International Journal of Electrical and Electronics Research ISSN 2348-6988 (online)
Vol. 5, Issue 3, pp: (1-5), Month: July - September 2017, Available at: www.researchpublish.com

Water Pump Control Using GSM

Namrata Pagare

(Department of Electrical) Shri Shankaracharya Group of Institutions, Junwani Bhilai

Abstract: **Water scarcity 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 in turn ensures that we save water for our future. We presented our research in embedding a control system into an automatic water pump controller through the use of different technologies in its design, development, and implementation.**

Keywords: **GSM, Microcontroller, Water Pump, Water Sensor, Mobile, LCD.**

1. INTRODUCTION

In everyday life, there must be some physical elements that need to be controlled in order for them to perform their expected behaviours. A control system therefore can be defined as a device, or set of devices, that manages, commands, directs or regulates the behaviour of other devices or systems. Consequently, automatic controlling involves designing a control system to function with minimal or no human interference. Intelligent systems are being used in a wide range of fields including from medical sciences to financial sciences, education, law, and so on. Several of them are embedded in the design of everyday devices.

2. BASIC THEORY

The working principle series of automatic water pump controller above is, at the time the water level is below both sensors, then the output of flip flop will be one and active relay through the transistor and turn on the water pump and also sends message to the operator by using GSM module. When the water touch the higher level sensor then the relay becomes off. Thus the motor becomes off. When the water does not touch all the sensors the relay becomes on and the water pump will turn on and when all the sensors touches water the relay turns off. Automatic water pump controller can be used to fill or drain the water according to which mode is selected via the relay.

In past few years there is a rapid growth in this system. The user communicates with the centralized unit through SMS. The centralized unit communicates with the system through SMS which will be received by the GSM with the help of the SIM card. The GSM sends this data to port 2 which is also continuously receives the data from sensors in some form of codes. After processing, this data is displayed on the LCD. Thus in short whenever the system receives the activation command from the subscriber it checks all the field conditions and gives a detailed feedback to the user and waits for another activation command to start the motor. The motor is controlled by a simple manipulation in the internal structure of the starter. The starter coil is indirectly activated by means of a transistorized relay circuit.

When the motor is started, a constant monitoring on soil moisture and water level is done & once the soil moisture is reached to sufficient level the motor is automatically turned off & a massage is send to subscriber that the motor is turned off. The water level indicator indicates three levels low, medium, high and also empty tank. Shen etc. al (2007) introduced a GSM-SMS remote measurement and control system for greenhouse based on PC-based database system connected with base station. Base station is developed by using a microcontroller, GSM module, sensors and actuators. In practical operation, the central station receives and sends messages through GSM module. Criterion value of parameters to be

measured in every base station is set by central station, and then in base stations parameters including the air temperature, the air humidity. In the field of remote monitoring and control, the technology used and their potential advantages. The paper proposes an innovative GSM/Bluetooth based remote controlled embedded system for irrigation.

The system sets the irrigation time depending on the temperature and humidity reading from sensors and type of crop and can automatically irrigate the field when unattended. Information is exchanged between far end and designed system via SMS on GSM network. A Bluetooth module is also interfaced with the main microcontroller chip which eliminates the SMS charges when the user is within the limited range of few meters to the designated system. The system informs users about many conditions like status of electricity, dry running motor, increased temperature, water content in soil and smoke via SMS on GSM network or by Bluetooth. The GSM based pump control system may offer users the flexibility to regulate and control the operations of their irrigation systems with little intervention to reduce runoff from over watering for improvement in crop yield. This enables users to take advantage of the globally deployed GSM networks with its low SMS service cost to use mobile phones and simple SMS commands to manage their irrigation system.

2.1. GSM module:

The connections between the two mobiles are done using GSM. The GSM module and microcontroller are connected using UART (universal asynchronous receiver / transmitter). When the moisture sensor senses the low moisture content of the soil, it gives a signal to the microcontroller. The microcontroller then gives a signal to the called mobile (which is kept in the auto answering mode). The called mobile activates the buzzer.

2.2. Microcontroller (8051):

The Intel 8051 is an 8-bit microcontroller which means that most available operations are limited to 8 bits. There are 3 basic "sizes" of the 8051: Short, Standard, and Extended. The Short and Standard chips are often available in DIP (dual in-line package) form, but the Extended 8051 models often have a different form factor, and are not "drop-in compatible". All these things are called 8051 because they can all be programmed using 8051 assembly language, and they all share certain features (although the different models all have their own special features).

Some of the features that have made the 8051 popular are:

- 4 KB on chip program memory.
- 128 bytes on chip data memory(RAM)
- 128 user defined software flags.
- 8-bit data bus
- 16-bit address bus
- 16 bit timers (usually 2, but may have more, or less).
- 3 internal and 2 external interrupts.
- Bit as well as byte addressable RAM area of 16 bytes.
- Four 8-bit ports, (short models have two 8-bit ports).
- 16-bit program counter and data pointer.
- 1 Microsecond instruction cycle with 12 MHz Crystal.

8051 models may also have a number of special, model-specific features, such as UART, ADC, Op_Amps, etc... it is a very powerful micro controller.

2.3. Probe Water Sensor:

The Water in Fuel Sensor or WiFi sensor indicates the presence of water in the fuel. It is installed in the fuel filter and when the water level in the water separator reaches the warning level, the Wifi sends an electrical signal to the ECU or to dashboard (lamp). The WiFi is used especially in the Common Rail engines to avoid the Fuel injector damage.

3. METHODOLOGY

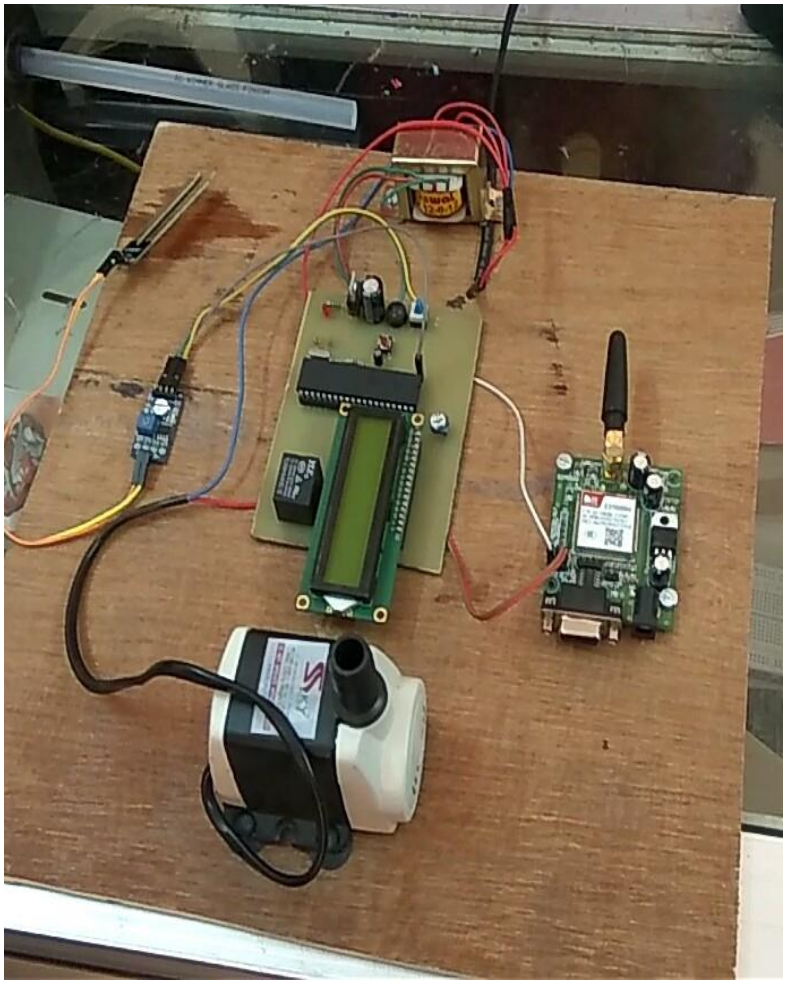

Fig 1: Hardware Model

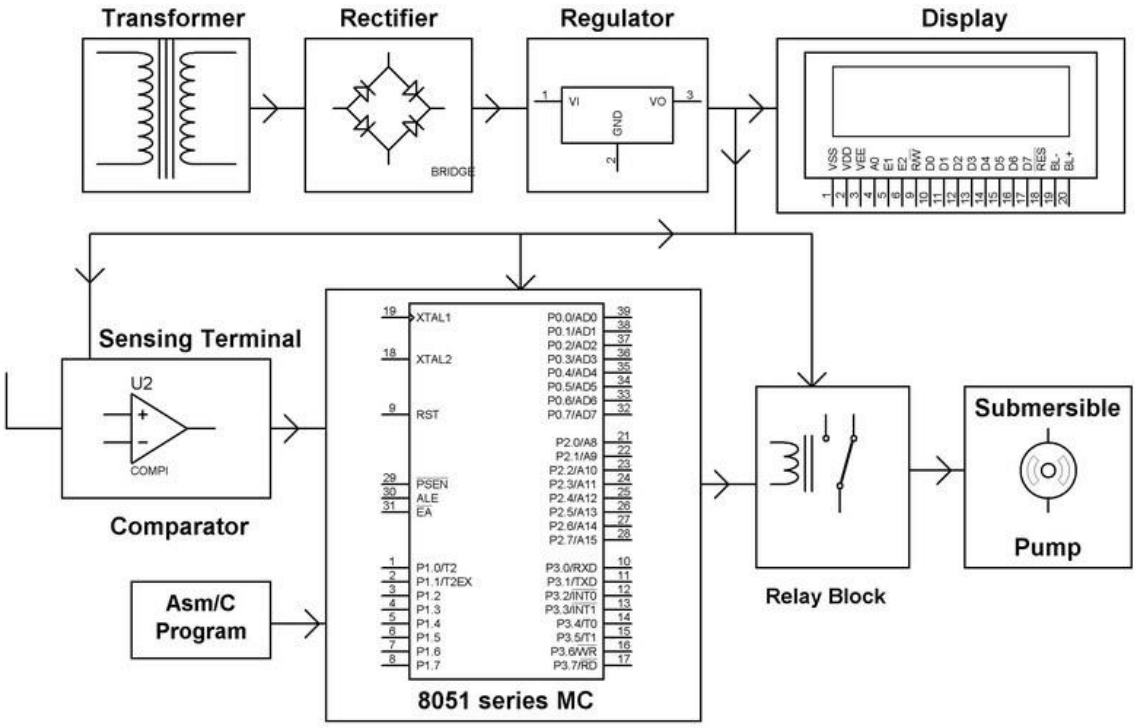

Fig 2: Block Diagram

4. WORKING PRINCIPLE

A water pump control using GSM circuit monitors the level of the overhead tank and spontaneously switches on the water pump whenever the level goes below a specific limit. The level of the overhead tank is indicated using 2 LEDs, and the pump is switched off when the overhead tank gets completely filled up.

The water level controller circuit does not allow the pump to start if the water level inside the sump goes low, and switches off the pump even during the pumping period if the water level inside the sump sinks low while the process of pumping the water towards the overhead tank continues.

In this work, the automatic water level monitor here presented consists of the following major units: sensors, comparator circuit, microcontroller, display unit, and the pump and the core work of detecting the level of water is done by the comparator. Figure above describes the flow of operations in the system as well as their inter-operability.

Taking advantage of the electrical conductivity property of water, we used the copper conductors as the water level sensor. When water touches the copper sensor positioned at a particular level in the tank, voltage is transferred to the copper which in turn is transferred to the comparator circuit for further processing.

The comparator was used to compare the inputs from the electrodes in the tank and with a pre-set resistance and output a HIGH or a LOW with respect to the result from the comparison. This HIGH or LOW feeds the microcontroller, which in turn uses this to control the water pump and display the appropriate status on a Liquid Crystal Display (LCD) screen. The programmable microcontroller was programmed in to control the functionalities of the entire system. Relays were used in building a switching unit that simply triggers the pump ON or OFF, depending on the signal received from the microcontroller.

The complete working process of the water pump control using GSM has been explained here with respect to the hardware model presented above and the circuit as well as the block diagram.

The water pump control using GSM monitors the level of the over head tank and automatically switches on the water pump whenever the level goes below a limit. The level of the over head tank is indicated using LED and the pump is switched OFF when the over head tank is full and the connected GSM module sends the message to the user about the current status of the tank and also displays in LCD. when the over head tank is empty, probe senses the level of empty tank and immediately sends the signal to GSM and LCD simultaneously turns ON the pump. The level sensor probes for the overhead tank are interfaced to the port 2 of the microcontroller through transistors. Have a look at the sensor probe arrangement for the overhead tank

5. RESULT ANALYSIS

The water pump control using GSM project has been successfully tested multiple times for all the possible situations and requirements within its scope. The whole apparatus has been assembled on a single board consisting of various blocks such as the microcontroller section, the LCD section, the GSM section, the supply section, the control section and the probe water indicator section. All these sections have been carefully prepared and tested thoroughly and are now in a proper active condition.

6. CONCLUSIONS & FUTURE SCOPE

Automatic water pump control system employs the use of different technologies in its design, development, and implementation. The system used microcontroller to automate the process of water pumping in an over-head tank storage system and has the ability to detect the level of water in a tank, switch on/off the pump accordingly, give message to owner by using GSM and display the status on an LCD screen. It can also be operated manually with the user sending and receiving the messages according to the current status. This project has successfully provided an improvement on existing water level controllers by its use of calibrated circuit to indicate the water level.

The advantages of this system includes reduction in wastage of power, reduction in wastage of water and increase in the pump set life due to efficient use of the equipments involved.

The future scope of this project is that by using solar panels we can provide supply to the sensor circuit and then we can monitor the water level during powercut events also.

REFERENCES

[1] A. P. Bagade, S. L. Haridas, P. R. Indurkar,"Development of a Mobile Based Device Remote Control with Voice Acknowledgment",NCIPET&IJCA, March 2012.

[2] Hicks, F., Tyler, G.; & Edwards, T.W. (1971), 'Pump Application Engineering' McGraw-Hill Book Company, New York.

[3] Khaled Reza, S.M., Shah Ahsanuzzaman Md. Tariq, S.M. Mohsin Reza (2010), Microcontroller Based Automated Water Level Sensing and Controlling: Design.

[4] Venkata Naga Rohit Gunturi (2013), 'Micro Controller Based Automatic Plant Irrigation System', International Journal of Advancements in Research.

[5] IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 11, Issue 4 Ver. I (Jul- Aug. 2014), PP 49-55

[6] Ejiofor Virginia Ebere and OladipoOnaolapo Francisca, "Microcontroller based Automatic Water level Control System", NnamdiAzikiwe University,International Journal of Innovative Research in Computer and Communication Engineering Vol. 1, Issue 6, August 2013.Pg. 13901396

[7] V. Bhaskar& T. GowriManohar, "GSM Based Motor Monitoring and Speed Control", IJMIE Volume-1, April 2011.