. 12th International Conference on Computers and Information Technology, 2009, 21-23 Dec. 2009, Dhaka, Bangladesh.
4. Al-Ali, A.R. Rousan, M.A. Mohandes, M. "GSM-Based Wireless Home Appliances Monitoring & Control System", Proceedings of International Conference on Information and Communication Technologies: From Theory to Applications, pp 237-238, 2004.
5. Rosolem JB, Dini DC, Penze RS, Floridia C, Leonardi AA, Loichate MD, Durelli AS. Fiber Optic Bending

Sensor for Water Level Monitoring: Development and Field Test: A Review. IEEE Sensor J. 2013;13(11):4113–20.

6. R. R.Lakhe, “Wireless Network Using Zigbee for Water Monitoring” , International Journal of Engineering research and Applications (IJERA), 2008,http://www.ijera.com/special_issue/VNCET_Mar_2012/55.pdf

7.Ejiofor Virginia Ebere (PhD), Oladipo Onaolapo Francisca (PhD).”Microcontroller based automatic water level control system”, International Journal of Innovative Research in Computer and communication Engineering(IJIRCCE) Vol. 1, Issue 6, August 2013.

