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SMART REAL TIME RESCUE SYSTEM FOR FISHERMEN

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ABSTRACT

In India, fishermen being caught and imprisoned or even killed is a common news that come across. Technology has developed so far and yet we fail to secure our borders and people. As a means of their livelihood they sail into the deep sea and most of them have conventional fishing boats with no modern technological provisions. The country's sea borders are not recognizable for the common fishermen. This paper proposes an eminent alert system for fishermen as they cross the border and the location of the fishing boat is indicated using GPS. Additionally, an IoT gateway system is used to send information about a fisherman to coastal guard system on the seashore indicating that the fishing boat has crossed the maritime border using internet. Thus, costal guards in the seashore can assist and provide additional help to those fishermen from anywhere. Staying in the memory line of the lost lives of Indian fishermen, this device has been implemented to help others not to navigate beyond the maritime border. On the whole, it is a honest attempt to build a cost effective alert system for fishermen.

Keywords: *GPS, Smart Real Time Rescue System, GSM, Microcontroller*

I. INTRODUCTION

Maritime border is an imaginary boundary on the earth's water surface marked based on physiographical as well as governmental standards (Costa et al., 2011, Agarwal and Sabharwal 2012). Every country has its own maritime border security which ensure the protection of the particular country by safeguarding against intruders. The violators are prone to imprisonment and even execution. But most of the time innocent people mostly poor fishermen gets caught up for accidentally crossing the border as they don't have account of border boundaries. To prevent such ill-fated incidents, a system is proposed which helps the fishermen to be aware of crossing the borderline.

An excellent border alert system for fishermen is developed by Border alert system by associated usage of GPS (Global Positioning System) and GSM (Global System for mobile communication). Topical location of the vessel is determined with the help of GPS receiver which calculates the latitude and longitude values with respect to the position of the vessel, which is further sent to a microcontroller unit. The controller then compares these values to a predefined value and calculate the current location of the boat. From this comparison result, the fishermen are informed whether they are about to reach the nautical border (Rao and Reddy 2011). With the fused usage of GPS and GSM, border security as well as vessel tracking in seas and oceans are achieved

II. **GPS:** GPS is a satellite-based object locating system. A GPS system may consist of at least 24 satellites (Dean and Ghemawat 2008, Zaharia et al., 2008). It was launched by US army for military use. GPS is a global system confined to work 24 hours a day regardless of changing weather conditions. It neither do have any subscription or set up charges. These satellites revolve around the Earth twice a day in its orbit. Depending on its location each satellite sends a signal consisting of its orbital parameters to the base station which is comprised of many GPS devices. These GPS devices decodes these signals and extract the relevant data and then compute the location of the satellite. Using this information, the GPS devices calculate the user's exact location (Kc and Anyanwu, 2010). Distance to each satellite is measured by transmitting a signal and subsequently measuring the time taken by the signal to reach the satellite. Analysing the distance measurements form a few satellites aids the receiver to determine a user's position and display the position parameters.

III. **GSM:** GSM is a digital cellular network developed with an objective to enhance the mobile voice and data transmission services. Cell phones connect to it by searching for GSM cells in the immediate vicinity. Basically, GSM network is com-prised of 5 different cell sizes which are macro, micro, pico, femto and umbrella cells (Gu and Robert 2009). Based on the implementation environment, the coverage area varies in each cell. Microcells are cells which have its base station antenna on a mast or on a building which is above the average rooftop level. Microcells whose antenna height will be less than the average roof top level are generally employed in urban areas. For indoor purposes, Pico cells are used whereas femto cells are employed in residential as well as small business environments (Michael et al., 2007).

IV. **PROPOSED SYSTEM:** The system mainly makes use of GPS and GSM technologies. The maritime border latitudinal and longitudinal values are

predefined in the primary module which is a microcontroller.

As the boat starts navigating the GPS receiver and MEMS compass starts calculating the distance and direction of the borderline respectively and is fed into the microcontroller. The distance travelled by the boat with respect to borderline is accounted through count sensor. The electronic compass helps in identifying the direction of the boat. Both these signals are then amplified using a signal conditioning board and is fed into the PIC microcontroller. The microcontroller analyses these signals and then alerts the fishermen by means of GSM and GPS modem when they reach predefined limit before the border.

The alert signals incl-ude an alert sound and SMS message signifying danger zone sent through applications (Priyanka and Kulennavar 2014). These are sent from the GSM in the system's primary module to the Fisher -men's android phone. The module also sends a message to the rescue patrol regarding the issue via GSM and GPS module. The block diagram of the proposed system is given below.

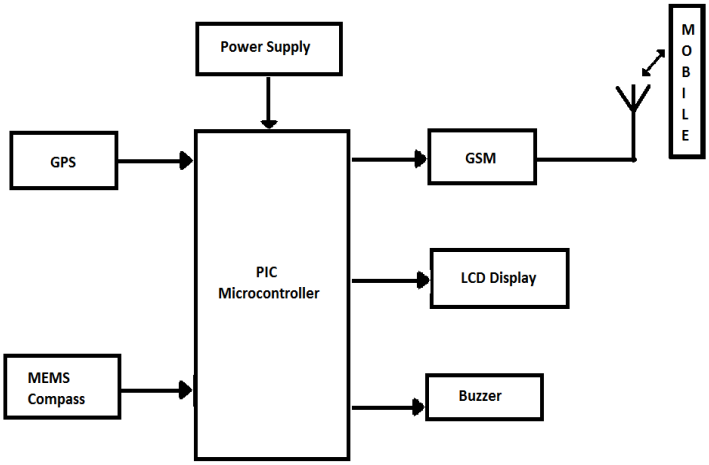

Figure.1: Block diagram of the proposed system

V. **IMPLEMENTATION:** As soon as the vessel starts moving, the distance and direction of the borderline from the starting point is calculated using GPS and is fed into the microcontroller (Jaliya et al., 2010, Agarwal and Sabharwal 2012). The maximum limit until which the fisherman can travel is fed into the microcontroller. The distance travelled by the vessel with respect to the border line is accounted with the help of a count sensor. An electronic compass aids in dealing with identification of boat's direction. Both the signals are transferred to the signal conditioning board to be amplified and filtered and the resulting output is sent to the PIC microcontroller. The PIC microcontroller analyses the received data and alerts the fishermen using the mobile application with the help of GSM and GPS modem when they reach the predefined limit before the border. The signals are an alert sound and a message signifying danger zone sent through the applications along with an SMS message. These are sent from the GSM in the system's primary module to the fishermen's android phone. The module then sends a message to the rescue patrol regarding the issue through GSM and GPS module. Hardware representation of the system is given below.

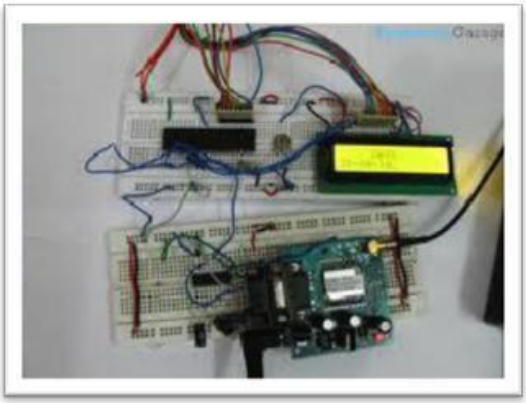

Figure 2: Hardware implementation of the proposed system

VI. CONCLUSIONS

A novel security system for fishermen boats which interweaves the GPS and Embedded system is proposed here. The fishermen while accidentally crossing the maritime border is alarmed using a buzzer alarm and they are also provided with an

eminent system to monitor their precise location and identify the national sea borders. This system will save lots of innocent lives and ensure a good relationship with the neighbouring countries

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