HYBRID TECHNIQUE USED FOR GEOFENCING AND GEOTAGGING FOR FISHERMAN RESCUE

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*ABSTRACT--*Tamilnadu is one of the leading States in India in Fisheries Development having coastal length of 1076 kmThe main theme of this paper is to save the lives of poor fishermen who is severely punishing by the other country coastal guards. In day-by-day life we hear about many Tamilnadu fishermen being caught and put under Srilankan custody and even killed. The sea border between the countries is not easily identifiable, which is the main reason for this cross border cruelty.Here we have designed a system using embedded system which protects the fishermen by notifying the country border and the boat does not go to out of border by using Global Positioning System (GPS) and Global system for mobile communication. Using GPS, we can find the current latitude and longitude values and is sent to the microcontroller unit. Then the controller unit finds the current locationby comparing the present latitude and longitudinal values with the predefined value, Until boat is going to forward direction, when the boat crossing of border, motor will be turn off and motor is rotate in reverse direction simultaneously From the result of the comparison, this system aware the fishermenthat they are about to reach the nautical border by voice speaker. In addition, the GPS information is sent to coastal guard where it is read and then through a GSM device,information is sent to the family at crossed border who are in expectation about their family member's safety. Fuel level will indicate LCD display at regular intervals. Emergency unit is provided voice alert for safety in the boat. Recording voice can be change in different types. Device has been created to help them not to move beyond the border by motor. On the whole, it is an attempt to build a suitable device for the fishermen at a reasonably low cost.

*Keywords:*GPS vehicle tracker, border alert system GSM technology.

I.INTRODUCTION

The Tamil Nadu fishermen even today invoke the historical rights and routinely stay into the International Maritime

Boundary Line for fishing. From Tamil Nadu about 18,000 boats of different kinds conduct fishing along the India-Sri Lanka maritime border. But by accidentally crossing the border without knowledge, they get shot by the Sri Lankan navy. Tamil Nadu fishermen were arrested in separate batches by Sri Lankan Naval personnel near Katchatheevu in the Palk Straits and close to the Lankan coast respectively, a fisheries department..The Lankan naval allegedly damaged two boats by forcing them to collide and also broke 40 fishing nets.
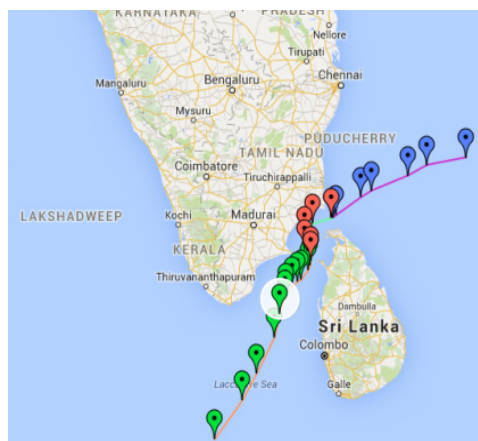

Fig 1 India and Srilanka border

The fishermen have been taken to Talaimannar and Kangesanthurai

respectively, boats were also seized. This leads to loss in the both humans as well as their economic incomes. We have developed a system which eliminates such problems and saves the lives of the fishermen.

II.EXISTING SYSTEM

Previous system, find the current boat location using wireless network with multiple applications. Mobile ad hoc network also used to find the location of vehicle. Presently there are few existing systems using GPS technology to track and identify the current position of the boats/ships. These systems used electronic map that provides an effective method for navigation and localization detection by users. Micro controller is information sent to family members through GSM system

III.PROPOSED SYSTEM

The proposed system can be used to less number of analog instruments and is comparatively a lot more cost effective than the existing systems. GPS receiver which receives the signal from the satellite and its gives the current position of the boat. The proposed system is used to detect the border of the country through the specified longitude and latitude of the position, not only between Sri Lanka and India but all over the world. The particular layer level i.e. border value can be stored in microcontroller memory. Then the controller

unit finds the current location by comparing the present latitude and longitudinal values with the predefined value. Until boat is going to forward direction, when the boat crossing of the border, motor will be turn off and motor will be rotate in reverse direction simultaneously From the result of the comparison, this system aware the fishermenthat they are about to reach the nautical border by voice speaker. Micro controller is sent to family members through GSM system even information is immediately sent to the coast guard and the necessary action is taken. In addition, Fuel levels indicate LCD displayed at regular intervals. Emergency unit is provided voice alert for safety in the boat. Thus it saves the lives of the fisherman and alerts the base station to provide help.

Work Flow Diagram

The GPS receiver receives the signal and converts it into desired data message. The data is sent to microcontroller and microcontroller extracts the latitude and longitude from the data. The positions are compared with the stored Boundary latitude and longitude positions. If the vessel is found beyond the border, motor will be turn off and motor is rotate in reverse direction then an alarm is generated along with a message transmission by a GSM
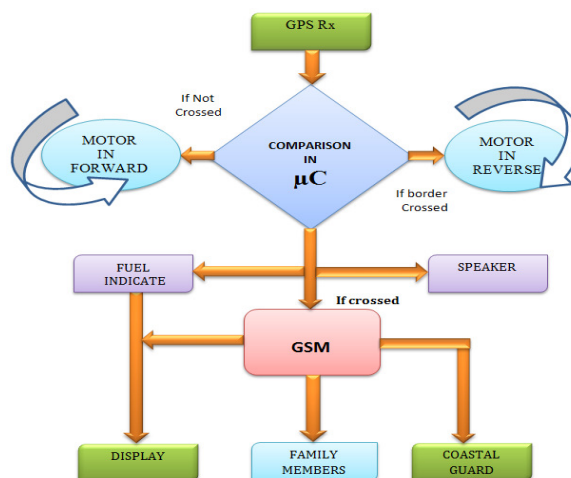

Fig 2 flow diagram

Micro controller is sent to family members through GSMsystem even information is immediately sent to the coast guard and the necessary action is taken. Fuel levels indicate LCD displayed at regular intervals by float using as the float changes the resistance value depending on the fuel level

Emergency Unit

In case of cyclone formation or any other critical situation such as gun shoot, tsunami, medical emergency occur when the emergency unit useful to fisherman. Because approximately 15 km distance in between of India (Tamilnadu) and Srilanka. Indian coastal guard can be reach to location by GPS and recovery of fisherman problems in easily and quickly. . Emergency unit is provided voice alert for safety in the boat. Micro controller is information sent to family members and coastal guard through GSM system

Fig 4 Block diagram of proposed system

Fig 3 Flow diagram of emergency unit

IV.PROPOSED SYSTEM DESIGN

The system is providing more secure as hybrid technique of using Global Positioning System (GPS) and Global system for mobile communication. In addition emergency system connected with micro controller. The gps receiver gets the information of latitude and longitude value from the satellite. RS232 cable used to send serial binary data to the microcontroller. Microcontroller also has predefined latitude and longitude value which compare with gps receiver value.When the value are matched ship/boat motor will be turn off and start rotate in reverse direction. Comparing value is less than of the predefined value then the boat/ ship moving into forward direction.
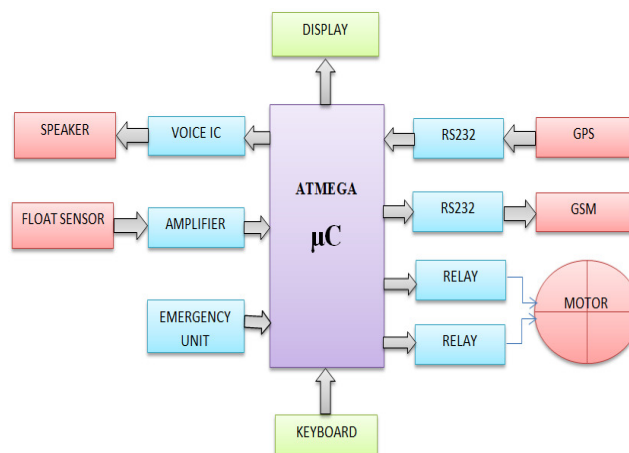
The GPS information is sent to coastal guard where it is read and then through a GSM device, information is sent to the family at crossed border who are in expectation about their family member's safety. Fuel level will indicate LCD display at regular intervals. Emergency unit is provided voice alert for safety in the boat. Recording voice can be change in different types. Device has been created to help them not to move beyond the border by motor

Interfacing With Micro Controller

The existing system used as AT89C51 microcontroller. The main disadvantages of AT89C51 there are no inbuilt ADC and EEPROM, if it is need more space in the circuits. The propose system use as ATMEGA162 microcontroller. It has inbuilt of ADC, EEPROM. It need only less amount of instruction so the system will fast. 131

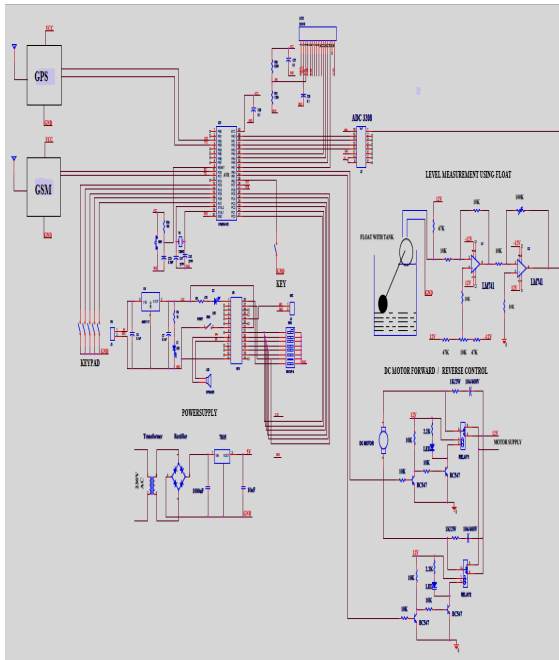Powerful Instructions can be execute in Single-clock Cycle Execution.

Fig 5 Interfacing with micro controller

Global Positioning System Device

The Global Positioning System based satellite navigation system that provides location and time information in all weather conditions. Positioning system basically consists of two and Receiver. The transmitter's job is to track the location with the help of information from satellite information is taken and this is sent to the exact longitude and latitude working of GPS is explained as follows. First, the signal is transmitted to the satellites and the time taken for transmissionis calculated.

Depending on the time taken, the latitude and longitude information is fed into the receiver. Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at the same instant. The signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are further away than others. The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver The system produces critical capabilities to army, civil users and commercial users everywhere the world. The GPS RX receives the signals from GPS satellites that can only be used suitably in outdoors. Conventional receivers did not suitable for forest regions or metropolitan cities due to the buildings obstruction but the latest receiver designs have high performance. Christo Ananth et al. [6] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management.

DGPS

Normally GPS units provides from 10 to 20 meter accuracy. Many types of GPS receivers used to find the current location. Differential Global Positioning System 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 from 1meter up to 3meter.

GSM

Global System for Mobile communications is a digital cellular technology.it is used for sending mobile voice and data. It operates at either the 900 MHz or 1800 MHz frequency band. GSM module is connected to microcontroller. Micro controller has database of latitude and longitude position value. Signal fed into the GSM unit from the controller and enabled of GSM module until GSM module is hold. The information is sent to the family member's mobile through SMS when crossing of the border is done. Simultaneously information is sent to the border security and immediately prevent action is taken. This process also same for emergency unit when it is active.

AVR Microcontroller

The AVR architecture is the fast-access RISC register file, which consists of 32 x 8-bit general purpose working registers, 131 Powerful Instructions execute within one single clock cycle. ATmega162 micro controller is consisting features of 16K Bytes of In-System Self-programmable Flash program memory, 512 Bytes EEPROM, 1K Bytes Internal SRAM Real Time Counter with Separate Oscillator Boundary-scan Capabilities According to the JTAG Standard Internal Calibrated RC Oscillator. In AVR, the program memory space is separated from the data memory space. Due to the true single cycle execution of arithmetic and logic operations, the AVR microcontrollers achieve performance approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

AVR Compiler

High Level Languages (HLLs) are rapidly becoming the standard methodology for embedded microcontrollers due to improved time-to-market and simplified maintenance support. In order to ensure that the new ATMEL AVR family of microcontrollers was well suited as a target for C compiler, the external C compiler development was started before the AVR architecture and instruction set were completed. During the initial development of the C compiler, several potential improvements in the AVR were identified and implemented. The result of this cooperation between the compiler developer and the AVR development team is a microcontroller for which highly efficient, high performance code is generated.

Sub-Components

Fuel Level Measurement Using Float

Float is the one type of transducer which is used to measure the fuel level in the tank. The float changes the resistance value depending on the fuel level. This change is resistance is converted into corresponding voltage signal which is given to inverting input terminal of the comparator. The reference voltage is given to non-inverting input terminal. The comparator is constructed by the operational amplifier LM 741. The comparator compares with reference fuel level and delivered the error voltage at the output terminal. Then the error voltage is given to next stage of gain amplifier which is constructed by another operational amplifier LM 741. In the gain amplifier the variable resistor is connected in the feedback path, by adjusting the resistor we can get the desired gain. Then the final voltage is given to ADC for convert the analog signal to digital signal. Then the corresponding digital signal is given to microcontroller in order to find the fuel level in the tank.

RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they

are doublethrow (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.
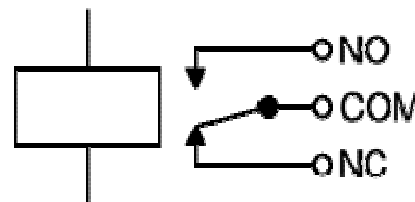

Fig 6 Relay symbol

COM = Common, always connect to this; it is the moving part of the switch.

NC = Normally Closed, COM is connected to this whenthe relay coil is **off**.

NO = Normally Open, COM is connected to this when the relay coil is **on**
DC Motor

Motors convert electrical energy (from a battery or voltage source) into mechanical energy (used to cause rotation). A simple DC motor has a coil of wire that can rotate in a magnetic field. The current in the coil is supplied via two brushes that make moving contact with a split ring. The coil lies in a steady magnetic field. The

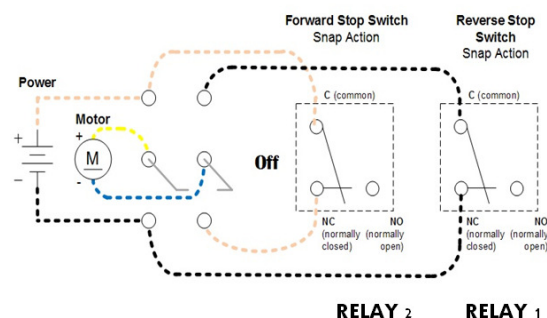forces exerted on the current-carrying wires create a torque on the coil.

Fig 7 Motor control by Relay

Generally, the rotational speed of a DC motor is proportional to the voltage applied to it, and the torque is proportional to the current. Speed control can be achieved by variable battery tapping, variable supply voltage, resistors or electronic controls. The direction of a wound field DC motor can be changed by reversing either the field or armature connections but not both. This is commonly done with a special set of contactors (direction contactors).

RS232

In telecommunications, RS-232 is a standard for serial binary data interconnection between a DTE (Data terminal equipment) and a DCE (Data Circuit-terminating Equipment). It is commonly used in computer serial ports.

LCD

Liquid Crystal Display (LCD's) has materials, which combine the properties of both liquids and crystals Crystalloids dot–matrix (alphanumeric) liquid crystal displays are available in TN, STN types, with or without backlight. The use of C-MOS LCD controller and driver ICs result in low power consumption. The LCD's are lightweight with only a few millimeters thickness. Since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long duration's .These modules can be interfaced with a 4-bit or 8-bit microprocessor /Micro controller

Boundary Locations

The boundary points are marked in figure. These points should be stored in microcontroller. The computation is done in microcontroller with these points
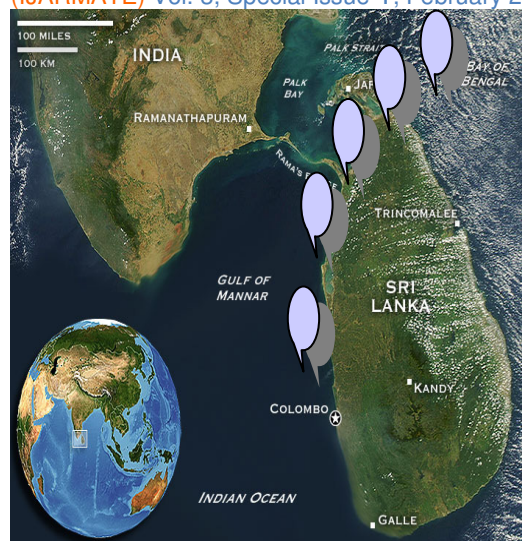.

Fig 8 Boundary of India and Srilanka

Boader Between India And Sri Lanka

The maritime boundary between Sri Lanka and India in theBay of Bengal shall be arcs of great circles between the Following positions, in the sequence given below, defined by latitude and longitude

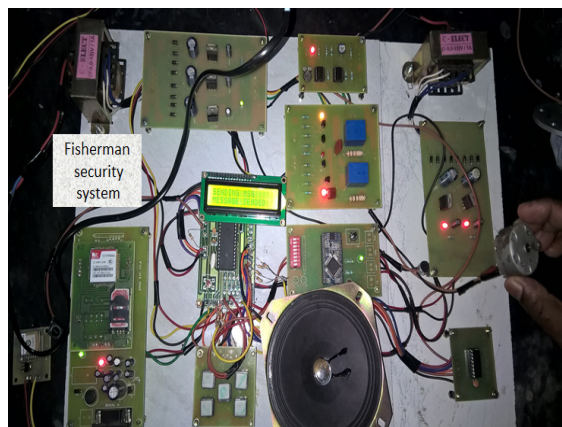| Border	Latitude & longitude value
Point1	+10 5'0.00" & +80 03'0.00"
Point2	+9 6'0.00" & +79 32'0.00"
Point3	+8 22.2' & +78 55.4 '
Point4	+7 53.3' & +78 45.7'
Point5	+ 5 53.9' & +77 50.7'

Table 1 Latitude & longitude value

Fig 10 Rescue system for fisherman

V.CONCLUSION

The project also aims at providing peace at the borders and reduces the tensions between the two countries. Thus saving their lives and providing good relationship with the neighboring countries. Also, the piracy of ship can be easily brought under control. The system devise will also include a waterproof casing such that the circuit is not prone to any damage. This model proves to challenge the already existing model which just uses a GPS device to track the border and make the boat move backwards as motor. The system proposed will not only alert the fishermen but also carries the information to the control station and also notifies the family members through the GSM system. In case the boat is lost due to rough conditions of the sea (or) intentional

crossing of the border is done, then the information is immediately sent to the border security and the necessary action is taken.

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