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ijircce@gmail.com

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Avoid Flooding using Arduino Uno

Supriya Katke, Srushti Memane, Rameshwari Kamble, Supriya Kale, Komal Jagtap

Department of Computer, Marathwada Mitra Mandal's Polytechnic, Pune, India

Department of Computer, Marathwada Mitra Mandal's Polytechnic, Pune, India

Department of Computer, Marathwada Mitra Mandal's Polytechnic, Pune, India

Lecturer, Department of Computer, Marathwada Mitra Mandal's Polytechnic, Pune, India

Lecturer, Department of Computer, Marathwada Mitra Mandal's Polytechnic, Pune, India

ABSTRACT: -The Avoid Flood Hardware Project is a hardware-based method for identifying and warning individuals about possible flood dangers in their immediate surroundings. The hardware gadget uses sensors to keep track of the water levels in lakes, rivers, and other bodies of water. In order to produce precise measurements, the gadget is intended to be put in key spots along the water body.

The Avoid Flood Hardware Project gadget tracks changes in water level in real-time by combining pressure and ultrasonic sensors. The gadget has a rechargeable battery and may deliver notifications to cell phones through cellular or Wi-Fi networks.

The hardware is made to be tough and weatherproof, able to survive extreme weather conditions including torrential rain, powerful winds, and flooding.

I. INTRODUCTION

Flooding is a natural disaster that can cause significant damage to property and threaten the safety of individuals in affected areas. The increasing frequency and severity of flooding in recent years have prompted many communities to take action to reduce the risk of flooding and minimize its impact. This has led to the development of various flood mitigation projects, including flood barriers, stormwater management systems, and early warning systems.

India faces floods almost every year, in varying degrees of magnitude. The frequent occurrence of floods can be attributed to factors like wide variations in rainfall both in time and space with frequent departures from the normal pattern, inadequate carrying capacities of rivers, river bank erosion, degradation of hilly catchment and silting of river beds, landslides, poor natural drainage in flood prone areas, glacial lake outbursts, cloud burst, etc. The country suffers huge economic loss annually besides the loss of precious human lives due to floods. There are evidences of increasing number of high intensity rainfall event in the recent years varying non-uniformly in space and time. Such events lead to flash floods. Urban flooding due to storm water drainage congestion (pluvial in nature) has also become common in towns/cities due to such extreme meteorological events

One critical aspect of flood mitigation is to raise awareness among the general public and encourage them to take proactive measures to protect themselves and their properties from flooding. This is where the "Avoid Flooding" project comes in. The goal of this project is to provide education and resources to individuals and communities on how to prepare for and respond to flooding.

The project will focus on several key areas, including understanding flood risks, creating emergency plans, building flood-resistant structures, and identifying warning signs of impending flooding. By providing comprehensive information and tools, the Avoid Flooding project aims to empower individuals to take an active role in mitigating the impact of flooding and protecting their communities. Ultimately, this project has the potential to save lives and minimize the economic and environmental costs of flooding.

II. FUTURE WORK

- There are things used for anti-flood protection and it makes your house, yard and much more, safe and protected when a flood arrives. They can be used over and over again.

- In our project we are going to make a model of a house. We are going to install 4 bottles below the house to save it from flooding.
- That is, as soon as the water comes out of the house, the house will rise up and the people in the house will know that the water is coming into the house.
- And let's say if water enters the house, then we have installed a buzzer outside the house.
- Due to this, the members of the house will be alerted and come out of the house. Their lives will be saved.

III. METHODOLOGY

Relevant details should be given, including experimental design and the technique (s) used along with appropriate statistical methods used clearly along with the year of experimentation (field and laboratory). A mixed-method approach has been followed in order to answer the research questions. The qualitative methods include focus group discussion, interview and observation in the field. Besides, I conducted a quantitative survey applying semi-structured questionnaire with the household representatives in the study areas. The relevant stakeholders for the study are people living in the areas, governmental organizations including Water Development Board (WDB), Upazila Agricultural Office, Disaster Response and Rehabilitation office, non-governmental organizations working on disaster risk reduction and resilience in Bangladesh, academicians researching on flood risk management in Bangladesh. The following section will describe the methods and techniques in detail.

The methodology is conceptually represented in Fig. 1

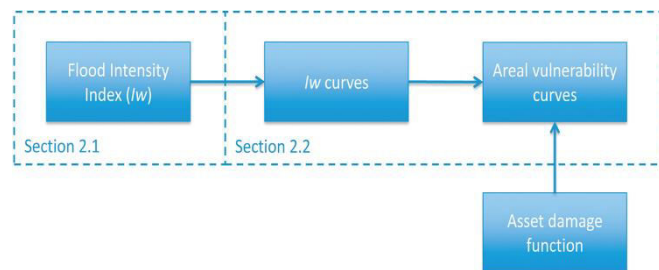


Fig.1

IV. PROPOSED APPROACH/MATHEMATICAL MODEL

- Step 1: We first load the Arduino Code.
- Step 2: set `rainapin=A0`
`greenLED=6,`
`redLED=7;`
- Step 3: then we adjust the threshold
`Value=800`
- Step 4: set LED light setup
- Step 5: set serial wise setup
- Step 6: read the input on analog pin
- Step 7: use if else

V. REQUIRED HARDWARE

1. Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website.

2. Soil Moisture Sensor

A Soil Moisture Sensor is one kind of low-cost electronic sensor that is used to detect the moisture of the soil. This sensor can measure the volumetric content of water inside the soil. This sensor consists of mainly two parts, one is Sensing Probes and another one is the Sensor Module. The probes allow the current to pass through the soil and then it gets the resistance value according to moisture value in soil. The Sensor Module reads data from the sensor probes and processes the data and converts it into a digital/analog output. So, the Soil Moisture Sensor can provide both types of output Digital output (DO) and Analog output (AO). Pin Number Pin Name Description 1 VCC +5 v power supply 2 GND Ground (-) power supply 3 DO Digital Output (0 or 1) 4 AO Analog Output (range 0 to 1023)

3. Red LED

A RED light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices and are increasingly used for other lighting. When a light-emitting diode is switched on, electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. An LED is often small in area (less than 1 mm²), and integrated optical components may be used to shape its radiation pattern. LEDs present many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. However, LEDs powerful enough for room lighting are relatively expensive and require more precise current and heat management than compact lamp sources of comparable output.

4. Jumper wires

The term "jumper wire" simply refers to a conducting wire that establishes an electrical connection between two points in a circuit. You can use jumper wires to modify a circuit or to diagnose problems in a circuit. A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment

5. 7.4v Battery

A battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy. Historically the term "battery" specifically referred to a device composed of multiple cells; however, the usage has evolved to include devices composed of a single cell.

6. Buzzer

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren. The pin configuration of the buzzer is shown below. It includes two pins namely positive and negative. The positive terminal of this is represented with the '+' symbol or a longer terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '-' symbol or short terminal and it is connected to the GND terminal.

VI. CIRCUIT WORKING

1. In our project we are going to make a model of a house.
2. When there is a flood in your residence and when the water accumulates outside the house, the buzzer installed outside the house will sound.
3. After that the person in the family will not understand that the flood has come.
4. That is, as soon as the water comes out of the house, the house will rise up and the people in the house will know that the water is coming into the house.
5. Let's say if water enters the house, then we have installed a buzzer outside the house.
6. Due to this, the members of the house will be alerted and come out of the house. And their lives will be saved.

VII. CONCLUSION

- Remain safe from floods you need to know when and how to deal with them.
- Lives could be saved by having more warnings of floods for places in threat.
- There are things used for anti-flood protection and it makes your house, yard and much more, safe and protected when a flood arrives. They can be used over and over again.

In conclusion, the Avoid Flood Hardware Project is an innovative solution that uses technology to address the challenges of flood detection and warning. With its accuracy, durability, and ease of use, the device is a valuable addition to flood monitoring systems. The Avoid Flood Hardware Project is a hardware-based solution designed to detect and alert people about potential flood threats in their local areas. The project uses sensors to monitor water levels in rivers, lakes, and other water bodies. It aims to provide early flood warnings to help people take preventive measures and reduce flood damages.

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