



**Article Title: Fisherman Border Alert System Based on IOT**

## **Fisherman Border Alert System Based on IOT**

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### **ABSTRACT**

An IOT-based fishermen border alert system was proposed in this project. Due to their methods of surviving, fishermen are forced to accidentally cross borders where they run the risk of being murdered or captured. The fundamental cause of this issue is the difficulty in identifying the marine borders between countries. By utilising the most recent GPS and GSM technology as well as Internet of Things (IOT) monitoring, this system is intended to prevent such accidents and to warn fisherman about border areas in advance. An embedded device that alerts fisherman to the country's boundary using the Global Positioning System (GPS) safeguards them from harm. Sensor data is gathered and modified using an Arduino Uno (microcontroller) using an ATmega328p chip. The sensors used in the microcontroller are ultrasonic sensor, flame sensor, temperature and humidity sensor. The location of boat is determined using a NEO-6M GPS receiver module. GPS location is acquired and uploaded to IoT cloud using the ESP8266 wi-fi module.

**Keywords:** Internet of Things, Global Positioning System, Border alert, Communication.

### **1 Introduction**

It has become essential to be aware of one's safety in today's, unsafe environment. When fishermen travel by boat to their fishing locations, their hazards are at their highest. Even today, the fishermen from Tamil Nadu continue to use their historical rights to frequently enter an International Maritime Boundary Line (IMBL) for fishing [2]. Global System for Mobile Communications, Wireless Networks, and RF Communication Systems may be the best options for resolving a marine border crossing issue [6]. A GPS route device might be a tool designed to find natural space especially using data from GPS satellites. The optimal solution for this issue is a GPS-based border alert system, which notifies the fisherman by voice anytime anyone is going to cross the border and also shows the boat's speed on an LCD. So that anyone can turn around after that [1-2]. Include a voice IC in the circuit that serves as the black box. We can store our signal to the voice IC in the event that need to store a voice in the event of an emergency [9]. The tracking in this case is entirely dependent on the device, not the signal or network being used at the time. The notification will be forwarded to border security officials, who act as the server for all other gadgets used by passengers on ships. [3]. Location of IOT



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and RF communication units for all maritime zones. The LCD display used by the integrated unit to communicate with fishermen [8]. The control unit also uses an RF transceiver to send the coastguards the boat's current location while stopping it from moving any further. This is accomplished when the boat is within 200 meters of an international border. Additionally, utilising RF technology, the boat was automatically turned in the appropriate direction even when an alarm system failed to notify a fishermen [4-5]. In order to prevent them from crossing the Indian border, this gadget was developed. As a result, the fisherman will be stopped in the actual warning zone. Naval authorities can protect the fisherman by using the centralized data monitoring unit [7-10].

Furthermore, the suggested study illustrates a border monitoring system employing an inexpensive Smart Controller that communicates with an IoT platform that offers vast storage capacity and quick data accessibility. The following summarizes how the paper is organized: The conventional work is described in Section II. The planned work and its performance are presented in Section III. Section IV provides border alert results. The suggested work and its application are summarized in Section V.

## **2 Recent Works**

S. Niveda et al [2021] [11] have asserted that RF technology is used to produce the alert. If the first approach doesn't work, use this one to change the boat's path. Fishermen utilize it when they are less than 100 metres from the boundary. The lives of the fisherman are protected, and it is feasible to maintain positive relations between the neighboring nations. The bandwidth of the wireless network is very low. It's pretty pricey.

Kumar Harsh et al [2019] [12] have presented a physical tracking device that uses adaptive algorithms to implement it. Save the lives of fishermen while also improving relations with our neighboring nations. These systems not only warn the fishermen about the borders, but they also use GSM to send messages to the base station. It is more adaptable. The system has a significant maintenance cost and is insufficient to pinpoint the ship's location with precision.

K. T. Krishnamurthy et al [2018] [13] a microcontroller is constructed, together with an RFID tag. The fishermen's information is enrolled using the VB software. Any tiny fishing boat that supports rechargeable batteries may be equipped with this technology. Due to audio visual indicators, fishing equipment is easy for illiterate people to use. It becomes essential to have precise position information. It is expensive.

D.Mohanapriya et al [2019] [14] A technique and algorithms have been implemented for flawless tracking based on the welfare number. It is possible to fully monitor the precise location and board. The manual operation of this system is simpler. Absence of a boat stopping system. Less efficient use of time.

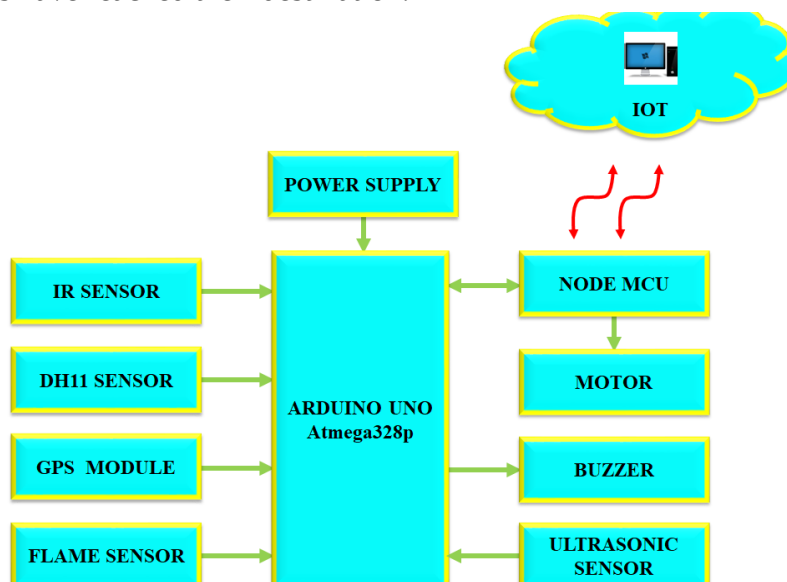
S.Srinivasan et al [2018] [15] devised a method that uses wind speed sensors to automatically monitor the weather. Both the transmitter and the receiver use the Lora wireless technology. Communication is made very simple. Accurate location determination. Low maintenance

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costs. This maritime border crossing problem may also be caused by a lack of coast guard security alerts. The fisherman must be saved by the coastal guards when they are in trouble. The short-range wireless communication system transmits and receives data.

### 3 Proposed Work Explanation

The suggested system involves a border alerting portion that provides a warning as it approaches that location. The controller's associated Buzzer helps to convey the alert. Figure 1.1 illustrates the block design of the suggested system, which makes use of a GPS receiver to locate the boat right now by receiving signals from satellites. The ships are equipped with GPS and Wi-Fi modules. GPS module allows us to ascertain the position's latitude and longitude after these ships have reached their destination.



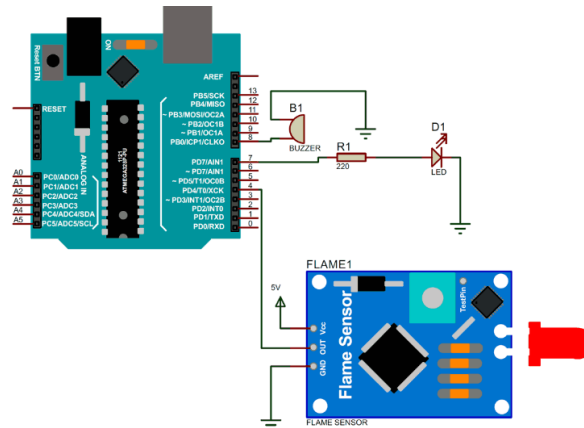
**Figure 1.1:** Block diagram for proposed system.

The suggested system can be used to identify a country's boundary anywhere in the world by using the position's longitude and latitude. This includes the border between Sri Lanka and India. Border coordinates can be predefined and saved in a microcontroller's memory as the specific latitudes and longitudes. The fisherman will be alerted when their boat is close to the border by the GPS, which will also sound a buzzer and turn on a red light. They will then be able to quickly return from the border. The microcontroller instructs the alarm to buzzer after comparing the current value to specified values and determining that it is the same. Additionally, a message transmitter is used to deliver the message, which is shown on LCD as "Warning! Do Not Cross" to base station that keeps track of the maritime boats.

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### 3.1 Flame Sensor

One type of detector, called a flame-sensor, is primarily made for both reacting and detecting to the occurrence of a fire or flame. Its fitment may affect how a flame detector responds. In addition to a fire suppression system, it has an alarm system, a propane line, and a natural gas line.



**Figure 1.2:** *Interfacing Arduino with flame sensors.*

In Figure 1.2, the flame sensors' interface with Arduino is depicted. Based on the Infrared (IR) wavelength emitted by the flame, the flame sensor determines whether there is fire or flame present. If a flame is detected, it outputs logic 1; otherwise, it outputs logic 0. In addition to performing additional functions like turning on the buzzer and LED and sending an alarm message, Arduino Uno also checks the logic level on the sensor's output pin.

### 3.2 Buzzer

Figure 1.3 depicts a buzzer or beeper, an audible signaling tool that can be mechanical, electromechanical, or piezoelectric (piezo for short). Timer alerts, train announcements, alarm clocks, and confirmation of human input like a mouse click or keyboard stroke are a few examples of buzzers and beepers in use.



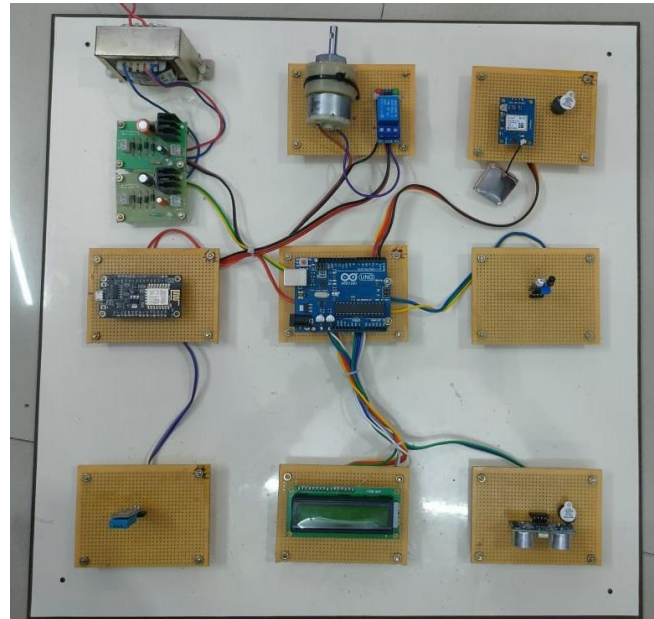
**Figure 1.3:** *Buzzer.*

This is generally used to transform audio signals to sound. It is frequently used in printers, computers, etc. and is powered by DC volts.

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#### 4 Results and Discussion

A border warning system is used to locate the boundary and warn fishermen when they are in danger. It determines whether the fisherman is within the warning range or not by comparing the GPS value it obtains with the recorded value in the microcontroller.



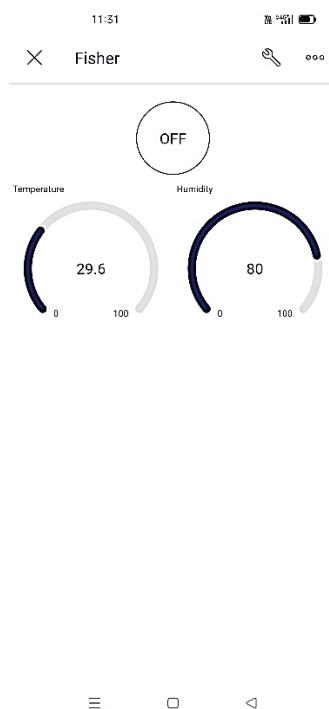
**Figure 1.4:** *Hardware Setup.*

The proposed system's hardware is shown in Figure 1.4. It uses an Arduino Uno microcontroller with an ATmega328p chip. Ultrasonic, flame, temperature, and humidity sensors are among the sensors employed by the microcontroller. NEO-6M GPS receiver module is used to locate a boat. The GPS location is downloaded to the Internet of Things cloud using the ESP8266 Wi-Fi module.

The Arduino Software allows users to construct computer programs called sketches (IDE). Text editors were used to create these graphics, which were then saved as files with the .ino extension. Embedded C programming generally necessitates non-standard changes to the C language in order to accommodate additional chip functionality. To monitor the Figure 1.5 shows text output from a complete error messages, Arduino Software (IDE) and other information. In order to preserve the lives of the fisherman, the temperature and humidity of the boat are sent to the coastal guards.



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**Figure 15:** *Software Output.*

## 5 Conclusion

The fisherman can recognize the national maritime borders with ease, preventing them from entering the border zone. As a result, it preserves lives and fosters positive relations with the neighboring nations. The proposed alarm system would effectively address the issue facing fisherman and stop them from crossing international borders. This verdict will prevent several fisherman from dying at the border. As a result, the project's major goal is to support good relations between two nations. Fishermen's life span will improve while the death rate will decline.



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