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BOAT SHRINKING ALERT SYSTEM USING IOT

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Abstract -*The boat accident alert system is designed using IOT. It is mainly developed to save lives of people in critical situations. Despite of rapid growth in technology, people cannot survive his/her life immediately after a boat accident because of unavailability of emergency facilities in our country. So, we develop a solution which facilitates emergency facilities. Boat shrinking alert system is used to identify the shrinking of boat using IOT devices placed in boat. It is designed using nodeMCU that is acquainted with sensors to detect shrinking of boat immediately. when the accident happen the boat alert system detects immediately and finds the shrinking of the boat. That will immediately inform that to the authorities. GPS system will be used to find the boat location during a shrinking of a boat. The results of boat accident alert system were promising in terms of efficiently detecting the shrinking of a boat and also detecting the location of a boat.*

Key Words**: Arduino uno, node MCU, weight sensor, water sensor, GPS module**

1. INTRODUCTION

The Internet Of Things (IOT) is a system of interrelated computing devices, mechanical and digital machines are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.Now-a-days Internet of Things is connected with our daily activities and it has become a part of our lives. With the advancement sensoract technology, availability of internet connected devices make IoT devices to smart devices in emergency situations without human intervention. IoT is used in almost every field such as sensing, Networking, Robotics, As technology advances IoT will become a part of our day to day life. Through IoT Humans save time, resources and human power by providing the real time services without any intervention of humans.

Seventy one percent of the earth's surface is covered by water. These are agumenting land based food supplies by fishing, expanding area of crop farming by accessing new land across the water. One of the major causes of unnatural death is drowning. In india about 80 people drown due to this. It is very difficult and takes time to detect the drowning of the boat. This raises the need for having a system that automatically detect the drowning boat and alarm the lifeguards. The information of the drowning boat can be send to the rescue team immediately, if we identify drowning using sensors. The system will also send the exact location of the boat to the rescue team.

2. RELATED WORK

In boat accident alert system, different approches have been proposed. One proposed system will alert the rescue team to avoid the drowning of boat and to detect the presence of human under water, this can be done by using RFID tag, accelerator and a siren. RFID use electromagnetic field to automatically detect and track the tag attached to that person. This tag contains electrically stored information. The RFID consists of two parts RFID tag and reader. The RFID reader is placed in dangerous locations of river or sea bed. RFID tag is attached to the person's hand. When the tag is nearer to the reader it will reads the ID and fetch for person details with respect to the tag.By programming the arduino the tag will identified and the GPS will be provide the location information. The GPS coordinates will be received at the arduino and send location to the rescue team to save the lives.

The main drawbacks with the current devices are, To identify the dangerous locations of the river or sea is very difficult. We place the RFID receivers in in all dangerous locations is very expensive. This system only identifies the human who is having RFID tag. Without RFID tag we can not save the person.

3. METHODOLOGY

Proposed method first calculates the weight of a boat.If boat weight is overloaded then it can send alert to the management team with in the boat. This can be done by using weight sensors. weight sensors calculates the weight of a boat. next, Our proposed system will sends notification along with the exact location of a boat to the rescue team regarding to the drowning of boat. This can be done by using water sensor and GPS module. Water sensor can detect the presence of water in a boat and GPS module is used to track the exact location of a boat.

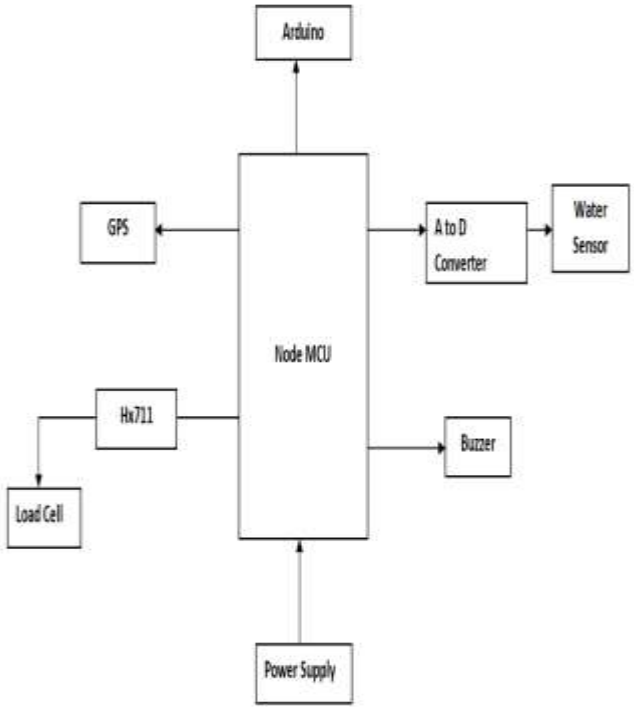

Fig-1:Block diagram

Hardware Components:

1. Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328.Arduino is an open source programmable circuit board that can be integrated into a wide variety of makerspace projects both simple and complex. This board contains a microcontroller which can be modified to sense and control objects in the physical world. By responding to sensors and inputs, the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays.

2. GPS

GPS is an navigation based system that is used to determine the current position of an object in terms of latitude and longitude. There are 24 satellites deployed in space which surrounds the earth. This satellite broadcasts the position of an object. GPS uses triangulation process to obtain the exact position of an object. The GPS module is connected to Raspberry Pi through GPIO pins.

3. NodeMCU

It is an open source IOT platform. It includes firmware which runs on the ESP8266 Wi-Fi SOC from Express if Systems, and hardware which is based on the ESP-12 module. NodeMCU Development board is featured with wifi capability, analog pin, digital pins and serial communication protocols. The ESP8266 is a low-cost Wi-Fichip developed by Espress if Systems with TCP/IP protocol.

4. weight sensor

The working principle of weight sensor is depends on the conversion of a load into electronic signal. This straight bar load cell can translate upto 10 kg of pressure into an electrical signal.

Fig-2: Loadcell

5. HX711

HX711 is a precision 24- bit analog to digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor.

6. Water sensor

Water detector is an electronic device that is designed to detect the presence of water .This sensor values are measured in terms of analog values.

Fig-3: Water sensor

7. LM324

The LM324 consists of 14 pins with four independent op-amps in one package. These electronic voltage amplifiers are available in high gain with different input as well as a single output. The voltage difference among the input terminals of the IC is very less than the output voltage.

Software Components

The Software Part used in our project are as follows:

Arduino IDE:

Arduino Integrated Development Environment is a free software which makes us to write and upload the code easily into the boards. With the help of this arduino IDE we can upload the code not only to the arduino boards but also to other boards like nodeMCU with the installation of related libraries.

Blynk:

Blynk is a platform that is used to control Arduino, Raspberry Pi and other similar things over the internet. Blynk app is free to download and there is no need to do any payment. The only thing we have to do is that, we have to create an account in the app. In our system nodeMCU update the status in the blynk and from this blynk platform the system can be controlled.

Embedded C:

Embedded C is a commonly used and it is the popular programming languages in the development of embedded systems. Embedded C is an extension of the C language, and we can say that they are almost similar.

However, there exists some differences between these two, such as: C is generally used for desktop computers, where as embedded C is used for microcontroller based applications. Embedded C has some additional header files compared to C language. These header files may change from one controller to another controller. In our system, the language used for writing code in Arduino IDE is embedded C.

4. DESIGN FLOW

When the arduino UNO is powered then light blinks in the system. By this we can say that all the connected components are intialized.

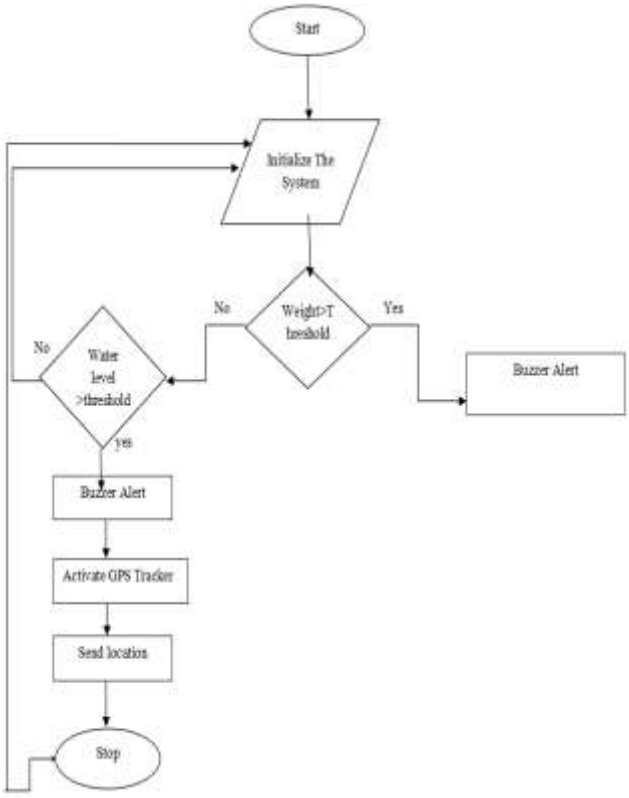

Fig-4: FlowChart

Process explanation

First arduino board gets power supply from our PC or it gets power supply from battery .Then arduino board will supply power to the remaining devices that are connected to that board. NodeMCU acts as micro controller and a wifi module and we upload the code in this board.

1. First we check the boat is overloaded or not.We apply the weight on load cell. If the applied weight is greater than the threshold value then it can send alert in form of buzzer otherwise it is in normal condition.

2. We dip the water sensor into the water, then this sensor will sense the water content. If the water present in the boat then it can send alert to the rescue team to “Boat Shrinking”.

3. If the boat is in normal condition it can send message as “All is Well”.

4. If the boat is shrinking it can also sends the exact location of a boat using GPS module.

5. RESULTS

1. If the applied weight is greater than the threshold value it sends alert as boat overloaded.

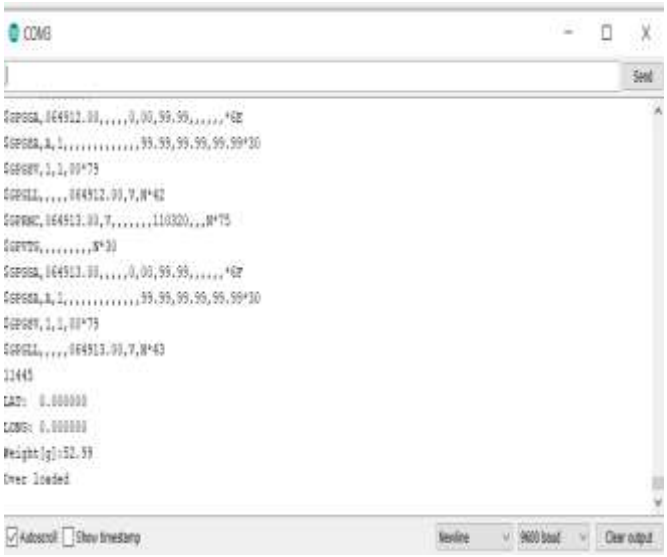

Fig-5: Weight results

2. If the water is present in the boat then it can send alert to the rescue team to **Boat Shrinking** along with the GPS location. This messsge is displayed in Blynkapp.

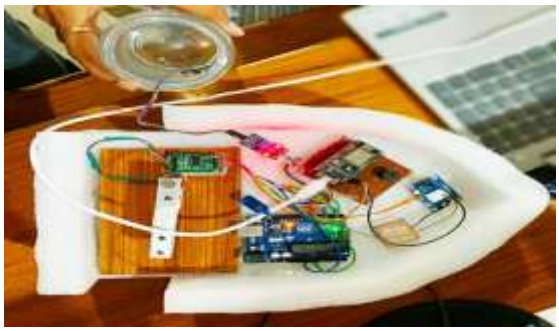

Fig-6:Boat Shrinking results

3. If the boat is in normal condition then it displayed as **All is Well**

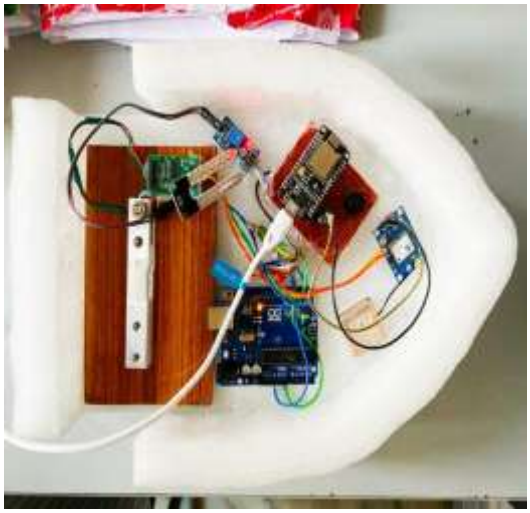

Fig-7:boat in normal condition

6. CONCLUSION

Boat shrinking alert system is an automatic accident detection and alert system is used for providing help to the accident victims. The proposed system is developed to rescue accident victims as fast as possible. Our system consists of Arduino UNO, node MCU, Water sensor, Weight sensor. Our system sends the message regarding the shrinking of boat along with the exact location of the boat to the nearest control station or rescue team.

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