Journal of Engineering Sciences
Vol 11, Issue 3, March/2020
ISSN NO:0377-9254

FLOOD ALERT MONITORING SYSTEM USING IOT

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ABSTRACT:

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. In this paper, we present a sensor to measure water level in rivers, lakes, lagoons and streams. For such purpose and to prove our concept, we designed a pilot project through a micro-model that is constructed with a water level measurement sensor based on a simple open circuit that closes when in contact with water and experimentally tested into a water container under a controlled This micro-model is performed on the basis of a, an electronic circuit connected to electrical resistances that are located at a specific height, within a water container; when the water level rises and reaches the resistors, varies the impedance, this shows the actual water level and so on for different heights. The information from water level sensor is transmitted via Wi-Fi to laptop, then this information is also seen in smart phones, where users can see the water level in rivers. Finally, the micro-model is tested by experimental tests under a controlled environment and satisfactory results are obtained environment.

I. INTRODUCTION

There exist several types of natural disasters, it is known that flood is one of the most dangerous since they have enough destructive power to change the course of rivers, sweep away and destroy whatever is in their path. Our motivation for this work is based on

All damages caused in our region due to floods, this natural disaster has caused many people to suffer damage to their homes and losing their belongings. Heavy rain caused flooding and damage to homes, inhabits from Tabasco have been warned against taking to the water without proper preparation following record heavy rainfall across the state. Tragic floods happened in Tabasco, Mexico in 1999 and 2007. In 2007, the homes of as many as half million people were destroyed and damaged by massive floods. Torrential rain pounded the region giving rise to widespread flooding by several rivers burst their banks. There exist encouragement for researching preliminary solutions in this kind of disaster to mitigate and help in rescue operations. A variety of options there is for creating systems capable of warning vulnerable populations about an imminent threat of floods.

II. LITERATURE REVIEW

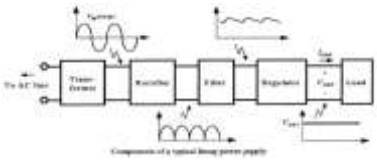
Very recently it appeared the concept of Internet of Things (IoT) as a topic emerged in the wireless technology field. IoT describes the pervasive presence of a variety of devices such as sensors, actuators, and smart phones or mobile phones that through unique addressing schemes, are able to interact and cooperate with each other to reach common goals . In is mentioned Internet of Things is a paradigm as a result of the convergence of three different visions: Internet-oriented visions (middleware), things oriented (sensors) visions and semantic-oriented (knowledge) visions. In previous works dealing with this term . Hence, it is possible to use the concept of IoT to provide communication capabilities toa device that could alert opportunely to a population before a natural disaster occurs. Before using sensors integrated into IoT (”Things”-oriented vision) some works have been proposed to disaster situations . Specifically ”Things”-oriented vision works like , where RFID technology is used. However, we are especially interested in those applications centered in disasters by floods. For example, a system for flood detection is ALERT .

III. HARDWARE REQUIREMENTS

- POWER SUPPLY
- ARDUINO UNO
- ULTRASONIC SENSOR
- GSM
- ESP8266
- LCD

POWERSUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".



ARDUINO UNO:

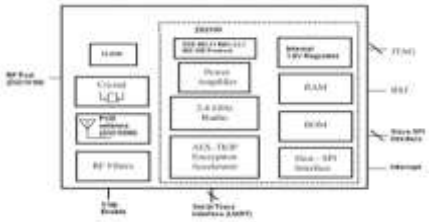
The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.

ULTRASONIC SENSOR:

The transmitter emits a 8 bursts of an directional 40KHz ultrasonic wave when triggered and starts a timer. Ultrasonic pulses travel outward until they encounter an object, The object causes the the wave to be reflected back towards the unit. The ultrasonic receiver would detect the reflected wave and stop the stop timer. The velocity of the ultrasonic burst is 340m/sec. in air. Based on the number of counts by the timer, the distance can be calculated between the object and transmitter The TRD Measurement formula is expressed as: D = C X T which is know as the time/rate/distance measurement formula where D is the measured distance, and R is the propagation velocity (Rate) in air (speed of sound) and T represents time. In this application T is divided by 2 as T is double the time value from transmitter to object back to receiver.

ESP8266:

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 Wi-Fi networking functions from another application processor. The ESP8266 modules are low-power 802.11b implementations. All RF components, the baseband and the entirety of the 802.11 MAC reside on-module, creating a simple and cost-effective means to add Wi-Fi connectivity for embedded devices. The module(s) implement a high-level API, simplifying design implementation and allowing the ZG2100M or ZG2101M to be integrated with 8- and 16-bit host microcontrollers.



LCD DISPLAY:

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

GSM:

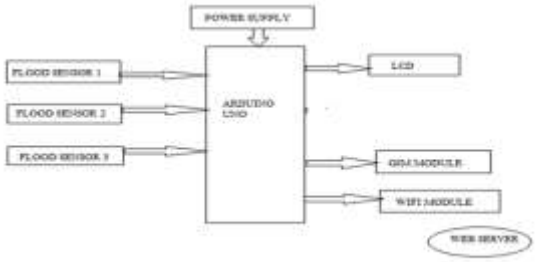
GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.There are various cell sizes in a GSM system such as macro, micro, pico and umbrella cells. Each cell varies as per the implementation domain. There are five different cell sizes in a GSM network macro, micro, pico and umbrella cells. The coverage area of each cell varies according to the implementation environment.

SOFTWARE REQUIREMENTS:

- ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. First, the Arduino compiler/IDE accepts C and C++ as-is. In fact many of the libraries are written in C++. Much of the underlying system is not object oriented, but it could be. Thus, "The arduino language" is C++ or C.

PROJECT DESCRIPTION:



WORKING:

The ultrasonic sensor works on the principle of echo of sound waves. When a HIGH pulse of 10usec is passed to the trigger pin of the sensor, it transmits eight 40KHz waves of HIGH Sonic Pulse shots back to back. A High pulse signal is out from the echo pin as the ultrasonic wave is transmitted. This wave when collides with an Flood, it is reflected back and detected by the sensor. On detecting the wave again, the High pulse signal from the echo pin of the sensor is terminated. The signal received from the echo pin is analog in nature. The distance from the obstacle can be measured by measuring the high time of the echo pin. This is the time between the transmission and reflection back of the sonic wave. The distance is calculated by the following formulae:

Test distance = (high level time × velocity of sound (340M/S)) / 2

The time multiplied by velocity is divided by 2 as the time taken is for the sonic wave to reach obstacle and return back. Therefore the distance measurement in cm can be given by the formulae -

Test distance = (high level time × velocity of sound (340M/S)) / 2

= (high level time(microsecond) × velocity of sound (340M/S)) / 2

= high-level time x 340/2000000 m

= high-level time x 34000/2000000 cm

= high-level time x 34/2000 cm

The ultrasonic sensor outputs the high pulse from pin 2 which is detected at the pin 11 of the Arduino Board. The Arduino sketch measures the pulse duration and digitizes it to a distance value using the formulae stated above.

By using the above data the output devices will give the Alert to the People Living Over there By making calls, SMS, sending data to the Servers and also by making different led glows based on the Water Level.

IV. CONCLUSION:

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 veryclose to what we are intending to achieve within the concept of Internet of things. Nevertheless, the real intent 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. This micro-model was developed based on a programmable electronic board where some electrical resistors were connected to three heights into a water container, the rising water levels covering the resistance so that cause variation in the impedance, this fact indicates what is the water level, and so on for the three different heights. This information was transmitted to a web server via WiFi. After, this information can be accessed by mobile devices, users can graphically see the data, these data show the values of water levels. Subsequently, the prototype tests were conducted into a controlled environment, these tests consisted in measuring the water level in a container with water, different filling levels were tested, such testing showed the expected results.

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