Mini Review

A SURVEY ON BORDER ALERT SYSTEMS FOR FISHERMEN

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ABSTRACT

This paper proposes a survey on the different border rescue systems using GPS for Fishermen. Fishermen bring a major portion of income to our economy. These poverty-stricken helpless people risk their lives and sail out into the sea for their livelihood. In India, there are many cases where fisher men from Tamilnadu lost their lives while they crossed the maritime border and sailed into the Sri Lankan premise unaware of the maritime border fact. This unawareness grabbed their lives and it also affected both the country's economic status. So an efficient border alert system for fishermen is necessary. So far, many border alert systems have been put forward. This paper aims to compare some of them and find the most efficient among them.

Keywords: GPS, GSM, Border rescue system, maritime border.

INTRODUCTION

Maritime borders are not recognizable like the land borders. There are so many practical difficulties in maritime border marking due to the ocean's geographical features. Many illicit activities happen via sea and oceans which include organized crimes, smuggling of drugs and illicit materials, human trafficking etc. So, every nation ensures a rigid organized border security system for maintaining the peace inside the nation as well as between the neighbouring countries. Karthikeyan et al., [2012], have used these border security systems have uncompromising rules, but in some extreme cases, poor innocent people like fishermen who are unaware of the maritime border line gets imprisonned or even executed while crossing the ocean. As a matter of lives and our country's economic status, there should a proper system to alert these fishermen about their location and the maritime border. Many border alert systems for marine navigation have been proposed which utilizes Global Positioning System.

GPS embedded in border alert system protects the fishermen from being killed or prosecuted for crossing the border unaware of it. It alerts them using an alarm system. Some border rescue system incurporates GSM technology and message alerts them as well as the coastal guards. The current location of a boat is found using GPS receiver. The instantaneous values of latitude and longitude are the current latitude and longitude values are estimated and sent to the microcontroller unit. The controller then compares these values to a predefined value and calculates the current location of the boat. With the help of this comparison, the distance of boat from the maritime border is calculated and the fishermen are alerted about their location. With the fused usage of GPS and GSM, border security, as

well as vessel tracking in sea and ocean are achieved.

LITERATURE SURVEY

Development of Instrument on Youth Fishermen's Readiness to Use Geographical Positioning Systems in Their Fishing Operations: Bolong, et al., [2013] explains the utilization of GPS to locate the boat and thus alert the voyager with an alarm when he is moving closer to the maritime border or crosses it. the location analysis is done using GPS and the information is sent to the control room which is set on the shore with the help of a GSM device. This system is mainly meant for fishermen who find it very difficult to recognize the maritime borders. This system incorporates PIC16-F877A. This coastal border awareness system has simple circuitry and hence cost effective. This makes it affordable to poor fishermen.

Design of Border Alert System For Fishermen Using GPS: Arun Vijay et al., [2015] depicts a system designed using an embedded system which alerts the fishermen about the maritime border with the aid of Global Positioning System and Global system for mobile communication. The maritime border attributes of latitude and longitude are predefined in the microcontroller. The Global Positioning System (GPS) pursues the location of the boat and transmits the current latitude and longitude of the boat to the microcontroller. The microcontroller compares the predefined values with the current values and thus calculates the location of the boat from the maritime border. If the boat is close to the border or crosses it, then an alert alarm is generated. The maritime zone is segregated into four subzones-normal zone, warning zone, the zone near to restricted zone and finally the restricted zone. If the boat is located in the normal zone, it is

displayed on the LCD. If it approaches the warning zone, a warning is displayed on the LCD. If the fisherman neglects the warning and proceeds further to the restricted zone, an alarm is activated and the speed of the boat is controlled automatically by 50 percent. Again, if the fisherman ignores the alarm and enters the restricted area, the alarm continues to beep, and the boat engine is switched off by cutting off fuel supply to the engine. It is followed by the transmission of a message to the base station responsible for monitoring the maritime transport. Here both the coastal guard as well as fishermen is indicated and warned about the location of the boat.

Protecting of Fishermen on Indian Maritime Boundaries: Karthikeyan, et al., [2015] propose a border alert system using GPS and GSM. Based on the preordained latitude and longitudinal values of the maritime border, the GPS determines the current position of the boat from the border. If the boat is out of the vicinity of the border, microcontroller warns the fisherman that he has crossed the boundary, with the help of an alarm and a message is transmitted to the base station instantly. Thus, both the fishermen and base station officials are alerted. In addition to location analysis and alert system, with the aid of sensors, there is provision for iceberg detection, tsunami prediction, and weather updates.

Implementation of maritime border alert system: Sivaramaganesh, et al., [2014] focuses on analyzing the tractability and effectuality of the maritime border alert system. The fisherman is alerted as they cross the maritime border of a nation unaware of it by using an alert alarm. Also, GSM transmitter interface sends a message to the base station alerting the coastal guards that the boat has crossed the maritime border. As a result, coastal guards can monitor and help out fishermen in need of help.

Advanced Border Alert System Using GPS and With Intelligent Engine Control Unit: Jim Isaac et al., [2015] have uses a sensible border alert system and an engine control unit for handling the speed of engine are proposed. The boat is dynamically located using the Global Positioning System and the Electronic Control Unit which incorporates ARM 7 microprocessor. Reference latitude and longitude (maritime boundary attributes) is fed into the ARM 7 microprocessor. If the boat approaches the maritime border, the fisherman is alerted by an alarm and the location of the boat is transmitted to the nearest coastal guard station. Even after the alarm, if the boat proceeds to the border, an interrupt is sent to the Engine Control Unit and the speed of the engine is controlled with the help of the electronic fuel injector.

COMPARISON

IMPLEMENTED SYSTEM	PLATFORM	METHODOLOGY	COMMENTS
GSM and GPS Based Border Alert System	PIC16F877A, GPS, GSM	Tracking system, location analysis, sending information	User friendly
Design of border alert system for fishermen using GPS	AT89C51, GPS, GSM	Tracking system, location analysis, sending information	User friendly, Easy to upgrade
Location Based System Using GPS-Fishermen SMS Alert system	Android, Microcontroller, GPS, GSM	Tracking system, location analysis, sending information, Weather tracking, tsunami forecasting, emergency sms	User friendly and easily implementable
Design of low cost maritime boundary identification device using GPS system	Microcontroller (89S52), GPS, GSM	Tracking system, location analysis, sending information	User friendly
Advanced border alert system using GPS and with intelligent Engine control unit	GPS, GSM, ARM 7 Microprocessor	Tracking system, location analysis	Low cost, user friendly

CONCLUSION

Maritime border alert system is a system which alerts the fishermen and other sea voyagers about the boundaries of the sea borders of different nations. From the comparison of different schemes discussed here, Location based system using GPS-fishermen SMS alert system seems to have much more advantages such as tsunami forecasting weather tracking, emergency SMS system etc. The system is user friendly as well as easily implementable.

REFERENCES

Arunvijay, D. and E. Yuvaraj, Design of Border Alert System for fishermen using GPS. International Journal of Students' Research in Technology & Management 2(2): 67-70 (2015).

Isaac, D. Jim and H. Eugene Kingsley, Advanced border alert system using GPS and with intelligent Engine control unit. International Journal of Electrical and Computing Engineering 1(4): 11-14 (2015).

Karthikeyan, R., A. Dhandapani and U. Mahalingham, Protecting of Fishermen on Indian Maritime Boundaries. Journal of Computer Applications 2(3): 0974-1925 (2012).

Punetha, D. and V. Mehta, Protection of the child/elderly/disabled/pet by smart and intelligent GSM and GPS based automatic tracking and alert system. In Advances in Computing, Communications and Informatics (ICACCI, 2014 International Conference on IEEE Pp. 2349-2354 (2014).

Sivaramaganesh, M., Ramya, M., Gowtham, V., Bharathi, T. and G. Jeevitha, Implementation of maritime border alert system. International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering 2(3): 1254-1257 (2014).

Bolong, J., Osman, N., Omar, S. Z., D'Silva, J. L. and H.A. Mohamed, Development of Instrument on Youth Fishermen's Readiness to Use Geographical Positioning Systems in Their Fishing Operations. Life Science Journal, 10 (3): 2153-2157 (2013).