Smart Border Alert System for Fishermen while Crossing Sea Border

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Abstract— **Countries with the International Marine time Boundary Line (IMBL) are always facing security problems. The family of fishermen is continuously threatened by IMBL problem because fishing is main economical support for their family. For the country like India where fishing is the main work for the people of coastal region, knowledge of sea border is very important. In such situations the lives of fishermen continued to be very difficult. As fishermen crosses the borderline, sometimes other country coastguards catch them and sentenced them to prison in a doubt of spying activity. This paper propose, the system to avoid any kind of accidents and to alert the fisherman about border area well before entering to unauthorized border area.**

Keywords— IMBL; GPS; GSM; Microcontroller, host navy; Fishermen, Sea Border, Buzzer

I. INTRODUCTION

The fishermen of India even today invoke the historical rights and routinely stay into the International Maritime Boundary Line (IMBL) for fishing. From different states of India about thousand of boats with different kinds conduct fishing. But unfortunately, by accident fishermen crosses the border without knowledge and they get shot by the other country navy. This leads to loss in the both humans as well as their economic incomes. This paper propose, the system to avoid any kind of accidents and to alert the fisherman about border area well before entering to unauthorized border area.

II. PROPOSED SYSTEM

The proposed system uses a GPS receiver which receives signal from the satellite and gives the current position of the boat in term of latitude and longitude and indicates the position of the fishermen and displayed of LCD. These latitude and longitude values are compared with the latitude and longitude values of actual sea border. The particular layer level i.e. sea border can be predefined and this can be stored in microcontroller memory. The current position of boat is compared with predefined latitude and longitude of sea border. If a fisherman is 1-2 km away from the sea border, this system will send a warning message on LCD and notify the fishermen so that fishermen can slow down boat. But if fishermen ignore the warning message and continue to travel toward sea border, when the boat is few meters away from the actual sea border the system sends notification mail to nearer costal guard office of fishermen's country. This message consists of current location of current location of boat so that costal guards can help fishermen to enter in unauthorized sea border of another country. This system also slows down motor speed of the boat automatically and eventually turns off the motor if fishermen's boat is very near to sea border area. If these values are same, immediately the particular operation will be done i.e., the microcontroller gives instruction to the alarm to buzzer.

III. PROPOSED SYSTEM ARCHITECTURE

The GPS receiver receives the signal and converts it into desired data message. The data is sent to microcontroller and microcontroller extracts the information like latitude and longitude of boat from the data. The current positions of the boat is compared with the stored Boundary latitude and longitude positions. If the vessel is found to be in predefined location certain warning methods will occurs.
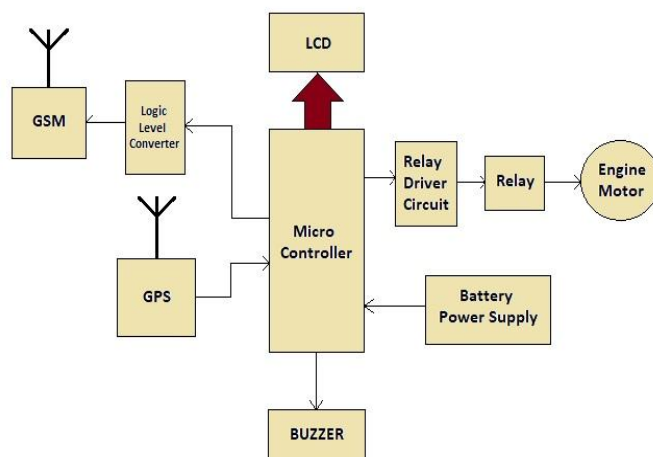
Fig.1 System architecture

IV.   GLOBAL POSITIONING DEVICE

A GPS navigation device is a device that receives Global Positioning System (GPS) signals for the purpose of determining the device's current location on Earth. GPS devices provide latitude and longitude information, and some may also calculate altitude. GPS devices are used in military, aviation, marine and consumer product applications.

The accuracy of GPS depends on the type of receiver. Most hand-held GPS units have about 10-20 meter accuracy. Other types of receivers use a method called Differential GPS (DGPS) to obtain much higher accuracy. DGPS requires an additional receiver fixed at a known location nearby. Observations made by the stationary receiver are used to correct positions recorded by the roving units, producing an accuracy greater than 1meter.

Microcontrollers are electronic circuits that can be programmed to carry out a vast range of tasks. They are found in most electronic devices such as alarm systems, computer control systems, phones, in fact almost any electronic device. Microcontrollers are relatively cheap and can be bought as pre-built circuits or as kits that can be assembled by the user.

Microcontroller receives the data from the GPS receiver through UART. The data received contains many details along with latitude and longitude. The latitude and Longitude of the current position is separated from the detailed data from GPS. The current positions are compared with already stored latitude and longitude of countries boundary locations. At first the latitude is compared with stored latitude which identifies if the current position is located near to the boundary. If the latitude matches then the adjacent latitudes and longitudes of the present latitude is retrieved from the microcontroller. The current position received from GPS is stored as L1(latitude), L2 (longitude). The latitude L1 is compared with stored latitudes. If latitude match, then adjacent latitude and longitudes (X1, Y1 and X2, Y2) are retrieved from stored table and compared and simultaneously warning techniques are implemented.

V. GSM MODULE

GSM module is used for transmission of message. GSM cannot be used in oceans as mobile network towers cannot be placed in oceans. Thus CDMA network or satellites can be used for message transmissions .When boat crosses border, the stored message along with current latitude and longitude positions is sent to the desired GSM module which is stored already. The prototype of the device is show in Figure 2.
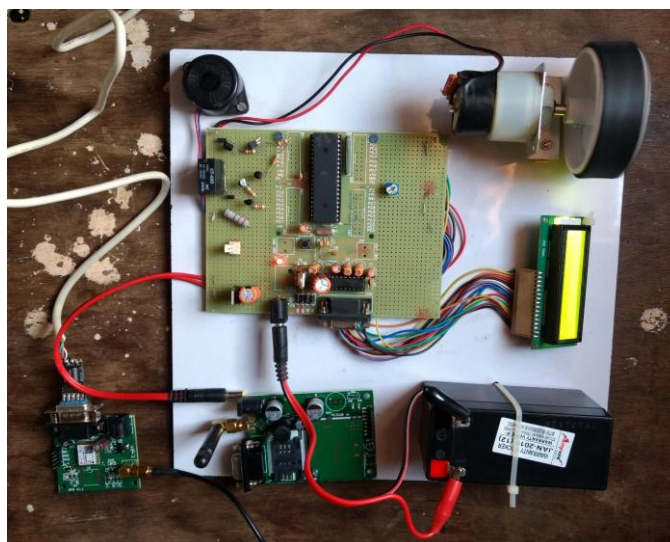
Fig. 2 Working Prototype of proposed system

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