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TRACKING AND WARNING SYSTEM FOR FISHERMEN USING IOT

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Abstract: The issues of fishermen stray in each territorial water has come as an potential irritant in the bilateral relations between the neighboring states and countries. International Marine Time Boundary line (IMTL) between countries will always have security problem. Due to carelessness the fishermen may accidently cross the country border. In such situation they may face attack from the opposite navy. To avoid such situation a device using embedded system has been designed to protect the fishermen. GPS receiver is used to find the current location of the fishermen. The heart beat sensor continuously monitorsHeartbeat of the fishermen. GSM is used to transfer the data to the cloud storage using IOT. If fishermen navigate beyond the country border a warning message is send from the control room. This device helps the fishermen to handle any hazardous situation and to improve the safety.

Keywords: Arduino UNO microcontroller, Global Positioning System (GPS), Global System for Mobile Communication (GSM), Heartbeat sensor.

1. Introduction

The fishermen even today invoke the historical nights and routinely stay into the international marine boundary line for fishing. The main aim is to give a well equitable and user friendly environment for the fishermen to handle hazardous situation .This system is designed by using GPS and GSM .A GPS route device is preciously discover natural area by getting data from GPS satellites. This device can track the GPS data every signal time at whatever point the fishermen across the border can be identified. [1],[2]

2. Existing Methodology

The Existing system helps to identify the position of the ship by using GPS and when the ship reaches the border, it stops automatically. The warning message is send by using GSM. The Fishermen who have small boat don't have this type of tracking system and there is no provision for monitoring the health condition of the fishermen. So there is no secure for the fisherman which leads to the death of the fishermen.

3. Proposed Method

In this system embedded based model is developed to save the fishermen life and to avoid the problem between two countries. Each fisherman who is sailing in the boat has this device. This device consists of GPS receiver which continuously receives the GPS location of the fishermen. Heart beat sensor is fixed in the device which is used to monitor the heart rate of the fishermen. The GPS location and the Heartbeat rate is stored in a cloud storage which is monitored by the control room. The particular layer land that is border level is predefined and it is stored in the microcontroller memory. If the current value is compared with the predefined value and if these values are same or greater than the predefined value, a warning message is sent to the fishermen and coastal guard. Here we are using Thingspeak IOT application to store and display the location and Heartbeat rate. The location can be viewed through google map. Fig (1) represents the overall block diagram of the proposed system.

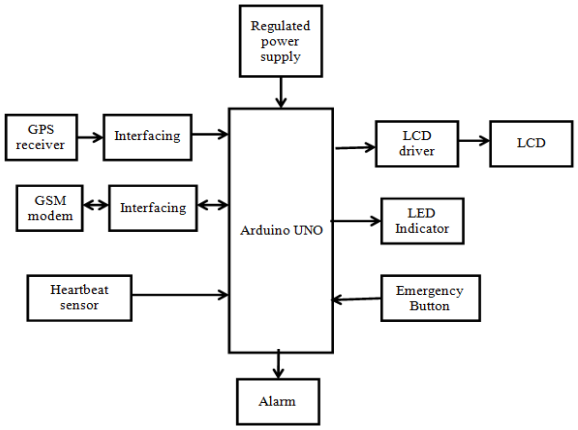

Figure 1. Block Diagram of proposed system

1. IOT

The IOT based architecture provides high level flexibility at the communication and information. The IOTs major significant trend in recent years is the explosive growth of devices connected and controlled by the internet. The IOT would encode 50 to 100 million objects and be able to follow the movement of these objects. It allows the object to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct interaction of the physical would in to computer based systems. It results in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

2. Thingspeak

Thingspeak is an applicationfor Internet of Things (IOT). It has API to store and retrieve data from things using the protocol over the internet. It collects and store data in the cloud. The interface provides simple communication capabilities to objects within the IOT environment. Data is stored in so called channels. The advantage of thingspeak over the other is that free hosting is provided for data channels. Each channel has up to eight fields where data can be stored, as well as four additional fields for location details. To get the data from thingspeak, we can retrieve the data by entry ID. The thingspeak web service is more useful and it also provides web serves maintenance. Fig (2) represents the block diagram using IOT indicating the slave device and master control.

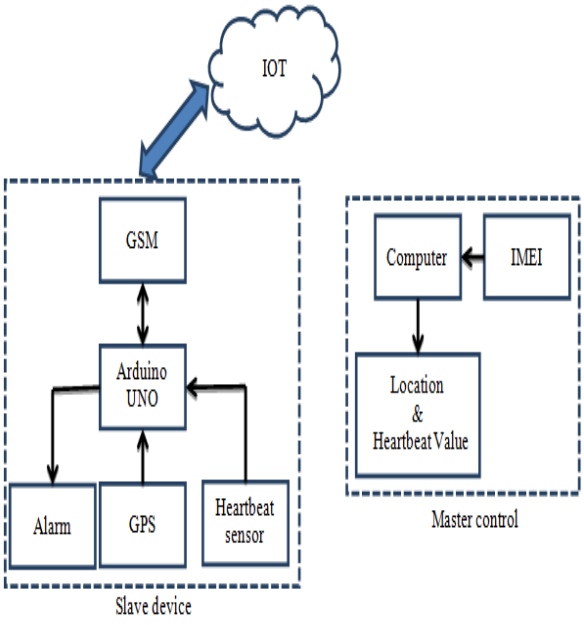

Figure 2. Block Diagram using IOT

4. Hardware Components

1. Power Supply

In this, 9V rechargeable battery used for power supply.It provides the necessary voltage to the microcontroller unit.

2. Arduino (Microcontroller)

Arduino UNO is microcontroller bored based on the ATmega328 .It has 14 digital input/output pins, 6 analog ,916MHZ digital oscillator , a USB connection , a power jack , an ICSP header and a reset button .The UNO differs from all proceeding boards in that it does not use the FTDI USB to serial driver chip . Instead , it futures the ATmega801 programmed as a USB to serial converter.[3] Fig (3) represents the Arduino Uno model used in this system

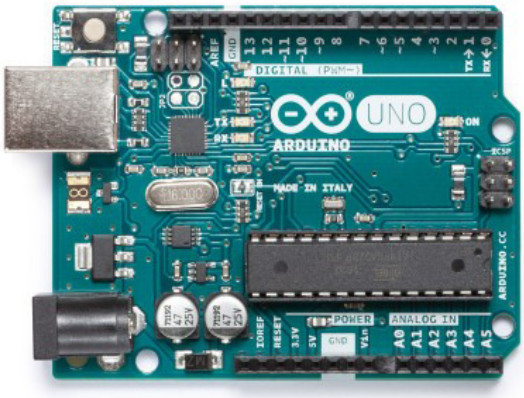

Figure 3. Arduino Uno (Microcontroller)

3. Global Positioning System (GPS)

GPS is a satellite based navigation system consists of a network of 24 Satellites located into orbit.GPS provides latitude and longitude information. The units has about 10-20 m accuracy .The GPS receiver is an electronic device that receive signal from three or four satellites .Using the distance measurement from multiple satellites ,the GPS receiver can store the current position of the device. The operating temperature of the GPS is about -40 (approximately) +85 degree celcius.

4. ***Global System for Mobile communication (GSM)***

GSM network operate in a number of different carrier frequency and its frequency upto 900MHZ or 1800MHZ.It is based on both TDMA and CDMA mechanism where a spectrum is divided into small slices.GSM module is used for transmission and reception of message and it also serve other purpose.GSM satellite roaming has also extended service access to areas where territorial coverage is not available

.It requires 5v power supply and operates at a speed upto 6KBPS.The operating voltage is from 3.2V to 4.8V.[2]

5. Heartbeat Sensor

The Heartbeat sensor sense analog signal to Arduino for processing .It has three terminal namely V_{CC} ,OUT ,GND. A supply of 5V is given to the V_{CC} and the output PIN of the sensor delivers the signal to the ARDUINO.[6]

6. Liquid Crystal Display (LCD)

The 16*2 is a very common type LCD .With two rows and each row display 16 character of either 5*7 or 5*8 dot matrix character .The row and column pins are connected to digital input/output pins of Ardunio .It act as an user interface which display message .It requires 5V power supply .If the display is not visible adjust contrast Pot(1K) to make it visible.

5. Results and Discussion

In this method, Arduino UNO microcontroller is used to implement the process.Here GSM module GPS receiver,LCD display and Heartbeat sensor are interfaced with the microcontroller .The GPS receiver receives the data from the satellite and provides the latitude and longitude .Similarly, theHeartbeat sensor continuously measures the Heartbeat rate.

The Heart Beat rate and latitude and longitude value are store in the cloud storage by using GSM and IOT .By using IOT ,the current position and the Heart Beat rate can be monitored from anywhere in the world .Whenever the fishermen reaches the border ,a warning message is send to them .The coastel guard also receives the message and helps the fishermen when the different situation arises .Fig (4) represents the overall hardware assembly unit and the LCD display indicates the latitude and longitude specifications

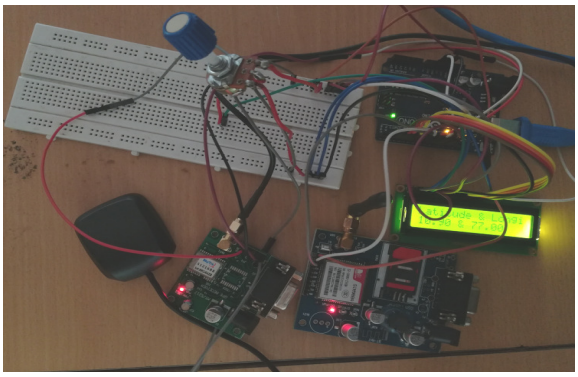

Figure 4. Overall Hardware Assembly Unit

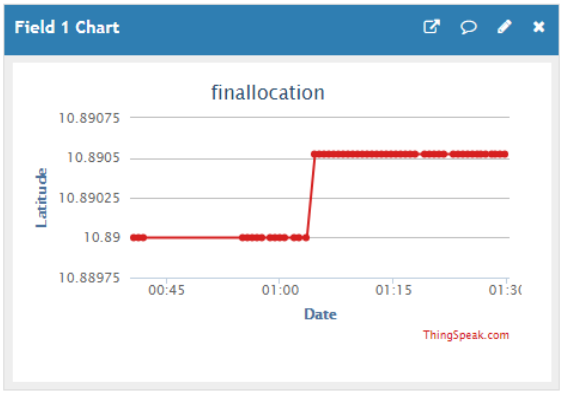

Figure 5. Latitude value using Thingspeak

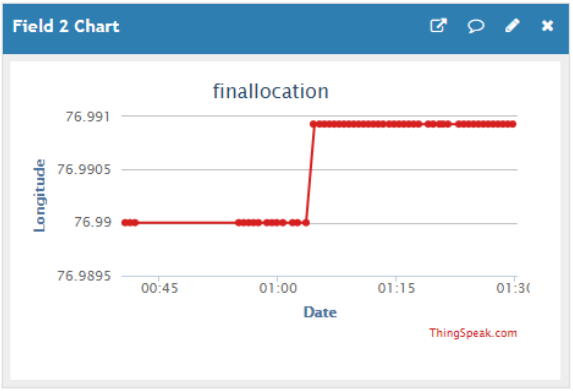

Figure 6. Longitude value using Thingspeak

Fig (5) and (6) indicates the IOT based output. Here the position of the person can be tracked.

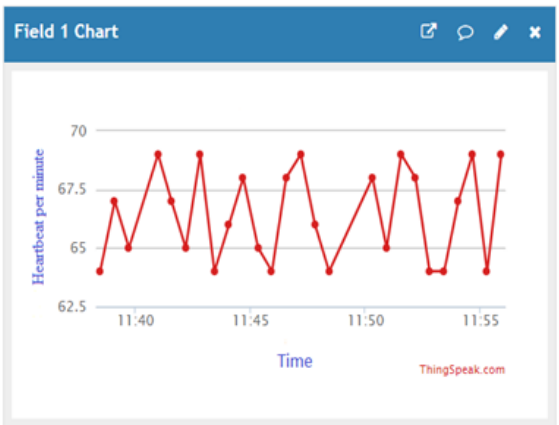

Figure 7. Heartbeat value using Thingspeak

Figure 8. Location displayed through map

Fig (7) indicates the heart beat rate and the variations after certain time can be noted. This helps to continuously monitor the health of the fisherman. The location can be triangulated in the google map as shown in the fig (8).

6. Conclusion

The method implemented continuously registers the latitude and longitude position of the individual fisherman, violation of border can be alerted based on position data. The heart beat rate of each fisherman is monitored continuously and this enables the dispatch of medical assistance immediately to their position.

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