



FLOOD MONITORING SYSTEM USING ARDUINO

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Abstract: The crucial disaster that disturbs the normal routine of people is flooding. Based on this, there is an important requirement to maintain a complete analysis over environment in frequent manner. Nowadays all prediction level has been moved from physical to mathematical modelling. Where, this paper distributes with the strategies of flood alerting system with help of GLOBAL NETWORKING SYSTEM (GSM) an embedded system which would give the real time calculation along with Wireless Sensor Network (WSN) for arithmetic processing, prediction and analysis that would help to send an alert message to the nearby surrounding and reduces the time of risk. Waterfall model algorithm is used as the approach. Here the Arduino uno is connected to water float sensors & ultrasonic sensor to analyses the water level. Further, these calculated values will be passed to the Arduino which is been developed with Java, C++. The Arduino would give the alert message to the IoT module. These analyses are made to discuss how the IOT is embedded in real time to prediction and alerting.

Keywords: Arduino board, LCD screen GSM board, Water FLOAT sensors, connecting cables, Power supply, LED, Ultrasonic Sensor, Buzzer, Soldering equipment.

I. INTRODUCTION

Flood takes place when water overflows from the river, lake or from heavy rainfall and it can happen at any time of the year. Flooding can be very crucial, when floods happen in an area that people live, the water carries along objects like homes, cars, furniture and even people. It can wash out property, trees and many more heavy items. For years, flooded roads have been a problem in area.

It causes heavy flow of traffic. Both motorists and commuters ARE getting s adhered in a flooded areas and getting lost in finding possible routes just to go to their destinations. When traffic happened, people's money, time and effort are wasted. Through the local government unit flood control has been extending their efforts to inform the commuters regarding the situation in flooded areas during rainy season, still the dissemination of information to the locals are not enough.

For this reason, the "Arduino Flood Detector System" is been develop, to help the road user to keep away from this problem happened. It was invented based on problem faced by motorists and commuters when flood occurred. This will avoid the traffic jam because the users have a time to find a possible routes before they are going to be adhered at the flood area.

The system will work when the admin activates the system and when water along the road detected by distance over ultrasonic sensor. When the flood occurs, the ultrasonic sensor will send signal to the microprocessor circuit and the sense water level will be display in the user interface and it will automatically send a Short Message Service (SMS) to those allow residents and it will continue update until the water level detected returns to normal. The process repeats as the water level continuous to rise. The idea of an SMS based warning system was proposed because mobile phones have become a popular communication device among people all over the world. All mobile phone is able to communicate because it comprises of a GSM. This system used to detect the current water level of flood around the road and will give real-time information to the motorists or commuters that has still not passing through the flooded areas to avoid problem.

II. PROPOSED METHODOLOGY

Agile Development Model generally uses regulation in software development process where Agile Manifesto was introduced. Agile development is a phrase used in software development to describe methodologies for incremental software development Ease of Use. Agile development is a substitute to old project management where focus is placed on allowing people to join together and make team conclusion for constant planning, testing and development.

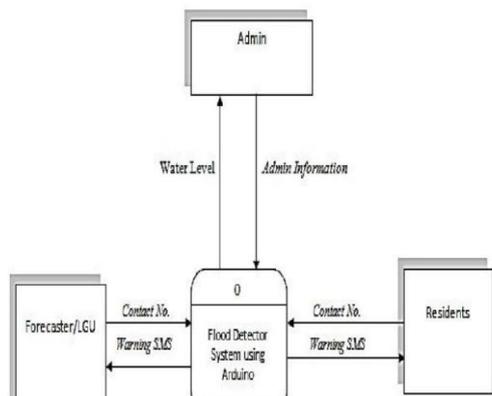


Figure.1

The above figure illustrates that the Forecaster or LGU, residents will supply a contact number; so that the system will send a warning message about the water level of the flood. The administrator will send personal information so that the admin can access the system and check the water level of the flood. When the device turns on, it can detect the level of water; and when the flood is being detected, Serial Communication will give warning messages to the Local administrator Unit and will check the interface and inform it to the residential people. When the developed system did not detect the water level, the Local admin can still check the interface and disseminate it to the area people if there are any signs of flood.



Figure.2

III. HARDWARE & SOFTWARE

3.1 Hardware Used

A) ATmega328P Microcontroller (Arduino UNO)



Figure. 3

Arduino Uno microcontroller-based development board

Fig 2 shows the Arduino Uno board. Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller.

B) LIGHT EMITTING DEVICE (LED)

LED Pinout

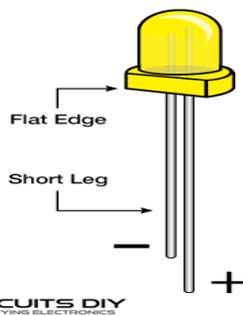


Figure.4

Is a two-lead semiconductor light source. It is a p-n junction diode, which emits light when activated. 5mm 3 led are enquire RED GREEN BUE

C) ULTRASONIC SENSOR



Figure.5

It provides an easy method of distance measurement. A single I/O pin is used to trigger an ultrasonic burst and then “listen” for the echo return pulse. The sensor measures the time required for the echo return, and returns this value to the microcontroller as a variable-width pulse via the same I/O pin.

D) FLOAT SENSOR



Figure.6

A float switch detects the level of a liquid in a tank. Based on the water level, it will open or close an electrical circuit.

E) GSM MODULE

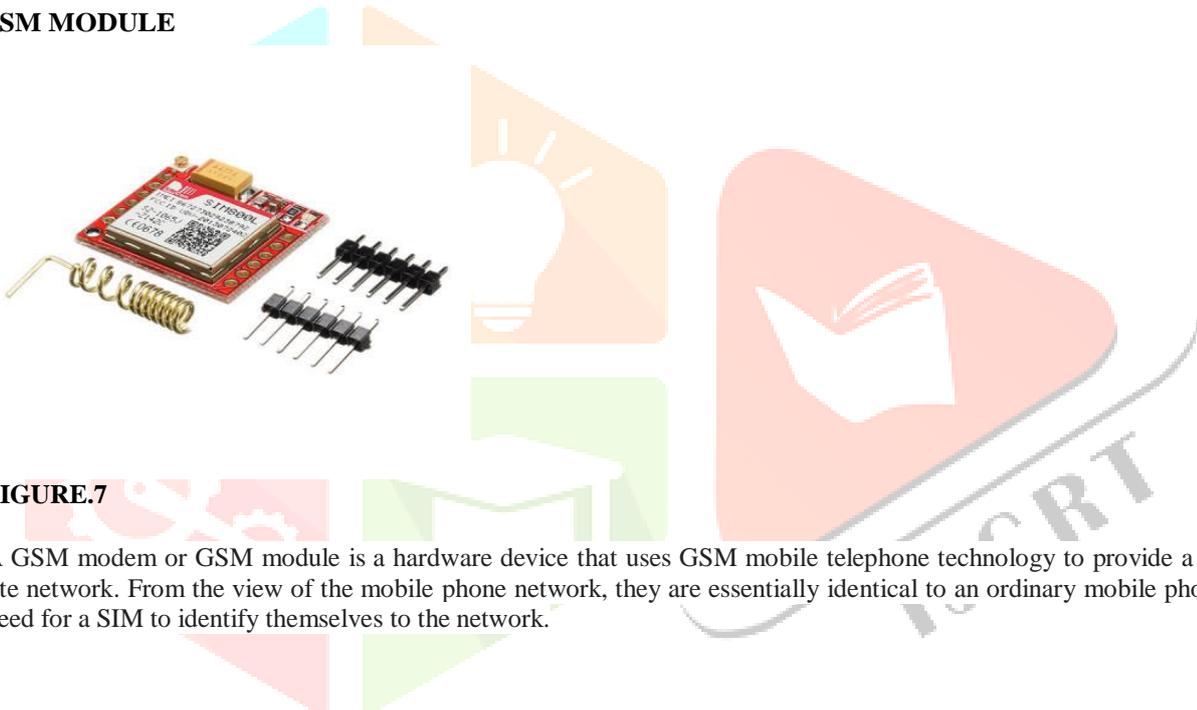


FIGURE.7

A GSM modem or GSM module is a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network.

F) BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short).

G) SHOULDERING EQUIPMENT

A soldering iron is composed of a heated metal tip and an insulated handle. Heating is often achieved electrically, by passing an electric current (supplied through an electrical cord or battery cables) through a resistive heating element. Cordless irons can be heated by combustion of gas stored in a small tank, often using a catalytic heater rather than a flame. Simple irons less commonly used today than in the past were simply a large copper bit on a handle, heated in a flame.

H) Jumper Wires

Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins. Though jumper wires come in a variety of colors, the colors don't actually mean anything. This means that a red jumper wire is technically the same as a black one.

Wire Number	Wire Color	Description
1	Brown	Ground wire connected to the ground of system
2	Red	Powers the motor typically +5V is used
3	Orange	Ultra-sonic sensor is connected to board

3.2 SOFTWARE USED

A) Arduino IDE 1.6.7

For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named Processing, which also supports the languages C and C++. The open-source Arduino IDE makes it easy to write code and upload it to the board.

VI. RESULTS AND CONCLUSIONS

In this paper, the main focus is on detection of the level of the flood. Based from the existing mapping of flooded roads in various areas researchers have concluded that the Flood Detection System using Arduino can measure the height of the flood. The measurement data can be allotted to officer and to the nearby residents. The system indicates satisfactory and unsatisfactory road that will help passengers to avoid getting stuck in an impassable road. The system also provides camera to easily monitor the flood. The system monitors floods using Arduino and give early alarm. It is very useful for coastal areas and it will help the residents in taking fast decisions and planning against this disaster mankind about the flood like dangerous natural disaster. The development of a rainfall forecasting sensor can be turn up to the early flood monitoring and detection and can be implemented to existing system in future.

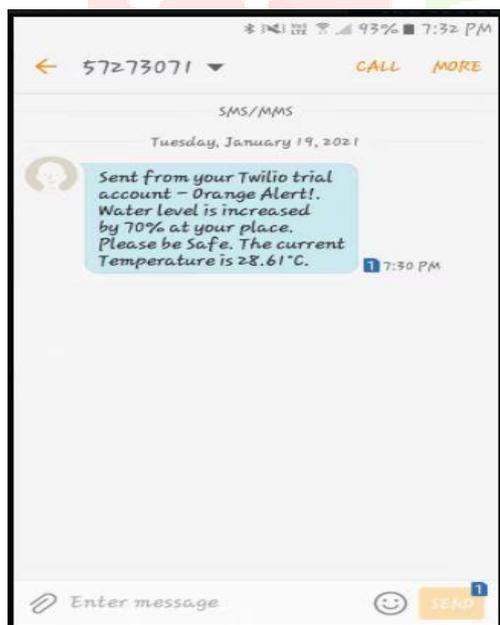


Figure.8

SMS AFTER WATER LEVEL REACHES 70%

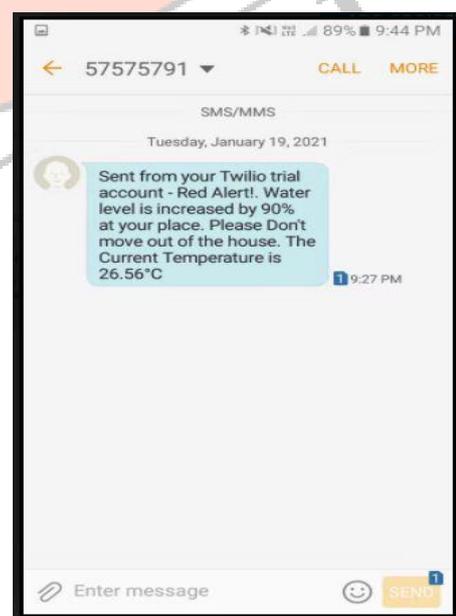


Figure.9

SMS AFTER WATER LEVEL REACHES 90%

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