Water Level Monitor, Control and Alerting System Using GSM In Dams and Irrigation System based on Season

[1]T.S.Yuvarani , [2]R.Archana

[1]Assistant Professor,, Dept. of Electronics and Communication Systems, Nehru Arts and Science College, Coimbatore-105, Email: yuvarani2007@gmail.com. Ph: 9894756602
[2]Assistant Professor, Dept. of Electronics and Communication Systems, Nehru Arts and Science College, Coimbatore-105, Email: archanar2008@gmail.com

Abstract: The global system for mobile communication (GSM) is used worldwide for continuous monitoring, controlling and alerting of dam water level. This advance technology uses short message services (SMS) to directly control and monitor the opening and closing of the shutter in dam. Through the SMS this system alerts the people staying nearby places about the rise in water level. Temperature sensor, sense the changes in atmospheric temperature and take up appropriate measure like relieving the excess water in dam for irrigation purpose in seasons. This paper gives a detailed model of the system which senses the changes like temperature and water level difference using sensors, and overflow detection using GSM technology.

Index terms: **PIC Microcontroller, GSM Module, Water level sensor, Temperature sensor**

I. INTRODUCTION

This project is designed for developing a system that effectively and securely manages dam shutters. A system comprising of a PIC Microcontroller, water-level sensor and GSM based circuitry, is physically installed on the dam. The system sends an SMS notification to the control room when it finds the water-level rising above the threshold level. When the authorized personnel from control room, receives and responds to the message. The system sends alerts as SMS broadcast, and opens the shutter. Another useful functionality implemented in the system is the periodic opening and closing of the tunnel pathways using a solenoid valve, to facilitate sufficient water-flow for irrigation. The temperature sensor is used in the system, if it finds the atmospheric temperature to be higher than usual; it increases the duration of opening the solenoid valve so as to ensure sufficient water-flow during harsh climates.

II. BLOCK DIAGRAM
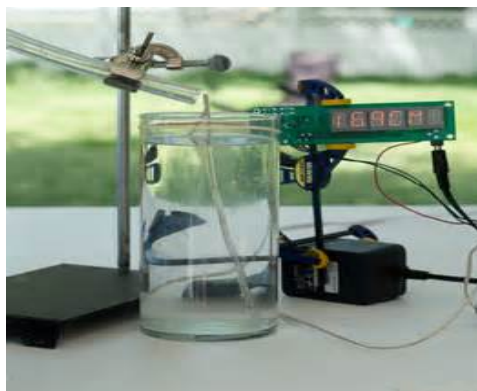
A. DAM Section:
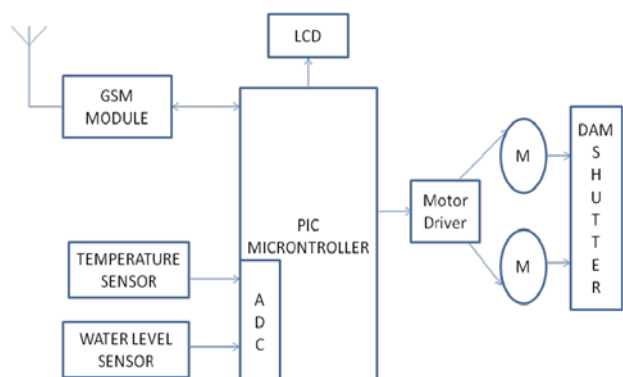
B. Control Room Section:

III. DESCRIPTION OF BLOCK DIAGRAM

A. Water Level Sensor

Float-type sensors can be designed so that a shield protects the float itself from turbulence and wave motion. Float sensors operate well in a wide variety of liquids, including corrosives. It senses the water at different levels in the dam and sends the information to the microcontroller. According to the measured information the Dam Shutter will opened or closed and passes the status to the control room.
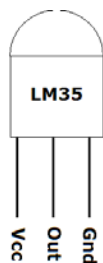
Temperature Sensor

Fig.2: Temperature Sensor

The temperature sensor used to measure the atmospheric temperature for the irrigation. The LM35 does not require any external calibration or trimming to provide typical accuracies of degree C at room temperature and degree C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy

GSM (Global System for Mobile communication) Module:

GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in all parts of the world. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone.GSM modem must support an "extended **Features of SIM300 GSM Module**

➢ Designed for global market, SIM300 is a Tri-band GSM engine

➢ Works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz.

➢ This GSM modem is a highly flexible plug and play quad band GSM modem

➢ Control via AT commands(GSM 07.07,07.05 and enhanced AT commands)

In this project the GSM modem is used to send the message about the status of the dam level and also send message to turn on the motor for opening and closing of the dam shutter. It alert the people living nearby the dam by sending SMS about the overflow of the dam to save them.

B. LCD Display

Liquid crystal display (LCD) is used for real time display of data acquired from the sensors and the status of the DAM shutter. When the water reaches at different levels microcontroller updates it on the LCD.

MOTOR DRIVER (L293D):
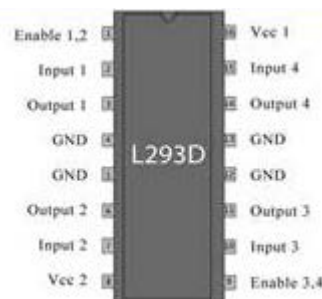
L293D is a typical motor driver IC which allows DC motor to drive on either direction. L293D is a 16 pin IC which can control two DC motor simultaneously in any direction. It works on the concept of H bridge circuit which allows the voltage to be flown in either direction for being able to rotate the motor in clockwise and anticlockwise direction. It is used to drive the motor to open/close the shutter of the DAM.

IV. WORKING PRINCIPLE OF THE SYSTEM

In DAM section the very important block is PIC Micro Controller. It gets the signal from various sensors and performs the control actions. Various level sensors are fixed in the dam to find the water level. First sensor is fixed at the lowest bottom of the dam. In the dam another sensor is placed at middle position above the bottom. Here the sensor finds the water level is appropriate then water will be given to irrigation purposes. In this project for different level of water the height is not fixed. Because in different seasons the expected water to be stored is different and the levels adjusted as per requirements. Finally the sensor is placed at the top of the dam to find the flood conditions. If this level is reached we have to take some remedial measure to evaporate the water and also an alerting message will be sent to control room that dam is reaching flood level.

From various levels the signal is given to micro controller built in A/D converter and it converts the signal into digital data by programming the different levels details are displayed on LCD and also same information passed to Control room through GSM modem.

Next sensor used in the block diagram is temperature sensor. The purpose of this sensor is mainly for irrigation and used to measure the atmospheric temperature. If the atmospheric temperature is high the fields may get dry. It needs water to increase the yields. The microcontroller checks the threshold value of the temperature sensor and

compares the level in the DAM using water level sensor. If enough water is available in the DAM and field is at dry condition due to high atmospheric temperature, it releases the water from the DAM for irrigation. If the atmospheric temperature is low due to rainy season, the microcontroller cannot drive the motor to open the shutter of DAM to irrigation because the fields have sufficient moisture content.

GSM module is used for sending status of the DAM levels to the control room. When water reaches the first sensor it sensed by it and displayed. When reaches the other level provides the signals to the microcontroller and opens the dam gate partially as soon as reaches the final level gives the signals to the microcontroller and turned ON the motor which is opens the gate fully also it alerts the people by SMS.

V. ADVANTAGES

- ➢ It is easy installation
- ➢ Low cost
- ➢ High Reliability
- ➢ Multipurpose system
- ➢ Prevent the disaster due to DAM overflow

VI. APPLICATIONS

- ➢ Agriculture Lands
- ➢ DAMS

VII. CONCLUSION

This proposed automated mechanism of water level monitor, control and alerting system using GSM in dams and irrigation system based on season reduces the wastage, ensures efficient use of available water resources and generates more precise and accurate results. There is no requirement of human laborers for monitoring the level, just one operator is sufficient for opening and closing the gate according to sensor output. By increasing the number of level sensors being more, we can open or close the dam gate whenever necessary knowing the accurate level of water.

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