A. Palanisamy, 2021, 9:3
ISSN (Online): 2348-4098
ISSN (Print): 2395-4752

Border Line Dispute Ship Border Security System for Fishermen using Wireless Communication

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Abstract- The adoption of IoT system assures to be the best for various alert system and prevention purposes in risk factors. Our approach attempts to assist the fisherman in safety calls and avoidance of danger situations. To aid the fishermen in prevention of crossing the prohibited border in sea, we have designed an embedded system to notify sea border of our country by using IOT and RF Transceiver. The embedded unit control overall system performance and compare pre-defined and present value of fisherman position and inform to them about their current location whether they are in safety zone or restricted zone. IOT and RF communication units provides location of all zones of sea. The embedded unit interface with fisherman by LCD display. The system aims at providing a system that will alert the fishermen well in advance and ensure maximum safety and peace at the border and also notify the patrol system in emergency time by software. This will help and increase safety of fisherman life.

Keywords:- RFID, Analysis, alert, warning, rescue.

I. INTRODUCTION

Recently unmanned border patrol system consisting of high tech devices, like unmanned aerial vehicles, surveillance towers equipped with wireless camera used to monitor fishermen whose family's main economical support is fishing.

From Tamil Nadu about 18,000 boats of different kinds conduct fishing along the India-Sri Lanka border. But accidentally crossing border without knowledge, they get shot by the Lankan navy. This leads to loss in the both humans as well as their economic incomes.

We have developed a system which eliminates such problems and saves the lives of the fishermen. Border systems have recently achieved interest to address concerns about national security.

The major problem in protecting long stretches of borders is the need for large human involvement. This system is designed to avoid such kind of accidents and to alert the fishermen. In Tamilnadu about 20,000 vessels make spinning routinely stay into the International Maritime Boundary Line (IMBL) of India- Sri Lanka for fishing.

II. MATERIAL AND METHODOLOGY

The proposed system consist of two categories as,

- Monitor
- Rescue

The proposed system is used to detect the maritime boundary of the country where the long time dispute between Sri Lanka and India still exists.

This mainly happens when fisherman crosses maritime border of neighboring country as he is not aware of the limits in sea. The proposed border alert system is designed to protect the innocent life of fisherman.

The main contribution of this system alerts the fisherman and rescues them from international maritime line crossing punishments. This system uses RFID Reader to monitor and track the movement of spinning boat vessel which is strayed in sea. It also

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uses a message transmitter to send message to the base station which monitors the boat s in the sea.

- More accuracy
- Better user interface via Map
- Accurate locations with the help of RFID
- Works long range data transfer using Lo-Ra Communication

The existing system using a GPS receiver which receives signal from the satellite and give the current location position of the boat. The existing system is used to detect the border of the country through the specified longitude and latitude of the position, not only between Sri Lanka and India but all over the world.

The particular layer level i.e. border can be predefined and this can be stored in microcontroller memory. The current value is compared with predefined values and if these values are same, immediately the particular operation will be done i.e., the microcontroller gives instruction to the alarm to buzzer.

- Lack of unawareness causes accident
- No alarming and warning system is present for Emergency
- No security system is present which causes loss of life

As the name suggests, main aim of the system is to prevent fishermen's from crossing boundaries. ESP 32 acts as a main control block of the proposed system.

RFID Transceiver is interfaced to the system using UART protocol. Modem continuously transmits the data containing location and other information. This data is read by the microcontroller which fetches the location information. This information is in the standard NMEA protocol data format. RFID Module Monitors

The Ship Location, Whenever The Ship Crosses The Fixed Boundary Line, It Will Buzzer On And Send He Data Information through Lora Transmitter To Get Emergency Help. Microcontroller is pre-programmed with boundary location for that particular geographical area. It continuously reads data from the GPS and compares with the boundary location; if the current location to be found is nearer to the boundary the microcontroller alerts the user using a buzzer.

1. Ship Setup - Transmitter Side:

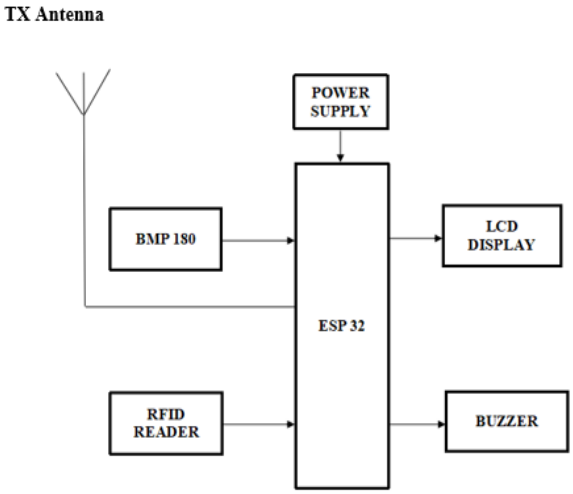

Fig 1. Block diagram for ship setup at transmitter side.

2. Receiver Setup:

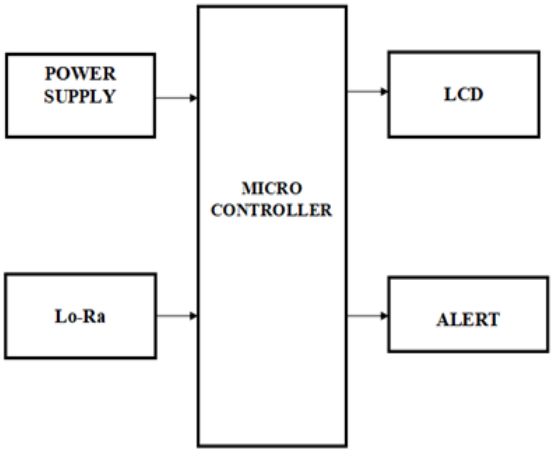

Fig 2. Block diagram for Receiver Setup.

3. RFID Reader and Tag:

Radio-Frequency Identification (RFID) is the use of radio waves to read and capture information stored on a tag attached to an object. A tag can be read from up to several feet away and does not need to be within direct line-of-sight of the reader to be tracked.

4. Buck Converter:

The buck converter is a ubiquitous DC-DC converter that efficiently converts a high voltage to a low voltage efficiently. Efficient power conversion extends battery life, reduces heat, and allows for

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smaller gadgets to be built. The buck converter can be used in lots of cool applications.

5. Buzzer Module:

An Active Buzzer Alarm Module for Arduino is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

6. ESP 32:

ESP32 can perform as a complete standalone system or as a slave device to a host MCU, reducing communication stack overhead on the main application processor. ESP32 can interface with other systems to provide Wi-Fi and Bluetooth functionality through its SPI / SDIO or I2C / UART interfaces.

7. Push Button:

A push to make switch allows electricity to flow between its two contacts when held in. When the button is released, the circuit is broken. This type of switch is also known as a Normally Open (ON) Switch.

III. RESULTS AND DISCUSSIONS

The experimental setup for border alert and safety system is initially when the motor is started the system is also switched on and the GPS location of the boat is tracked continuously with the help of software.

When the boat is approaching the border of the other countries the signal is sent to the microcontroller and an alert message is displayed on LCD display and also a voice alert is given to the people on boat. Along with the alert, a signal is sent to engine of the boat through microcontroller and the boat stops automatically. Later the boat can be started manually and navigated in the safer direction.

In case if the boat is facing any danger or if they are lost in the sea, system has a feature of emergency switch which can be pressed. At this point of time the location of the boat is sent to coastal guards By knowing the current position of the boat, coastal guards try to navigate them back to shore by assisting the directions i.e. east, west, north or south based on the boat's current location which will be sent as a voice message and also sent as text message and is displayed on LCD board.

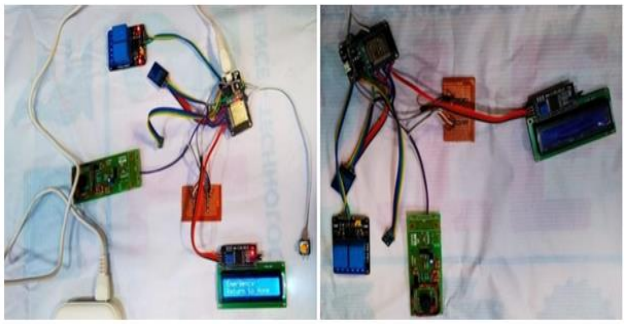

Fig 3. Images of Kit.

IV. CONCLUSION

Risk of fishermen in border line due to unknowingly crossed the border could be reduced by this system. Thus saving their lives and providing good relationship with the neighboring countries.

Also, the piracy of ship can be easily brought under control. It is not easy to find the border range as in land for anyone in marine region. When they crossed the border limit they have to pay penalty or got arrested by neighbor country navy guards.

This project helps the fishermen to guide by navigation and alerting system them when reached the border limit. By using emergency switch fishermen can be navigated back if they have lost their way in the sea or can be sent help if they are in danger.

This concept of vessels tracking may enlarge to individual's vehicle security, with the RFID transmitter. Forecasting images which helps the fishermen by providing the information where the more number of fishes had been locating. Accuracy and more range of transmission will be achieved in future.

V. FUTURE WORK

In future following features can be added to the project and enhanced.

- By keeping kits in all boats and by knowing the locations of all the boats we can use kits to assist the traffic.
- By using IR sensors, the obstacles which can damage the bottom of the ship can be avoided.

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- The density of the fishes can be found ny using the sensors.
- The fishermen can be assisted by making use of the weather reports.

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