IOT Based Fisherman Border Alert System using ZIGBEE

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ABSTRACT

In our regular day to day existence, we have overcome many incidents on Indian fishermen caught arrested or even killed by Sri Lankan navy. However, it's an "unsubstantiated allegation". Asserting that its personnel is not authorized to open fire in such situations, the major cause set to be the negligence of the anglers who aren't aware of the Maritime borders. Indian fishermen enter Sri Lankan boundary unknowingly. In major areas it's impossible to know the exact border without the help of the GPS, the GPS gets the coordinates from the PIC microcontroller and wireless transmission of information is transferred from ZigBee tracking unit to the monitoring unit that store the coordinate of the exact location and if the anglers cross the border the microcontroller signals the ignition to set off, so that the anglers don't have to cross the maritime border as well as the life of the fishermen's is saved and the coordinates of the anglers is sent to the listed members or the naval officers as SMS(Short Message Service) who can rescue the fishermen's on time.

Keywords: *GPS, ZigBee, PIC, SMS.*

1. INTRODUCTION

The anglers in Tamil Nadu even today struggle for the common rights into the International Maritime Boundary Line for angling. India gave away Katchatheevu Island to Sri Lanka in 1974. The water around this island has copious ocean assets and Indian anglers erroneously cross their border to get more assets which in turn lead the Sri Lankan naval force to capture or shoot the fringe crossing fishers, this happens deliberately or might be caused by carelessness yet in view of this issue numerous dissent and civil arguments are occurring which has not settled even in the constant. This minimal effort model can spare the lives of the fishers and can convey a legitimate answer for the border crossing issues as the watercraft will be monitored time to time.

2. WORKING PRINCIPLE

The GPS antenna gets the signal from the satellite and the signal is stored in the GPS unit is sent to the PIC microcontroller that stores and retrieve the information to the tracking unit ZigBee. GPS antenna increases the coverage of the signal from the satellite. Using, GPS the signals from the satellite are stronger in day and night regardless of all the climate, the satellite keeps sending signals with no breakage in the communication while decoding the information using the GPS. Wireless transmission of information takes place from the sender side to the monitoring unit ZigBee that stores the raw data for every 60 seconds on the Server. The location is continuously stored in the MYSQL Server database in the DOTNET Framework platform. The server database manages the registered users and it stores the values of coordinates and current time in records. The fishermen's details and the family member's contacts are saved on the Server. When the anglers cross the maritime border the microcontroller signals the monitoring unit getting the exact location of the vessel, the monitoring unit sends an SMS with the coordinates (longitude and latitude) on google maps, and the fishermen's live location is sent to the angler's family or the coastal guards at base station to give assistance for faster recovery. At the same time, the microcontroller signals the boat ignition to set off, stopping the boat to cross the border saving the lives of the fishermen's.

3. EXISTING FRAMEWORK

There are a numerous number of location-based frameworks that can naturally produce caution, for example, border alert framework which exists with GSM module with a LED alarm with long-distance telegraphy "Relay Mechanism" to track the vessel into the ocean with the assistance of GPS. It was proposed to locate the fishermen and to track them and alert him while crossing the border, but eventually, the model failed because they were unable to find the GSM signal once they move deeper into the ocean. The major drawback has prolonged the delay on the working border alert system model yet.
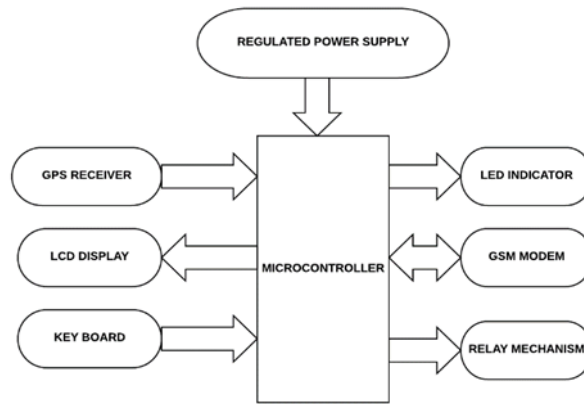

Fig.1 Existing Framework

4. PROPOSED FRAMEWORK

In our proposed system a low cost and easy tracking device for fishermen's was designed using tracking unit separately and monitoring unit separately and by using the IOT technologies you can track their relatives, friends and other fishermen's. If someone crossing the border, then the entire fishermen's will get the alert about the person who crossed. so other fisherman's can rescue them if they wrongly crossed or due to boat failure. Accordingly it spares the lives of the angler and cautions the base station to give assistance. The coordinates are located and if the angler has crossed the border the ignition is set to off i.e., the PIC microcontroller offers guideline to the start to stop the motor from a signal sent from the micro-controller.
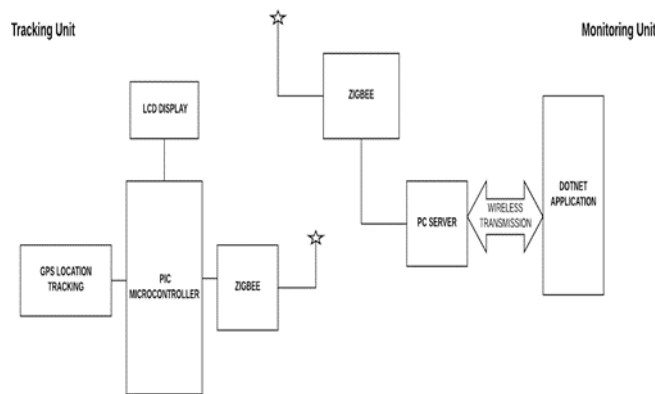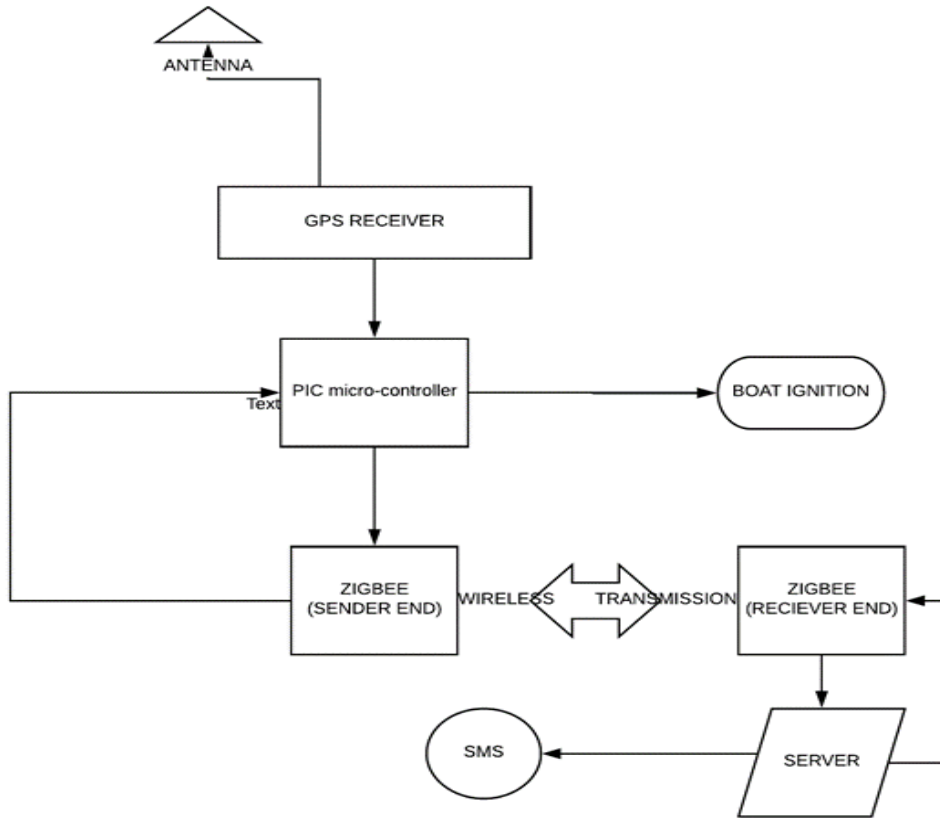
5. PROPOSED FRAMEWORK ARCHITECTURE

Fig.2 Piece Diagram

6. PROPOSED FRAMEWORK FLOW DIAGRAM

Fig. 3 Framework Flow Diagram

The GPS recipient gets the flag and changes it into wanted information message. The information is then delivered to the PIC microcontroller which extracts the accurate coordinates. The positions are compared and stored with the Boundary positions using ZIGBEE. If the vessel is found beyond the border, then the boat Ignition gets off and an SMS is generated along with a message transmission from the server.

7. GLOBAL POSITIONING DEVICE

A Global Positioning System (GPS) gets the global coordinates without any help from the user as it is independent of internet reception. GPS satellites broadcast signals and each GPS receiver uses these signals to calculate the dimension of location (latitude, longitude, altitude) and the current time. To get significantly higher accuracy with different recipients utilize Differential GPS requires an extra beneficiary settled at a known area close-by. The values obtained from the GPS can be stored and retrieved anytime, the GPS can even broadcast live stream with more accurate coordinates. The real-time GPS module represents the antenna acts as a receiver that increases the distance and strengthened the signals from the satellite.

8. CONTROLLER

Microcontroller gets the coordinates from the GPS receiver and stores it before processing the information to the ZigBee. The PIC Microcontroller acts as a centralized hub between the GPS and ZigBee and also controls the ignition switch based on the instructed signals just in case if the vessel crosses the border coordinates then the nearby coordinates of the present position is recovered from the PIC microcontroller. At that point, the microcontroller sends the co-ordinates to the wireless module "ZigBee". In the event that the Server sends a notice flag that the vessel has crossed the fringe, the Microcontroller signals the start to kill its supply.

9. ZIGBEE

ZigBee innovation is a remote sensor innovation that guarantees remote checking and controlling to stack parameters. A portion of the qualities like minimal effort, low power, low information rate, simple establishment, low support, different topologies, and so on., make this correspondence more appropriate for a wide assortment of utilizations contrasted with other short-extend correspondence advancements. ZigBee is a standout amongst the most broadly utilized handset standard in remote sensor systems. ZigBee over IEEE 802.15.4 characterizes particulars for low information rate WPAN (LR-WPAN) to help low power observing and controlling gadgets. This paper exhibits a definite investigation of ZigBee remote standard, IEEE 802.15.4 determination, ZigBee gadget writes, the convention stack design and its applications. The gadget transmits the information from the sender to the recipient end with the assistance of microcontroller under remote transmission.
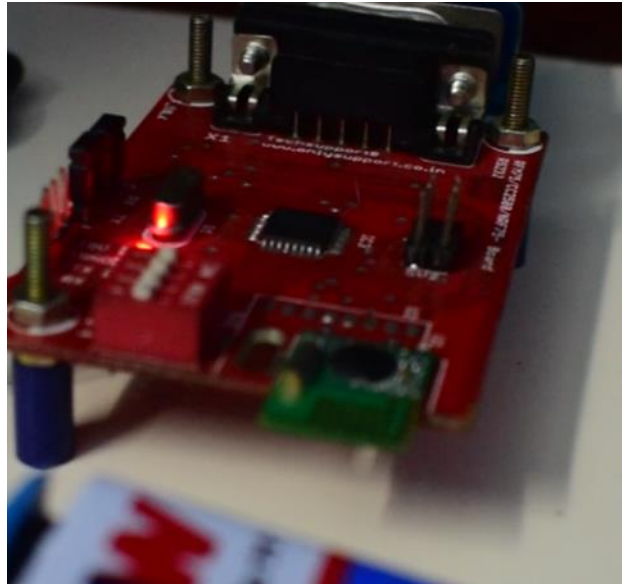
Fig. 4 ZigBee Module

10. MARITIME BOUNDARY BETWEEN INDIA AND SRI LANKA

The passionate and consuming issue raised at the exhibit is trespassing of oceanic limit line between Sri Lanka and India. Both Indian and Sri Lankan anglers have been angling into Palk Bay territory for quite a long time. The issue developed simply after a sea assertion was marked by India and Sri Lanka in 1974. Indeed, at first, the 1974 fringe assertion did not influence angling on either side of the outskirt. In 1976, through a trade of letter, the two India, and Sri Lanka consented to quit angling in each other's waters. In any case, the assertion couldn't prevent the anglers from angling in these waters, as anglers know no limit. They, intentionally or accidentally abuse the International Maritime.
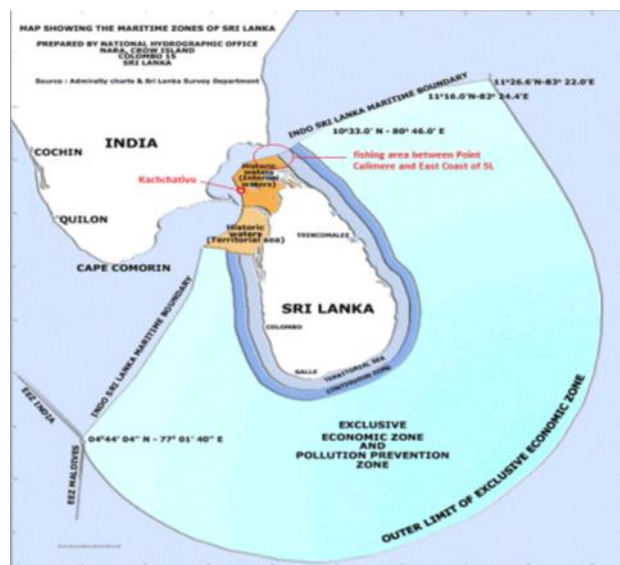

Fig. 5 Maritime Boundary

Boundary Lines looking for a decent catch. It is essential that in spite of the consenting to of oceanic limit arrangements, anglers groups of both the nations proceeded with their angling in the Palk Bay zone gently until the point that the Eelam war softened out up 1983. Regardless, after the finish of War in 2009, the Sri Lankan anglers have been raising their protest to Indian anglers angling in their waters. In this manner, the primary issue with Indian anglers is that countless are subject to angling in Sri Lankan waters, which is precluded by the 1976 Maritime Boundary Agreement. Likewise, a substantial number of Indian anglers are subject to trawling which is restricted in Sri Lanka.

11. SERVER DATA PROCESSING

Here the Data will be gotten from the ZIGBEE and separate the estimation of scope and longitude to the distinctive areas of the database table in the arrangement of an enormous number of clients. The information shared is put away on the server for at regular intervals for the lossless transmission line. In the event that the watercraft crosses the outskirt, the server sends an alarm to the microcontroller and furthermore communicate something specific with the area crossed to the recorded individuals from the predetermined anglers.
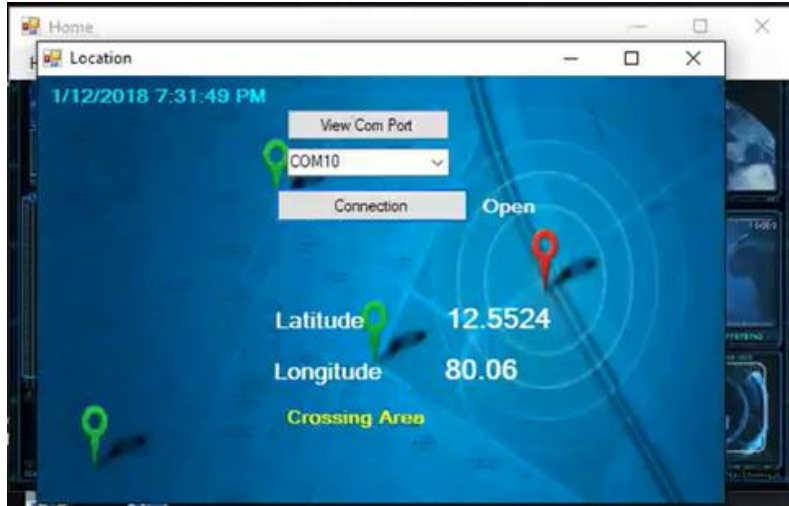
Fig. 6 Border Crossing Alert

Fig. 7 Location SMS

12. BENEFITS

- The off-track of the ship can be controlled by natural calamities.
- The commander of the watercraft by the privateers can be eliminated.
- Track any vessel with live timing with faster and accurate positions.
- Coordinates/directions of any seized vessel could be found.

13. FUTURE SCOPE

- We can employ the EEPROM to save and store more areas of navigation coordinates
- Can diminish the extent of the pack by utilizing GPS on a similar module of GPS pilot.
- We can expand the boundary with exact and accurate coverage by enlarging the cost of the ZigBee/Xbee devices.

14. ADVANTAGES

- Instant Recovery Support
- High Accuracy
- Low Power Device
- Low-Cost design
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15. CONCLUSION

In this manner, the Tamil anglers can recognize and abstain from intersection the neighboring domain and furthermore we can without much of a stretch discover fishermen on the off chance that they appear to be lost in the sea knowing their exact co-ordinates. The framework gives high exactness and high accuracy estimations of the Latitude and Longitude. This model demonstrates to challenge the officially existing model which just uses a ZIGBEE for remote transmission with high precision and speedier reaction.

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