



Smart Engine Based Border Security System for Fishermen

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Abstract— The technology of Received Signal Strength Indication (RSSI) is used to provide Border security anywhere anytime. This module can be installed in any type of boat. The existing system is not that useful with security, It gives only the border details, whereas in this module Radio frequency signal is measured, zones are divided accordingly and regional voice alerts are given. Before starting the boat, Rain Prediction is done, engine starts only if the weather is safe and good to go. The speed of the boats is controlled with respect to the zones as a safety measure. This module is created especially for the Tamil fishermen who unknowingly enter the Sri Lankan border and got arrested or killed. An emergency button is given in case of any emergency like a pirate attack, storm, etc. if the button is pressed it shoots the flare gun, and the current boat's GPS coordinates are sent to nearby boats for help with an emergency help message.

Keywords— Machine Learning, Rain Prediction, Border Alert, RSSI.

1.INTRODUCTION

Peoples living near the border can use this programme to their advantage to locate the best route to their destination. Prior to the civil war in 1983, there was no border issue and no controversy. Currently, territorial division is a key idea in international relations between countries on the coast. In our world, countries are divided by International Maritime Boundary Lines. This was initiated by United Nations Convention on Law of the seas. This border encourages economic growth. Also, it aids in the prevention of criminal and terrorist acts. The tourism-transportation-network-economy triplet is the definition of a marine border [2]. The maritime border benefits the country economically and supports the travel and tourism industry. Marine spatial

design standardizes tourism coastal economic movement [9].

The state has special rights because of UNCLOS to make use of the marine resources and economic zones of the sea.[3] The special economic sea zones for fishing and trade within international waters which is shared number of nations like Saudi Arabia, Egypt, Iran, etc. [7] Marine parts have a great impact on a country's economic growth. The UN is responsible for ships not polluting the sea and for security, safety, and worldwide shipping.[1] International Maritime Organization (IMO) is started for tracking the service, Security, and traffic. It is necessary to accomplishing the UN-set objective for sustainable development.

In UNCLOS, countries have special rights to investigate and use the resources of marine in special economic zones of the sea.[7] Many countries share their zones for fishing and trade. The development of the nation's economy is great mainly because of the sea trade industry. UN maintains safety and controlled shipping in seas.[1]A system was developed by the International Maritime Organization to monitor maritime services, security, and traffic (IMO). It is necessary to achieving the UN's goal of sustainable development.

Due to their inability to discern the maritime boundaries between two nations while they are fishing, the fishermen's lives could be in significant danger, including the possibility of being killed and arrested. Our fishermen are accidentally crossing the border, and foreign national security guards kill or imprison the fishermen. The issue of the fisherman has come up frequently [5] despite the close relationship and advanced understanding that currently exist between India and Sri Lanka. Sometimes, in the context of domestic maritime boundary politics, the alleged detention and killing of Tamil Nadu fisherman by the Sri Lankan Navy becomes a big human rights issue.

The conflict between the China and the ASEAN countries over China's Nine Dash Line Claim is then raised [9]. China



disputes its boundaries with other neighboring countries, which regularly results in transgressions in the East Sea. [6]. Thus, it is vital to identify marine borders and inform fishermen [4]. For 600 fishermen, crossing the frontier in 2015 proved dangerous. Every year, the risk of becoming a fisherman increases [1]. In order to avoid danger, fishermen should be informed before they arrive at the border. Yet, the system for alerting border crossings is currently insufficient for automatically supporting fishermen. Hence, the goal of the system we've developed is to keep an eye on the fishermen and encourage them to use smart boat vessels to explore the sea within our country's borders. Effective assistance is provided to the fishermen as a result of dialogue with coast guard officials. The section two literature review is there. Part 3 provides descriptions of the engine control unit, GPS, and border alert system. Part 4 describes results and the options, and Part 5 concludes the paper.

2. LITERATURE SURVEY

The (IoT) Internet of Things, which is the one connects billions of sensors worldwide, significantly advances the Internet portfolio of technologies. Technology developments in the Internet of Things are influencing a variety of economic sectors, such as communications, computing, construction, and logistics. The rapidly developing Internet of Things technology will fundamentally change how people live. IOT devices' compute and storage are offloaded onto the cloud environment in order to perform their operations intelligently, making it their client. Scalable and affordable solutions can be made by using cloud-based IOT software. A border alerting system using GPS and LoRa is discussed in this article.

A Low Cost Maritime Boundary detection gadget utilizing GPS system was developed by Suresh and Sharath [8,3] for fishermen's navigation the route and not crossing the nautical border. Surekha et al. recommended a module with an ARM CPU. The travelling vessel is tracked using GPS, and the fisherman is notified when he/she crosses the line. This border crossing data will also be sent to the control part through a ZIGBEE transmitter module. Naveen and Ranjith presented a idea of using DGPS and GSM for international border alerts and smart tracking system with built-in alarm. The boat's current location may be identified using DGPS. This system sounds an alarm if the border is crossed. Also, the GSM sends border crossing information to the Naval control room and family members of the boat owner on a recurring basis for illegal crossings of international maritime boundaries. A GPS (Global Positioning System) receiver built into the boat helped pinpoint the fisherman's exact location. The proper Coast Guard station receives this position via GSM(Global System for Mobile communication). Jim and Eugene gave a Improved Border Warning Module Using GPS and Intelligent Engine Controller Unit, which is meant to stop fishermen's boat from travelling close to the border of another country.

International boundary scanning system and vessel monitoring system, proposed by Pamarthi Satyanarayana et al., March 2017. The sea or ocean also forms the borders of the islands, peninsulas, and coastal nations. Fishing is the primary occupation of the majority of people in coastal locations. Others transport visitors aboard ships. Many people, particularly fishers, violate boundaries without being aware of them. This is one of the causes of cruelty that crosses borders [7]. Their boats are being taken, and they are being kidnapped. Sometimes it also causes a loss of life. Manual boundary line measurement and coordination with the navy are significant issues. Our paper's main goal is to prevent such incidents and warn shipboard passengers about boundaries. GPS is used in our suggested system to identify borders, and an alarm system is supplied to warn fisherman. Wireless communication is also utilized to establish communication between a ship and navy control and to send information. Uses include defense and border scanning. The suggested approach can efficiently inform shipboard passengers about boundaries and crew members about mishaps, enabling them to receive the assistance they need [8]. Boat direction approaching the border can be controlled by the driver unit.

3. EXISTING SYSTEM

The present system's embedded technology, which makes use of an Arm microprocessor for RFID, can prevent this (Radio Frequency Identification). There are three limitations on cross-border travel.[10] The last state border will be the border between the two nations, with the other two borders initially coming under the control of the parent nation. The Indian government will keep an eye on the initial two border crossings. While they are crossing the first two boundaries, the fisherman is notified by warning devices like a speaker (a buzzer) and an LCD display.

❖ DISADVANTAGES

- Speeds and memory bandwidths are constrained in these situations because some ARM processors operate at specific clock frequencies.
- Debugging is challenging because of how the instructions are scheduled.

4. PROPOSED SYSTEM

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❖ **ADVANTAGES**

- The fisherman can therefore quickly recognize the maritime borders of their country, preventing them from entering their territory.
- The technology provides values for latitude and longitude that are highly accurate and precise.

❖ **BLOCK DIAGRAM**

➤ Receiver Section: Boat

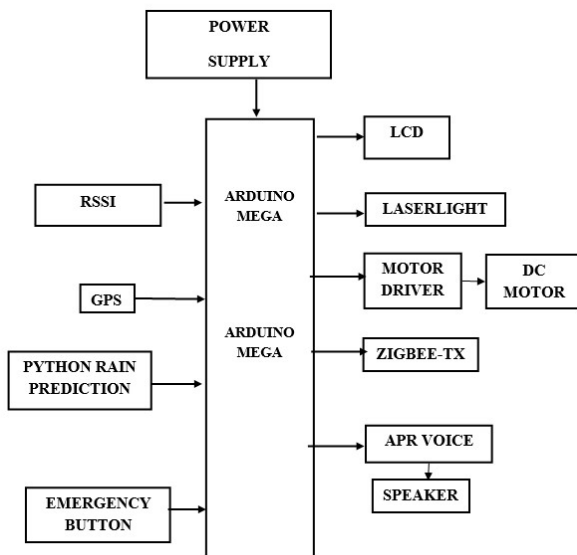


Fig.1 Schematic Diagram of boat

➤ Transmitter Section: Harbor

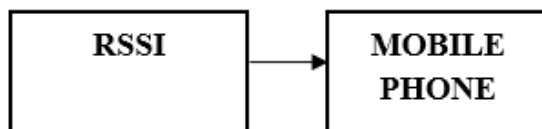


Fig.2 Schematic Diagram of harbor

➤ Transmitter Section: Boat Emergency Alert System

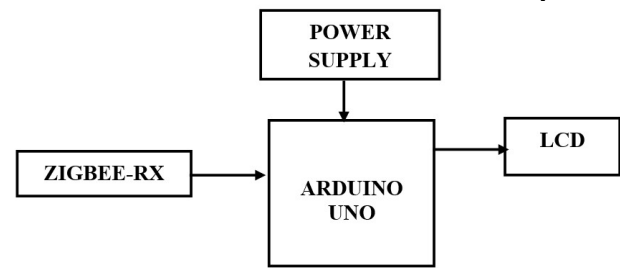


Fig.3 Schematic Diagram of emergency boat

❖ **DESCRIPTION**

➤ **ARDUINO**

Electronics open-source platform UNO The hardware and software that make up Arduino are easy to use. A board with a microprocessor is called an Arduino Uno. Arduino UNO has 6 Analog input/output pins, 14 digital input/output pins, 16MHz Crystal Oscillator, USB Port, a Reset button.

The designs for microcontroller boards created with a variety of microcontrollers are the basis for the article. The board contains serial connection interfaces, including USB on some models, to load programmes from personal computers. The Arduino paper introduces an integrated development environment (IDE) based on a programming language.

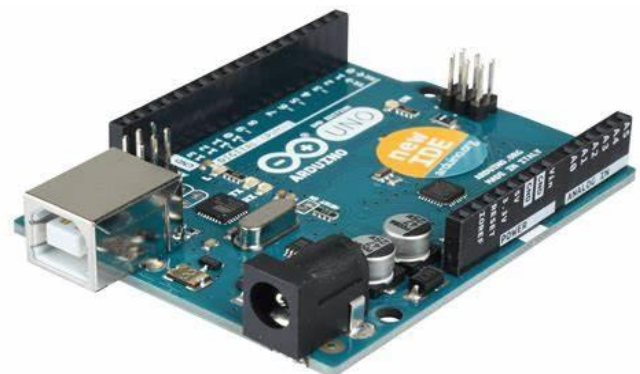


Fig.4 Prototype of Arduino Uno

➤ **GPS MODULE**

Any place on or close to the earth with a line of sight with no obstruction. GPS satellites receives geographical location and information of time from the GPS Module. The user does not need to transmit any data in order for the GPS system to work, and it is not reliant on cellular or internet reception. The GPS system gives users in the Army, Construction, and Commercial sectors around the globe essential locating capabilities. The GPS constellation sends its location and time in real-time. A GPS receiver invigilates number of satellites and solves an way to estimate the precise position and the time difference from true time.



Fig.5 Prototype of GPS Module

➤ LCD DISPLAY

The result is displayed using LCD (Liquid Crystal Display) technology. The same 14 pins (0–13) or 16 pins are used in all LCD displays (0-15). Several applications call for alphanumeric displays. The sizes range widely. A large number of global corporations produce their own unique type of LCDs for use in their devices. If LCD is connected to a microcontroller, the power supply shouldn't be more than 5 volts.



Fig.6 LCD Display

➤ 12 Volt POWER SUPPLY

For the internal components, a power supply unit converts Alternating Current AC supply into regulated DC power, which is low voltage. Power supplies come in two varieties: switched mode and linear mode. Transformers are used by linear power supplies to lower the voltage.

➤ ZIGBEE

In order to satisfy low-cost efficiency, low powered wireless IOT networks, the open global std Zigbee was developed as a wireless technology. For sensor and control networks, Zigbee communication was developed specifically. The 2.4GHz, 902-928MHz, and 868MHz frequencies that the Zigbee WPANs use for operation. This communication technique is less expensive and simpler to utilize when compared to current commonly used short-range wireless sensor networks like Bluetooth module and WIFI module.



Fig.7 Prototype of Zigbee Module

➤ BUZZER

A buzzer is an audio signaling device. It is a Proper system of electrical transducers. An buzzer, which is active can be directly linked to a sound source that is rated for 5V. Beacons and buzzers are frequently used in alarm clocks and timers. By just supplying D.C. voltage, it produces a steady single tone sound.

➤ DC GEAR MOTOR

The DC motor is a dependable industrial alternative for high power as well as low power, variable speed electric drives and fixed. It is used in everything from low-cost kids toys to technologically advanced systems.[10] They are manufactured in a low cost and are utilized in power tools and other household equipment with variable speeds. An electric motor, gears, or a gearbox are all included in gear motors.



Fig.8 DC Gear Motor

The use of a gear motor makes it easier to integrate a motor and gear reducer system. To reduce the motor's speed while boosting its output torque, gears are utilized with motors. A gear motor modifies the motor's speed and torque to suit the application by adding mechanical gears. Typically, such an augmentation works to improve torque while decreasing speed. The use of a DC motor without gearing is widespread.

5. RESULTS AND DISCUSSION

The boat module and the nearby boat module are included in this fully functional prototype model of our idea, which also includes a mobile device and its hotspot being utilized as the harbour module.

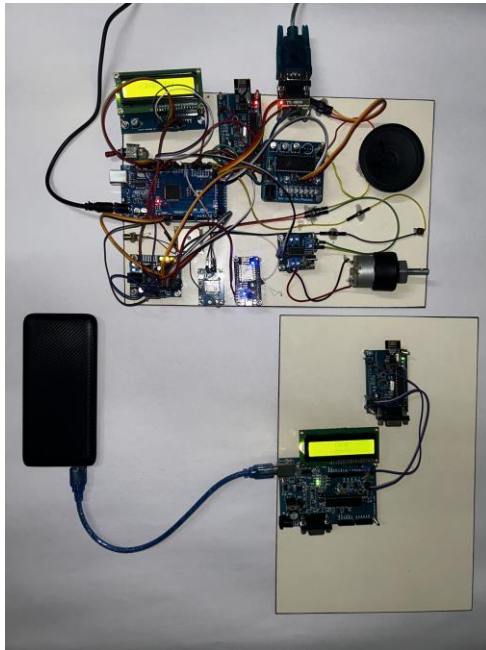


Fig.9 Fully functional prototype model.

When the emergency button is pressed, the current boat's GPS coordinates are broadcast to adjacent vessels along with an emergency alert message, and the laser light is turned on to signal for assistance. As it is a prototype laser is used in real time flare gun will be used.

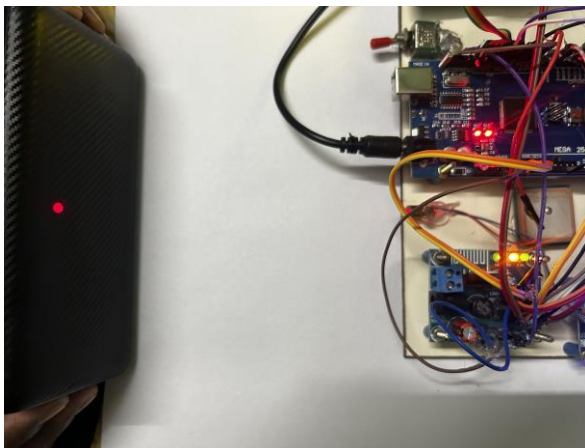


Fig.10 Laser Light



Fig.11 Emergency alert with GPS Coordinates

The region is divided into three sections: safe, moderate, and danger zone.

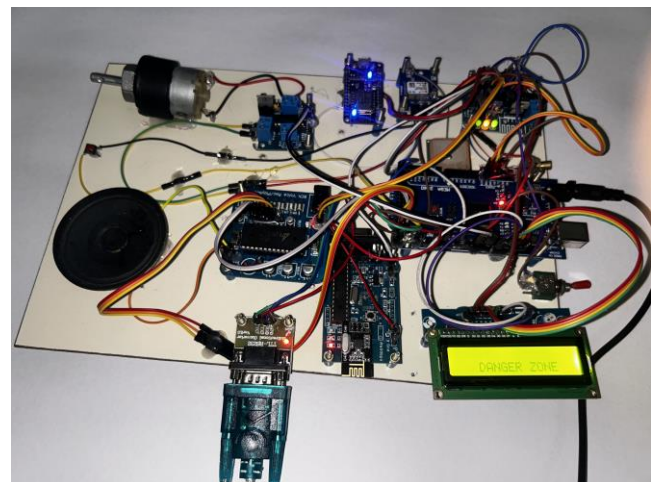


Fig.12 Danger zone alert

5. CONCLUSION

The poor environmental International Journal of Engineering Research & Technology (IJERT) conditions and the lack of innovation in rescue efforts, local alert systems are essential for fishermen. These issues with neighboring countries are ones that they face in real life. After pondering over the issue, we suggested a simple weather warning system for fishermen that enables them to maintain tabs on their loved ones, friends, and other fishermen.

If any fishermen experience issues like unforeseen climatic changes or catastrophes, this approach might be helpful to



them. We are now using sensors such as temperature, humidity, wind speed, and rain sensors to keep an eye on the weather conditions in the fishing region. This implies that there is a crisis button that the angler can press to send an alarm to the specific primary server where, in the event that the weather is unfavourable, further preparations will be made and a bell will start to ring to warn the other passengers. These sensors continuously monitors the fishing area and send the data to the server using Zigbee module whenever the angler needs any assistance. In normal weather circumstances, the main server continuously updates the data from the pontoon's sensors and GPS area, which is also shown on the LCD display.

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