A Methodology for Sea Border Intrusion Alert and Black Box System Using IOT

P Jayaselvi, J K Periasamy, M Padma Priya, S Samundeswari

Abstract--- *We have heard many incidents of fishermen shot in maritime boundary which have enraged the citizens of the state. The technology is increasing at a faster pace in various sectors. Security based technological advancement are utilized by us in our day-to-day life. In marine services, knowingly or unknowingly our fishermen find it difficult to locate the border zone. So they are getting captured by the other countries and been arrested. So in order to overcome this issue and provide alert for the fishermen, we propose this system to provide an alert. The system consists of a border alerting section with a microcontroller which provides an alert while nearing the border and helps the boat to go in the reverse direction. The navy is also intimidated with the location of the boat that is displayed on the system using latitude and longitude coordinates. We also make use of a voice IC to utilize it as a black box in critical situations.*

Keywords--- *fishermen; border zone; boat; voice IC; microcontroller; black box.*

I. INTRODUCTION

As we know Global Positioning System (GPS) provides navigation and timing services, with GSM technology we can improve the border security by tracking ships and boats in the oceans and seas. The main reason of developing a system to track the ships is the issue faced by the Indian fisherman's who are being kidnapped by the Sri Lankan navy which is a serious concern. Topographic location of a country border can be obtained with the information of the latitude and longitude of the place and position of the boat. The main objective of the system is to alert while nearing the border using a border alerting section. Whenever the boat enters that section, the motor reverses its mechanism and starts running in opposite direction. We also provide a voice IC to the circuit which acts as a black box. So that once fishermen were lost, we can recover their boat and find the voice IC which contains the stored voice signal.

II. EXISTING SYSTEM

In Existing systems it only enables the fishermen to be aware of the country's border line. The system includes GPS which continuously notify the fishermen.GPS module sends the data to Microcontroller through MAX232. The data contains the latitude and longitude values which are further compared with the predefined latitude and longitude values. The threshold values are set to as normal and warning zone. A comparison is made ,based on that further action is taken. The latitude and longitude values are continuously displayed on a 16X2 LCD that indicates a normal zone and warning zone. If it's in the normal zone, the motor will run at regular speed. If the boat is in the warning zone, the speed of the motor is reduced through PWM technology and the direction of the boat can be

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changed mechanically or through programming. If the boat is in the normal zone, the buzzer will not be functioning. If the boat is in the warning zone, the buzzer will alert the fishermen. GPS (Global Positioning System) technology became a reality through the efforts of the American military, which established a satellite-based navigation system consisting of a network of 24 satellites orbiting the earth. GPS works in all weather conditions ,which helps in tracking locations, objects and persons.GPS technology can be used by any person if they have a GPS receiver. The power supply circuit is also built in the module that can be activated by using a suitable adaptor.

III. PROPOSED SYSTEM

The proposed system consists of a border alerting section which provides an alert while nearing that place. The alert is provided with the help of the Buzzer attached to the controller. Whenever the boat enters that section, then the motor reverses its mechanism and starts running in opposite direction. This makes it easier for us to detect the exact border zone, where the fishermen get captured. We also provide a voice IC to the circuit which acts as a black box. In case if we want to store a voice, signal in case of emergency situations we can store our signal to the voice IC.

So that once fishermen were lost, we can recover their boat and find the voice IC which contains the stored voice signal.

IV. ARCHITECTURE OF THE SYSTEM
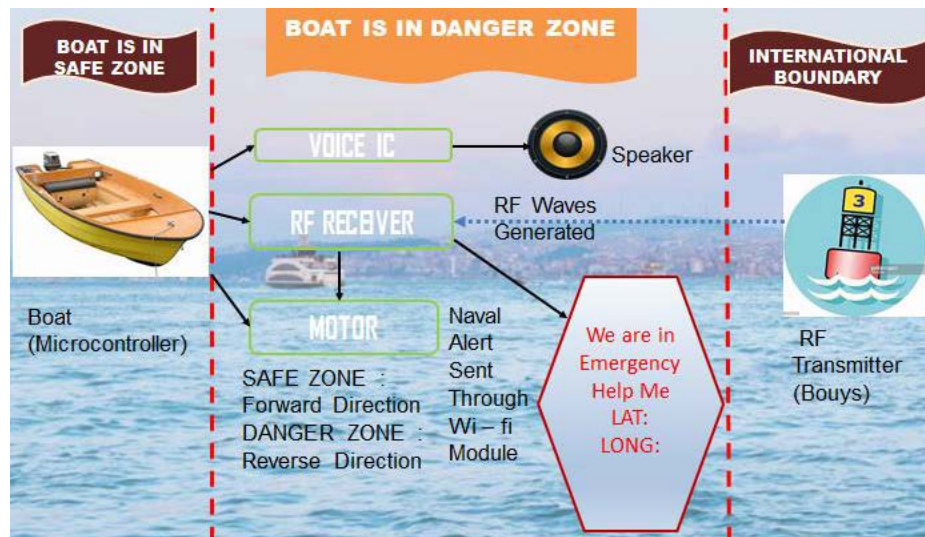
V. LIST OF MODULES

A. Boundary alert system

Interfacing of RF Receiver and Microcontroller

The boat consists of a microcontroller PIC16F8778 fixed inside which is interfaced with a RF Receiver. RF Transmitter is fixed as buoys in the sea which continuously transmit Rf waves. As the boat nears the International

Boundary the RF waves are received by the receiver which in turn sends the corresponding latitude and longitude to the LCD Display.

Interfacing of Motor and Microcontroller

The motor which helps to run the boat is fixed inside. When the RF Transmitter sends its RF waves in the sea, the boat which is nearing the boundary captures the waves through the RF Receiver. This in turn sends the coordinates of latitude and longitude to the microcontroller display. This simultaneously will make the boat to run in reverse direction as the International Boundary is detected.

Interfacing Microcontroller and Voice IC

As soon as the latitude and longitude coordinates of the International Boundary is sent to the microcontroller display, an alert is sent to the Naval Office system. The alert is displayed as a webpage in the system which consists of the latitude and longitude coordinates, alert message, date and time. This will help the officers to correctly identify the location of the boat.
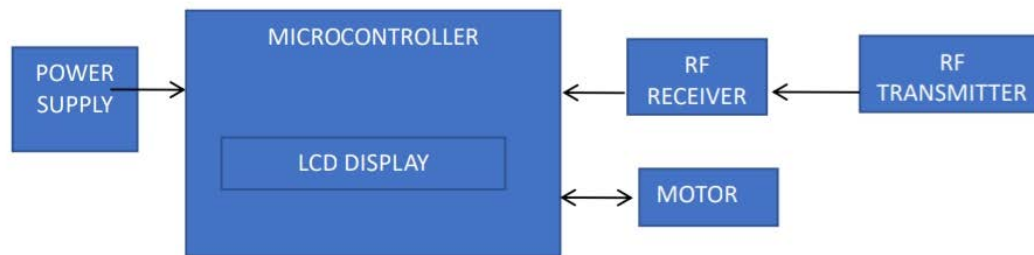

Figure1. Boundary alert Processing

B.   NAVAL ALERT SYSTEM

Interfacing GPS with Naval system.

As soon as the latitude and longitude coordinates of the International Boundary is sent to the microcontroller display, an alert is sent to the Naval Office system. The alert is displayed as a webpage in the system which consists of the latitude and longitude coordinates, alert message, date and time. This will help the officers to correctly identify the location of the boat.
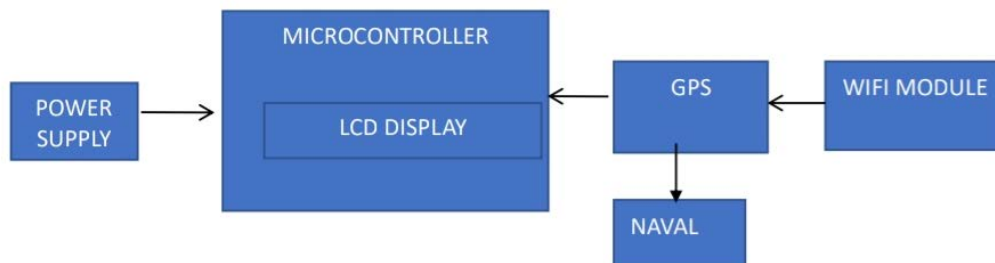

Figure2. Naval Alert Processing

SPLAY

C. BLACK BOX SYSTEM

It is consists of a voice IC and a speaker interfaced with the microcontroller .It can be used to store the voice message of the fishermen during emergency situations .Figure
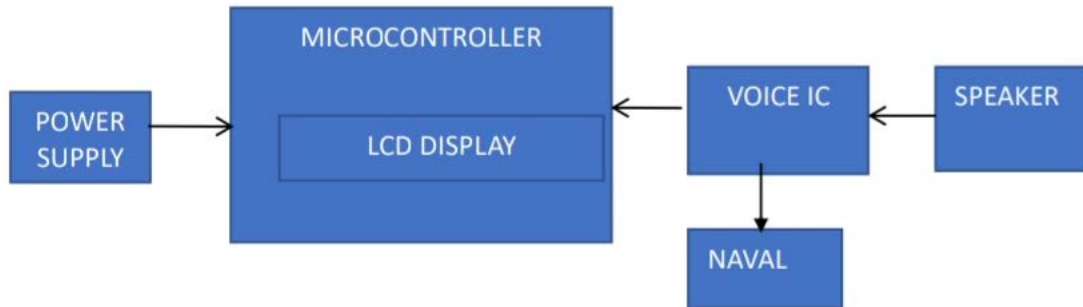

Figure3. Black box system

VI. RESULT AND DISCUSSION

Figure4.When Boundary is not detected.

Figure 5.Displaying latitude and longitude
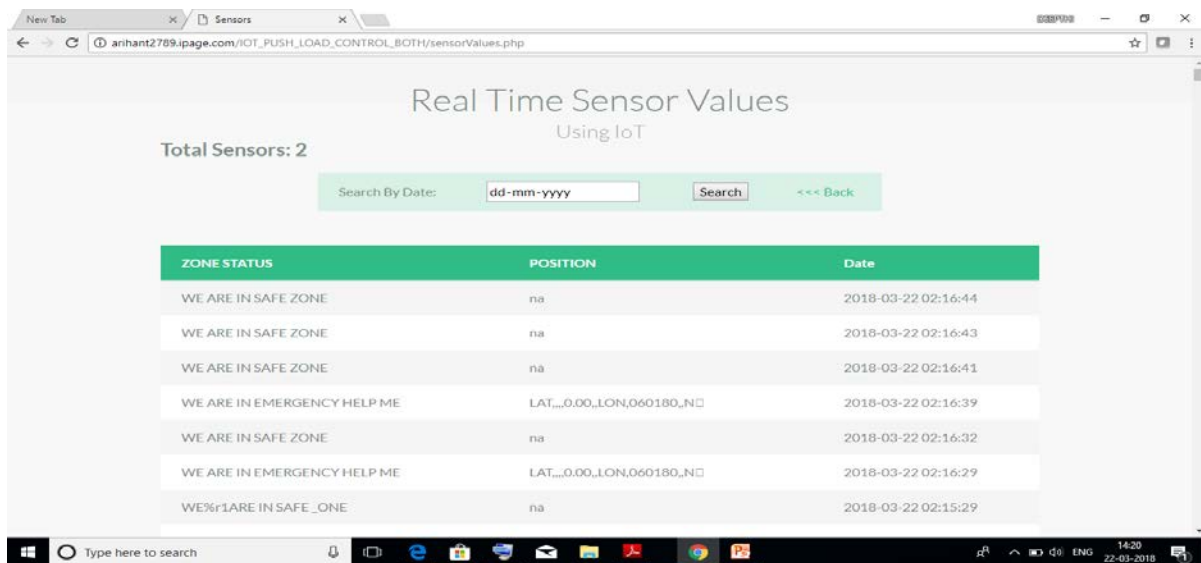
Figure 6. When Boundary is not detected

Figure7. Real time sensor values

VII.   CONCLUSION

An effective technology has been developed to the benefit of fishermen for identifying the International Boundary. The boat automatically runs in the reverse direction without manual effort by the fishermen. A Voice IC is used to record the voice of the fishermen in case of an emergency. A message is sent to the naval office with the corresponding latitude and longitude with an emergency message. Also, it helps in minimizing unnecessary financial losses, property losses, and lives losses with minimal efforts of fishermen.

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