IOT Based Fisherman Border Security Alert System

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ABSTRACT: Location based alert services are essential components for fisherman's, due to bad climate conditions and lagging of technology in rescue support our fisherman's facing a life time problem with neighbor countries. On considering the issue we proposed a low cost and easy tracking device for fisherman's which is used to track their relatives, friends and other fisherman's. If someone crossing the border the entire fisherman'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 the crossed. Location based alert represent an emerging location-aware, just-in-time web services, which can propagate information of location to the right users at the right time and the right place. It reminds the user about the location when the user enters some predefined location of interest in the future. All the user needs to have is the mobile phone with android platform, and then the user can select the destination and find the destination on the Google map. The user can even choose from preselected major locations or recently selected locations. The main objective of the project is to develop a GPS (Global Positioning System) based application to handle the following requirements: To alert the users through an alarm when the user reaches near a preset location, To retrieve the users current location coordinates (Latitudes and Longitudes), To allows users to set their target location and save that target to the list, Allows user to delete and edit the alerts, To allow user to the put the reminder text along with the alarm.

KEYWORDS:Location tracking, Alert system,GPS, Position monitoring, Marine border.

I. INTRODUCTION

There are three boundaries of borders taken. Final state boundary will be the border between the two countries and other two borders before that comes under the parental country circumstances. First two border crossing will be monitored by Indian government.The fishermen's are warned by the warning devices such as speaker (a buzzer) and an LCD display while they crossing the first two borders. Their position based on the latitude and longitude data from GPS is used.The movements of the vessels using the motion detection sensor and illegal entry of other country vehicles are identified.The Shut off engine is again restarted by the biometric ID of the Security Officer. Also the movement and activities of the boats ,the speed of waves are detected using PIC motion detector

II. PROPOSED ALGORITHM

FLIGHT PLANNER ALGORITHM
- We introduce the concept of detection of the movements of the boat and the waves using the PIC motion detection sensor(x , y, z axis)
- The movements of the vessels and the intrussion of illegal vehicles are identified.

- The Engine control and the weather conditions are checked using wind speed sensor.
- The data from the locations of the nearby boats are used to identify the neighbouring boats in case of emergency an help.

III. RELATED WORK

31.Data Acquisition.
The GPS unit will get the latitude and longitude position of the current location.This data is transmitted to the microcontroller and it finds the current location by comparing the present latitude and longitudinal value with the predefined values.This data is transmitted to the border security force for monitoring and provide alarm to the fisherman.

3.2.Monitoring System
The Data from the fisherman boat is transmitted to the central server in border security agency.The locations are continuously monitored by the security officer and sends an alert message when fisherman reaches the border. The border security officer also monitors the intrusion of other country boats to international border. On security breach the security officer alerts the armed forces.

3.3.Server side Alert system
The positions of the fishermen's boats are frequently monitored and their tracks are recorded. When the fisherman reaches near 5 km of the national border an security Alert is created by the server side.The naval officer provides an alarm to the fisherman boat. On further critical movements the engine control is accessed remotely by the server..

3.4.Interfacing module.
After sending alert alarm to the fisherman from the server ,The fisherman is notified with message , that the boat has reached the national border.Hence the fisherman is stopped from crossing the border by the means of interfacing module.The exact location of the boat is viewed in the display device of the fisherman's boat.

3.5.Interaction between users and the system.
The location of the fisherman are monitored by the naval security officers continuously. The controls are accessed using IOT cloud server.The fisherman finds their GPS position and finds the distance to be reached.The log data collected from the fisherman and the other boat locations are used to identify the sea traffic and frequent fishing locations.

- Inside border : Green colour indication in database
- Near the border : Red colour indication in database
- After crossing border :
    1. First layer Alert : Alert given to administrator side and to the fisherman through SMS
    2. Second layer Alert : Navy personnel should govern the fisherman to the diagram

IV.ARCHITECTURE DIAGRAM OF THE PROPOSED MODEL

This detailed architecture diagram of the advanced GPS location tracking system is described in Fig 3.1 gives the following ways for tracking boats and data interpretation .The advanced GPS module in this project is used to find the location of the boats in sea and the sensors are used to find the movements of the fisherman boats in sea. This locations of the fisherman boats are constantly monitored by the security officer in the server side. The location data are used to prevent the fisherman from crossing the border.
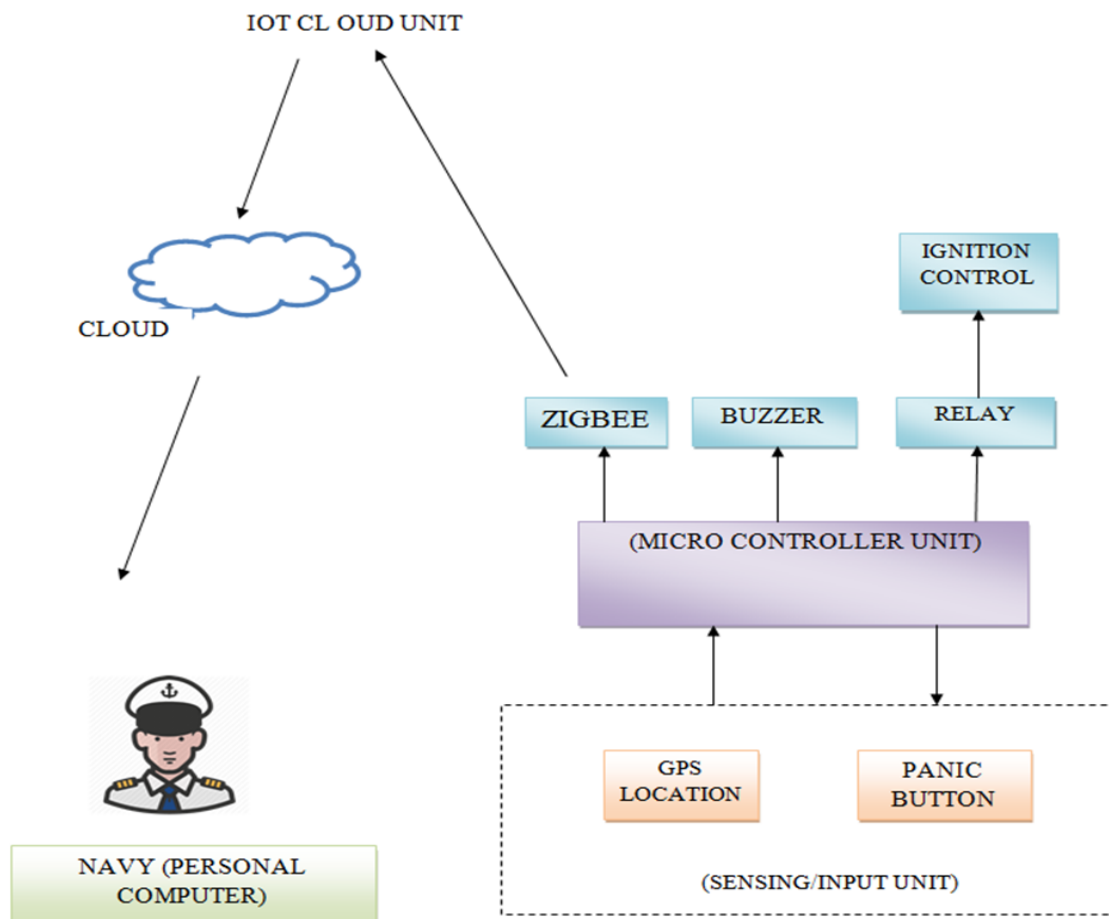
Fig 4.1: View of the border locations monitoring system

V.IOT MODEM IN BOATS

The IOT Modem consists of 4 sensors namely ultra sonic sensor, windspeed sensor, temprature sensor and raindropsensor. The hyper spectral sensor performs soil analysis, moisture analysis and identifies whether water is needed or not. It also performs crop yield i.e. what crop can be grown in the next harvest. The infrared sensor is used for pesticide spraying and seed sowing. The thermal sensor is used to monitor the health of the crop by means of chlorophyll pigment classification.

IOT Modem with WIFI module is a WIFI serial transceiver module based on ESP8266 soc. This chip implements a full TCP/IP protocol stack and the very interesting feature is that it also has a great computational power onboard.

The Wireless transmitter is used to send alert [14] messages to the fisherman via Internet through SMS and also alerting through web browser. The specifications of the transmitter consists of transmission range over 4000m with a Standby power consumption of < 1.0mw (fig 5.1).

FIG 5.1: DETAILED VIEW OF WIRELESS TRANSMITTER

VI. GPS FOR LOCATION DETECTION

The Location from the GPS is sent to the microcontroller. This microcontroller sends the location coordinates to the server via the wireless transmitter to the server. This data is compared to the location data of border from the border and alert message is sent to the fisherman boat through the wireless transmitter. [13].
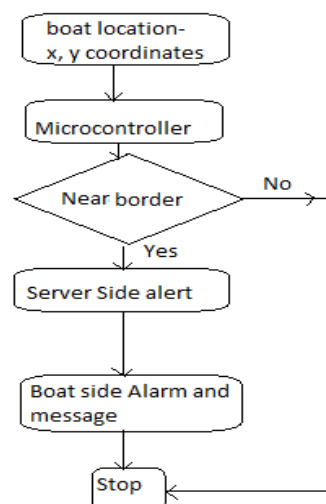

FIG 6.1: WORKFLOW OF THE GPS MODULE FOR LOCATION DETECTION AND COMPARING BORDER COORDINATES

The Ultrasonic sensor finds the movements of other boats in its range. This sensor finds any boats that are getting closer and also finds the unauthorised movements and entries of other country boats without the border security system.
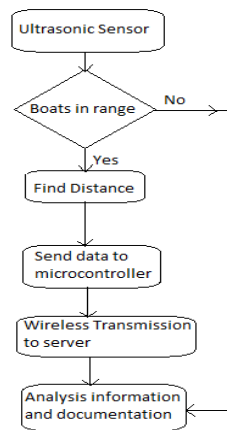
FIG7.1: WORKFLOW DIAGRAM OF THE ULTRASONIC SENSOR IN FINDING MOVEMENTS

VIII.REMOTE CONTROL OF BOAT

The boats that are moving towards the border are provided an alarm through the wireless transmitter. Further movements towards the border is detected by the ultrasonic sensor .then the control of the engine over remote control over the server using engine control module and relay are used to stop the boat.
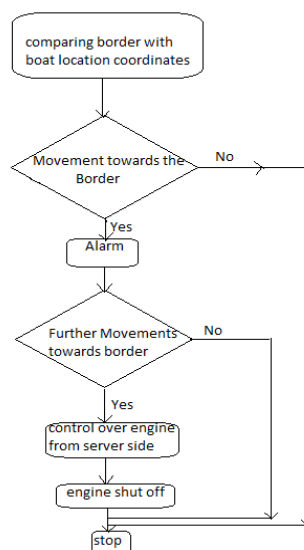

FIG 8.1: OPERATION OF THE REMOTE CONTROL SYSTEM OVER BOAT ENGINE

IX.CONCLUSION

Using this device the fisherman are prevented from crossing the international border .Also the illegal entries of other country boats and armies are detected and is defended by the armed navy ships. The intense weather conditions in the sea are detected and rescue are provided by the navy ships.The data acquired are used for future data analytics for frequent fishing locations criminal and abnormal activites .This is system can also be used for naval security purpose in monitoring the entry of other country armies in war situations and make a surveillance network over the sea border of our nation .The main drawbacks are signal coveragefor long distance and accuracy GPS location. The other drawbacks that is the cost and power consumption of the system is little high.

REFERENCES

[1] Guoqiang Mao, Barıs Fidan and Brian D.O. Anderson, "Wireless sensor network localization techniques", Computer Networks Vol.51, Issue 10,Elsevier, 2007.
[2] Jiuqiang Xu, Wei Liu, Fenggao Lang, Yuanyuan Zhang and Chenglong Wang, "Distance Measurement Model Based on RSSI in WSN", Wireless Sensor Network (SciRes), 2010, Vol. 2.
[3] V.Thayananthan, A. Alzahrani, M.S. Qureshi.(2012)." Analysis of key management and Quantum Cryptography in RFID network"s.S International Journal of Academic Research Part A.
[4] Ndeye Amy Dieng, Maurice Charbit, Claude Chaudet, Laurent Toutain and Tayeb Ben Meriem, "Indoor Localization in Wireless Networks based on a Two-modes Gaussian Mixture Model", IEEE, 2013.
[5] Ndubueze Chuku, Amitangshu Pal and Asis Nasipuri, "An RSSI Based Localization Scheme for Wireless Sensor Networks to Mitigate Shadowing Effects", IEEE, 2013.
[6] Luigi Pomante, Claudia Rinaldi, Marco Santic and Stefano Tennina, "RSSI-based Performance analysis of a lightweight localization forWireless Sensor Networks", IEEE, 2013. 2016 Online International Conference on Green Engineering and Technologies (IC-GET)
[7] Z.Mary Livinsa and Dr.S.Jayashri, "Performance Analysis of Diverse Environment based on RSSI Localization Algorithms in WSNs",Proceedings of 2013 IEEE Conference on Information and Communication Technologies (ICT 2013), IEEE, 2013.
[8] Nordby, K. (2010). Conceptual Designing and Technology:"Short-Range RFID as Design Material". The Oslo School of Architecture and Design, Oslo, Norway: International Journal of Design Vol.4.
[9] Hyunsung Kim, ― "RFID Mutual uthentication Protocol based on Synchronized Secret"‖ International Journal of Security and Its Applications Vol. 7, No. 4, July, 2013
[10] Sadagopan, V.K.; Rajendran, U.; Francis, A.J., "Anti theft control system design using embedded system," Vehicular Electronics and Safety (ICVES), 2011 IEEE International Conference on, 10-12 July 2011.
[11] Iman M. Almomani, Nour Y. Alkhalil, Enas M. Ahmad, Rania M. Jodeh "Ubiquitous GPS Vehicle Tracking and Management System", IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT) 2011.
[12] Hu Jian-ming; Li Jie; Li Guang-Hui, "Automobile Anti-theft System Based on GSM and GPS Module," Intelligent Networks and Intelligent Systems (ICINIS), 2012 Fifth International Conference on , 1-3 Nov. 2012.
[13] Fleischer, P.B.; Nelson, A.Y.; Sowah, R.A.; Bremang, A., "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," Adaptive Science & Technology, 2012 IEEE 4th International Conference on , 25-27 Oct. 2012.
[14] El-Medany, W.M.; Alomary, A.; Al-Hakim, R.; Al-Irhayim, S.; Nousif, M., "Implementation of GPRS Based Positioning System Using PIC Microcontroller," Computational Intelligence, Communication Systems and Networks, 2010 Second International Conference on 28-30 July 2010.
[15] Parvez, M.Z, Ahmed, K.Z.; Mahfuz, Q.R.; Rahman, M.S., "A theoretical model of GSM network based vehicle tracking system," Electrical and Computer Engineering (ICECE), 2010 International Conference on , 18-20 Dec. 2010.