

SAFETY IMPROVEMENT OF FISHERMEN USING ARDUINO UNO

Someswara Rao Gaddala¹, Dr.K vadivel², Dr.C.N Ravi³ Dr.G.Shiva Kumar⁴,

¹Assistant Professor in VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, Hyderabad, India

²Professor in VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, Hyderabad India.

³ Professor in VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, Hyderabad, India

⁴Professor in VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, Hyderabad, India

Someshwar@vjit.ac.in

Abstract. In daily life we come to know that in newspapers about many tamil fishermen being caught and put under Sri Lankan custody and even killed. The sea boundary among the countries is not easily recognizable, which is the main reason for this cross border cruelty. Here we have proposed a system using embedded system which safeguards the fishermen by acquainting the country border to them by using RF transmitter and receiver ,Global Positioning System (GPS) and Global system for mobile communication (GSM).To find the receiving signal of the fishing boat or vessel from the RF transmitter (Which located at port), using RF receiver. We can find the current latitude and longitude values and is sent to the microcontroller unit by means of GPS. The Current signal strength can be obtained by comparing the present values with the predefined value by using control unit. Then from the result of the comparison, this system will gives an indication to the fishermen that they are about to reach the nautical border. If the fisherman overlooks the warning or fail to see the instruction display and keep on navigating, and if the boat enters the zone nearer to the restricted zone the alarm will turn on and the engine stops, the alarm will make continues to beep.

1. Introduction

Here Arduino uno is used a basic Microcontroller Unit (MCU), GPS and GSM Modules are used to track the location of a boat and send alerts to authorized authority [1]. This embedded system is placed in a board, GPS system find out the location of a boat, if a boat nearer to restricted area then this system alerts the fisherman[2] .Using same technology disaster management team track the board and save the people from the disaster situation[4].

2. Implementation

The proposed system consists of Microcontroller unit (Arduino UNO),GSM Module,GPS module,Buzzer,LCD Module and relay modules. Here GSM and GPS modules are connected to the serial pins of Arduino uno,LCD is connected to some of the digital pins of arduino to display present board location(longtitude and latitude).MCU reads the data from GPS module , process that GPS data and Display on LCD. MCU compares GPS data with threshold data if values are abnormal it sends SMS to authorized authority using GSM Module,MCU is also send a signal to Engine control unit to stop the Boat(motor) and Buzzer is sound to intimate restricted zone

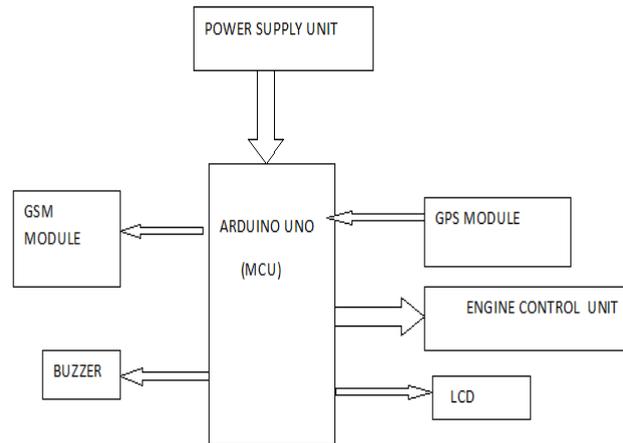


Fig 1. Blok Diagram of fisherman safety system

A. Arduino Uno:

The Arduino Uno is a microcontroller board based on the ATmega328. 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.



Fig2: Arduino Uno

B.Arduino IDE: Arduino is an open-source electronics platform based on easy-to-use hardware and software.

Advantages of Arduino IDE

- Open source
- Easy to develop the applications with the availability of predefined functions.
- It support all (editor, compiler, debugger, linker and loader etc) the tools in a single IDE.
- It supports many libraries (like WiFi, GSM, LCD, ETHERNET, RTOS, SPI, I2C, DHT, ONEWIRE and ESP8266 etc) for interfacing devices.
- Easy to add the board packages from board manager.

C.GPS (Global Positioning System) module used for navigation. The module simply checks its location on earth and provides output data which is longitude and latitude of its position.

D. GSMMODULE:

GSM stands for Global System for Mobile Communications and it is the global standard for mobile communications. It has 4 pins vcc,gnd,tx and rx. GSM supports serial communication, so GSM serial pins connected to the Arduino UNO serial pins. Pin description of GSM module is as shown in table.

Pin Name	Description
VCC	Positive power pin
RX	UART receive pin
TX	UART transmit pin
GND	Ground

Table1 pin description of GSM Module



Fig3: GSM Module

Serial no.	Features
1	Compatible with Arduino and clones
2	Allows you to send SMS, MMS, GPRS and Audio via UART using AT commands
3	it has 12 GPIOs, 2 PWMs and built-in ADC of the SIM900 module
4	Quad Band: 850; 900; 1800 and 1900 MHZ, so it should work in all countries with GSM (2G) networks
5	Control via AT commands
6	Supports RTC (real time clock)

Table2 Features of GSM Module

E. Mapping Between GSM and GPS Module:

The Mapping Between GSM and GPS Module is as shown in table

GPS Module Pin Name	Arduino Uno pin Name
VCC	5V
GND	GND
TX	RX(0)
RX	TX(1)

Table3 mapping of GPS and GSM Module



Fig4: GPS Module

F. Engine Control Unit (ECU):

Engine control unit consists of Microcontroller and relay modules. here relay modules are used to control the motors(start,stop and varying the speed of motor) and control the fuel. if a boat reaches to restricted area then this engine control device used to stop the engine .if boat is nearer to restricted area the engine control unit reduce the motor speed and also control the fuel flow in to the engine.

3. Working Principle:

The theme of the System is to Protect the Fisherman from the Attacks of Foreigners when the fisherman Accidentally crosses the border. This System alerts the fisherman when he crosses the border and Immediately Switches the Motor off. There is a RF transmitter which is kept near the Sea port which covers the signal all over the border and RF receiver is kept in the boat. The ships gets a signal when it is in the border and when the boat passes the border or near to the border line ,there is disturbance in the signal or no signal, this disturbances in signal or no signal is detected by the Arduino and gives supply to the relay(Which switches off the motor from being feed from the supply),GSM (This is used to alert the people in the boat through the phone by messages) and Neo-6m GPS tracker (Which tracks the latitude and longitude of current position and sends information to Arduino).

A buzzer is inserted in the ship which alerts at the time when the boat crosses border. This buzzer sound continues to Sound until the boat captain realizes and moves the ship in to the border line. Therefore this system may help many fishermen and it does not required any skilled persons or educated persons to operate it.The flowchart clearly explains the working of the border protection system. If there is any disturbance in the signal or when it is entering the danger zone near the border then the system immediately intimates the base station about its position. The boat will also return back when it is about to move into danger zone. The buzzer that is placed will track the danger area and makes a sound when the fishermen is approaching near to it.

Thus the fishermen can easily identify the national sea borders and therefore prevents them from entering their area. The system provides high accuracy and high precision values of the Latitude and Longitude. This model proves to challenge the already existing model which just uses a GPS device to track the border and make the boat move backwards .Hence; along with saving lives it also establishes good relationship with the neighboring countries. Piracy of ship can be controlled.

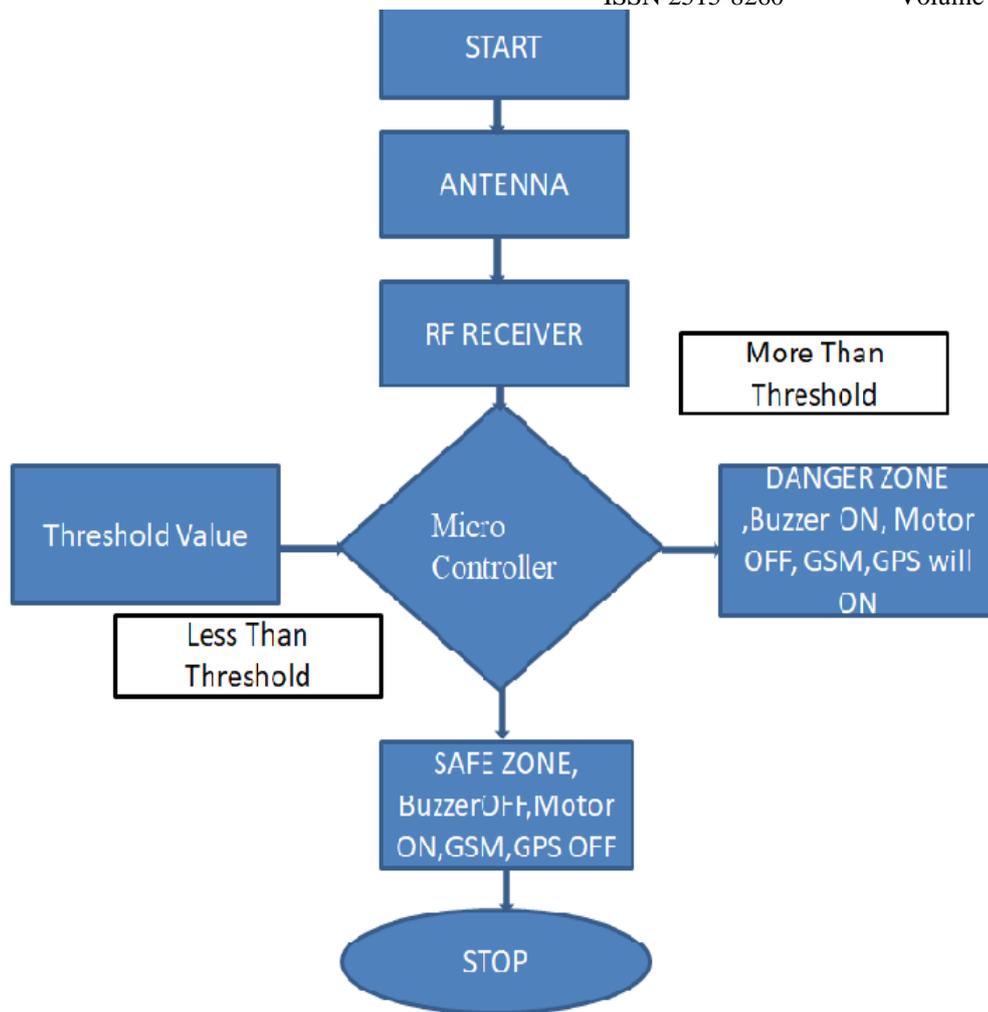


Fig 5: Flowchart of Fishermen border protection system

4. Experimental Results and Discussions

Hence, the kit shows the fishermen border protection system using Arduino UNO and its helps in preventing the lives of fishermen. It continuously monitors the boat and intimates the base station about its position. Thus it is one of the effective way for implementing the safety for fishermen in a beneficial manner.

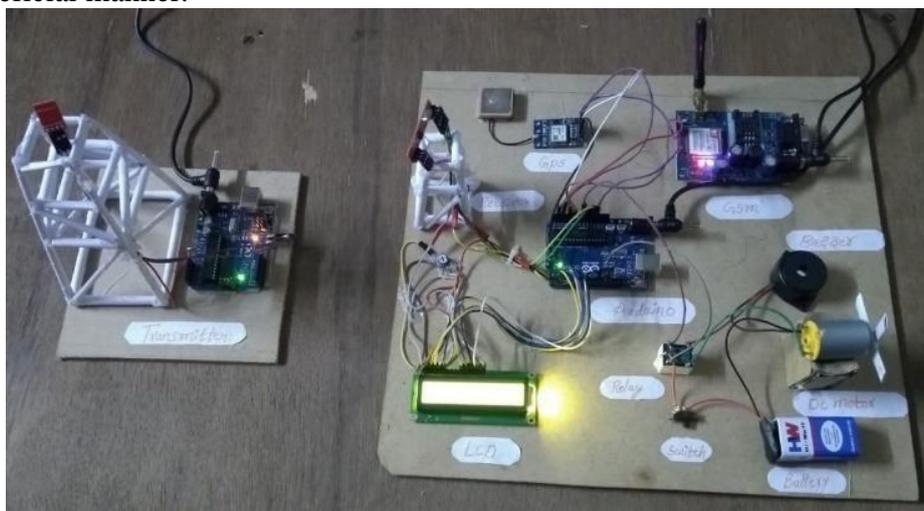


Fig 7: Complete working module of border protection system

5. Conclusion:

Thus the fishermen can easily identify the national sea borders and therefore prevents them from entering their area. The system provides high accuracy and high precision values of the Latitude and Longitude. This model proves to challenge the already existing model which just uses a GPS device to track the border and make the boat move backwards .Hence; along with saving lives it also establishes good relationship with the neighbouring countries. Piracy of ship can be controlled.

6. Future Scope:

We can use the EEPROM to store the previous Navigating Positions up to 256 locations. The process of directing the fishermen can be enhanced by placing the engine control unit system in the coastal office. They remotely control the engine to restart the boat for the safety of fishermen.

- We can reduce the size of the kit by using GPS and GSM on the same module of GPS navigator.
- We can increase the accuracy up to 3m by increasing the cost of the GPS receiver.

References:

- [1] Bhavika Sakre, Bhupendra Amarghade, Pradeep Patwari, Preeti Suryavanshi, Rahul Saratkar, "Vehicle Tracking System Using GPS and GSM", International Journal of Recent trends in Engineering and Research ISSN(online): 2455-1457, Volume 03, issue 04; April-2017.
- [2] Ulhas Pati, Pranali More, Raghul Pandey, "Tracking and Recovery of the Vehicle Using GPS and GSM", International Research Journal of Engineering and Technology (IRJET) Volume 04, Issue 03, March 2017.
- [3] L.V. Rajani Kumari, Y. Padma Sai, Balaji " Arduino Based Abnormal Heart Rate Detection And Wireless Communication", International Journal on Cybernetics and Informatics (IJCI) Vol 5, No.4, August 2016.
- [4] Jim Isaac, the paper titled as "Advanced border alert system using GPS and with intelligent Engine control unit "International Journal of Electrical and Computing Engineering (IJECE) Vol. 1, Issue. 4, June 2015
- [5] timesofindia.indiatimes.com/madurai/85-fishermen-killed-by-Sri-Lanka-in-10-years-Govt/articleshow/15540452.cm
- [6] G. Sivagnanam, A.J. Midhun, N. Krishna, G. Maria Samuel Reuben A. Anguraj "Coast guard alert and rescue system for international maritime line crossing of fisherman" " at International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163 Issue 2, Volume 2 (February 2015)
- [7] Naveen Kumar. M Ranjith. R The paper titled as " Border alert and smart tracking system with alarm using DGPS and GSM" International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE) ISSN: 0976-1353 Volume 8 Issue 1 – APRIL 2014.
- [8] R. Karthikeyan, A. Dhandapani, U. Mahalingham " Protecting of Fishermen on Indian Maritime Boundaries", Journal of Computer Applications ISSN: 0974 – 1925, Volume-5, Issue EICA2012-3, and February 10, 2012
- [9] Abid Khan and Ravi Mishra (2012), "GPS – GSM Based Tracking System" International Journal of Engineering Trends and Technology Volume 3 Issue 2.
- [10] Abid Khan and Ravi Mishra (2012), "GPS – GSM Based Tracking System" International Journal of Engineering Trends and Technology Volume 3 Issue 2.
- [11] Ahmed. M, Ajaz. S, Asim. M, Ozair. M, Siddiqui. M, Mushtaq. Z, "Autonomous Vehicle Monitoring

- and Tracking System” SCONEST 2005. pp.1-3, 2005
- [12] GPS-based vessel position monitoring and display system. Aerospace and Electronic Systems Magazine, IEEE, Jul 1990