WATER LEVEL MONITORING SYSTEM FOR ALERTING PEOPLE ABOUT THE FLOODS

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Abstract*: The main aim of the paper is to design a system which will monitor and control the water level in the dams and also intimates the concerned authority when the water level exceeds the limit. The purpose of the paper is to monitor the water level in dams using sensors. This system also checks continuously the water flow in dams and whenever water level exceeds the higher limit the system will generate alert signal. In this paper we are using Microcontroller which controls all the operations in regarding the level of water in the dam. For this process we require the components such as microcontroller, power supply and sensors. These sensors are placed in different threshold levels and are connected to the controller. If for suppose the level of water is being increasing in the dam, then immediately when the water level crosses the sensor then the microcontroller will give an alert sound using buzzer.

As the result this system will helps to monitor the different threshold levels in dams and also it will generate alert signal. this system will help to monitor the different threshold levels in water bodies and also it will generate an alert signal.

Index Terms*: Arduino Microcontroller, Buzzer alert *Floods, Water-level meter,

I. INTRODUCTION

An embedded system is a special-purpose system in which the computer is completely encapsulated by or dedicated to the device or system it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few predefined tasks, usually with very specific requirements. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced, benefiting from economies of scale.

Personal digital assistants (PDAs) or handheld computers[2] are generally considered embedded devices because of the nature of their hardware design, even though they are more expandable in software terms. This line of definition continues to blur as devices expand. With the introduction of the OQO Model 2 with the Windows XP operating system and ports such as a USB port both features usually belong to "general purpose computers", the line of nomenclature blurs even more Embedded systems plays major role in electronics varies from portable devices to large stationary installations like digital watches and MP3 players, traffic lights, factory controllers, or the systems controlling nuclear power plants [5]. In terms of complexity embedded systems can range from very simple with a single microcontroller chip, to very complex with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

1.1.1 Examples of Embedded Systems

1. Avionics, such as inertial guidance systems, flight control hardware/software and other integrated systems in aircraft and missiles
2. Cellular telephones and telephone switches
3. Engine controllers and anti lock brake controllers for auto-mobiles
4. Home automation products, such as thermostats, air conditioners, sprinklers, and security monitoring systems
5. Handheld computers
6. Handheld calculators
7. Household appliances, including microwave ovens, washing machines, television sets, DVD players and recorders
8. Medical equipment
9. Personal digital assistant
10. Computer peripherals such as routers and printers.

The main aim of the paper is to discuss the design a system which will monitor and control the water level in the dams and also intimates the concerned authority when the water level exceeds the limit.

EXISTING SYSTEM

Existing system has implemented a unique system for this application by using magnetic sensors. The sensors are fixed at specific locations. If water in the river reaches lower level magnetic sensor, then it switches the LED ON. Similarly second magnetic sensor is also indicated with an LED. The main drawback is it does not have any remote monitoring system using IoT module. There is no buzzer alert for this system as well.

PROPOSED SYSTEM The main objective of this project is to develop a micro-model based system, which will identify the level of water and updates information in mobile phone via IoT . Water level will be analyzed using magnetic sensors and updated in the mobile phone using IoT module connected to the controller .A buzzer alert is given to know severity of the water level.

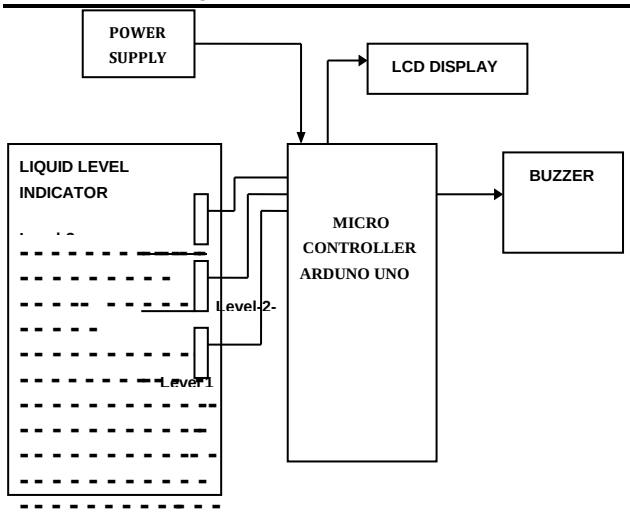

Figure 1 Block diagram of the proposed system

The above Figure. 1 shows that the Arduino board is connected to power supply ,Liquid level indicator, LCD display and Buzzer.

2. LITERATURE SURVEY

Current emergency management and disaster recovery systems usually involve several parts such as communication infrastructure and an information management system. Forecasting flash flood by the over flowing of rivers is able to process, analyze (by means of rain gauge and stream gauge) and remotely sensed data to detect the occurrence of (including computer applications and programs), and communication capabilities are required a flood. This system is the ideal solution, but is quite expensive. A variety of hardware, software to support and maintain this water level measurement system. Several studies have designed river level sensors using databases, processing raw data, extracting information and sending wireless.

Beza Negash Getu, Hussain A. Attia proposed Automatic Water Level Sensor and Controller System. Here, an electronic system is designed to control and monitor the level of water in a tank or a similar reservoir based on the water detector sensor information. The electronic system is designed to automatically control and display water levels from zero to nine. The proposed system eliminates manual monitoring and controlling for home, agricultural or industrial uses. It uses water level sensor, seven segment display, priority encoder, relay and JK flip-flop[1].

Thinagaran Perumal, Md Nasir Sulaiman & Leong.C.Y proposed Internet of Things (IoT) Enabled Water Monitoring System. Here, the system is built on a microcontroller based platform Arduino Uno board which is interfaced with GSM modem and Ultrasonic sensor. The ultrasonic sensor is placed at the top of the can which helps in measuring the stature of the can. The IoT based water system is made using 2 different IoT sensors (i.e. ultrasonic, water sensor) by applying IEEE802.11 communication standards. The data transmission between those sensors is done by integrating a wireless gateway within the consumer network in them[2].

Nicola Ivan Giannoccaro, Luigi Spedicato proposed Ultrasonic Sensors for Measurements of Liquid Level, Volume and Volumetric Flow in a Tank. This paper presented a plan of an application of industrial interest. It helped in assessing the capacity of a tank, measuring and controlling the contained liquid level and flow by using ultrasonic sensors. A tank is generally represented by the lateral surface of a cylinder which can be generated by rotating a curve around a defined axis. This rotation of an ultrasonic sensor permits to fit out the generating curve of the surface so that the tank volume may be evaluated. This reconstruction then helps to measure the quantity of water contained in the tank by using a second ultrasonic sensor placed above the mouth of the tank[3].

3. SYSTEM DESIGN

The main objective of this project is to develop a electronics based system, which will detect the level of water and updates using IoT in a real-time basis which offers more flexibility. This system consists of a set of sensors connected through a micro controller. The water level will be analyzed using these sensors and updated in the web server using IoT module connected to the controller. Authorities can view this information using internet from any place and also they can make a decision to divert the people from that place, this is to avoid further complications. A buzzer alert and a siren alert will be given to indicate the severity of the water level.

The most important thing immediately before, during and after a disaster occurs is the dissemination of information, a deployment of devices enabled by IoT (Internet of Things) could bring benefits in terms of giving to people information opportunely for making decisions in face of this disaster.

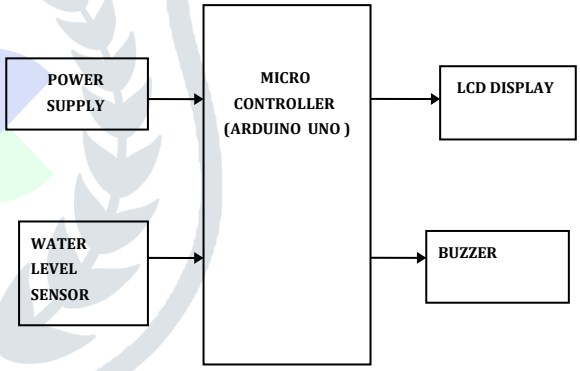

Figure 2 Block Diagram Of The Proposed System

The above Figure. 2 shows the Block Diagram Of The Proposed System

BLOCK DIAGRAM DESCRIPTION

Microcontroller Section:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

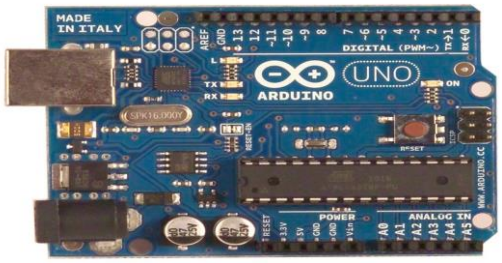

Figure 3 Microcontroller (ATMEGA328P)

LCD Display Section:

This section is basically meant to show up the status of the project. This project makes use of Liquid Crystal Display to display / prompt for necessary information.

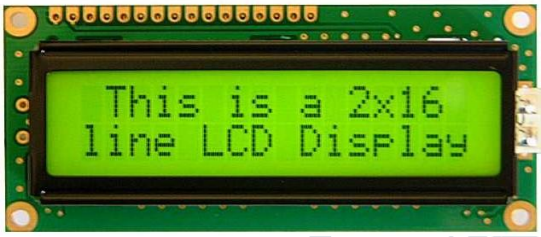

Figure 4 Liquid Crystal Display

Water level sensor:

The sensor used for measurement of fluid levels is called a level sensor. The sensing probe element consists of a special wire cable which is capable of accurately sensing the surface level of nearly any fluid, including water, saltwater, and oils.

Buzzer Section:

This section consists of a Buzzer. The buzzer is used to alert / indicate the completion of process. It is sometimes used to indicate the start of the embedded system by alerting during startup.

ESP 8266 WIFI Module :

The **ESP8266 WIFI Module** is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your **WIFI** network. The **ESP8266** is capable of either hosting an application or offloading all **WIFI** networking functions from another application processor

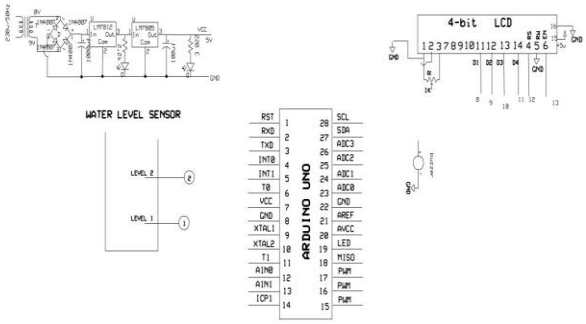

Figure 5 Schematic Diagram Of Arduino

4. IMPLEMENTATION

The main objective of this project is to develop a electronics based system, which will detect the level of water and updates using IoT in a real-time basis which offers more flexibility. This system consists of a set of sensors connected through a micro controller. The water level will be analyzed using these sensors and updated in the web server using IoT module connected to the controller. Authorities can view this information using internet from any place and also they can make a decision to divert the people from that place, this is to avoid further complications. A buzzer alert and a siren alert will be given to indicate the severity of the water level.

The most important thing immediately before, during and after a disaster occurs is the dissemination of information, a deployment of devices enabled by IoT (Internet of Things) could bring benefits in terms of giving to people information opportunely for making decisions in face of this disaster. First one is to alert people about floods

The implementation of this project is mainly in the software where all the hardware is fixed and connected to a software version Arduino sketch IDE. **Arduino** IDE(Integrated development Environment) is fully developed into functionality of full of libraries as long as programming the Arduino UNO in **Embedded C** language is possible because Arduino IDE can Compile both arduino code as well as AVR standard code.

Three variables are setup to know the three water levels and we will be dynamically assigning the water level value to the temporary variables. In those functions itself we have added the buzzer alert and the time delays.

As soon as the prototype model detects the water level, the message is sent to the specified number in the code. We can also change the target phone number in the code. In the GSM Module we have to insert a sim through which the target will receive the messages of the water level.

5. TESTING AND RESULTS

This is the output seen of our implemented prototype micro-model. The message is sent from the remote area to the phone number specified in the code. As we can see in Fig 5.1 we got to know the water level of the dam and the messages are sent to the target phone number.

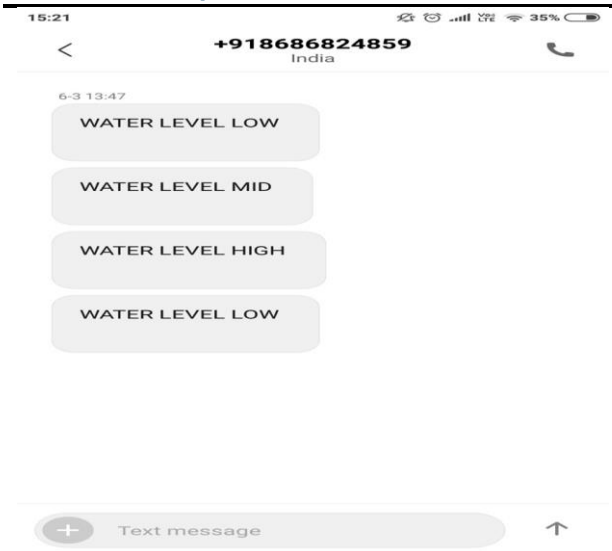

Figure 6 Message Received From Iot To Phone

6 CONCLUSIONS

The problems caused by floods are large in scale and complex in nature to deal with. The aim of this project is detecting occurrence of floods with the help of magnetic sensors and alerting the people. The severity level will be indicated with buzzer and 60 db siren. When water level reaches to maximum automatically a Siren of 60 db is activated. Then the information will be updated on the web server using IOT module. As the result this system will helps to monitor the different threshold levels in dams and also sends the information to the concerned authority to take the appropriate decision. As a part of analysis, by using R Tool we can predict the flood patterns which may be useful for further references.

According to definitions of IoT, if we consider a sensor as an element of IoT which enables to communicate its current status and be published on Internet, then our proposal is very close to what we are intending to achieve within the concept of Internet of things. Nevertheless, the real internet of the proposal is to achieve a flood early warning system. So far, we have only built a micro-model through a prototype that sends an audible signal and graphical messages towards smart phones about the water level into a container.

A flood monitoring and warning device with automatic emergency lighting was developed to monitor the water level, that would help in the disaster mitigation and disaster preparedness of the community. The emergency light, lights up during power outages supplied by the rechargeable lead acid battery to provide lighting. It also addresses the specific objectives of the study (1) an alarm system was developed to monitor the water level. 2)As a part of this project, we are going to perform an analysis using R. (3) water levels were established based on available data. High water level means awareness that there is water build-up on the river caused either by flooding due to continuous rains or by high tide.

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AUTHORS PROFILE

Author-1 Photo

Dr B.Veera Jyothi, completed her PhD in CSE , M.Tech(SE) from JNTU Hyderabad.she completed her B.E(CSE) from Gulbarga University.She is involved in Research and Teaching for a period of 18 years. Her research domains include Image processing, machine vision,pattern recognition,machine learning,neural networks,IOT.She has received several awards viz., Research excellence award from IEAE India for her contribution to research in the domain of Image processing and machine learning. She has received Recognnised reviewer award for the Elsevier Pattern recognition journal for the research review contribution made to the journal.She has received Best Project Supervisor award for the Best Student Project of the Year award, from IEAE,India.Presently she is working as Assistant Professor,in CBIT,Hyderabad.