

Satellite and RF based Submarine Navigation

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Abstract: In any country's Coast line, fishing is one of the most important occupations of the people. When the fishermen go out to sea for fishing, they cannot visually distinguish between their country's border, the international water boundary and the other country's border. When they tread into the other country's border unknowingly, they get arrested for trespassing and are thus jailed. This is a major issue existing till date. Hence this project provides border alerting for the fisherman at sea. The system gives alert when fisher man about to reach other countries boundary through RF transmitter and RF receiver, alert is provided through MP3 module and fisher man will be provided with RFID tags so that system can acknowledge which fisher man is out at sea. At emergency conditions the location of ship is fetched through GPS and sent message to base station via GSM and any changes in weather is also informed to fisher man from base station through audio alert.

Keywords: GPS (Global Positioning System), GSM (Global Service For Mobile Communication), Map, Alarm System, Android Smartphone.

I. INTRODUCTION

Unlike on land, visually distinguishing the border of a country at sea is impossible. We have seen many cases where in the fishermen are found "trespassing" into other country's border and as a result are jailed. Unfortunately, these fishermen fail to realize they are in the other country's border and thus get caught. This is one of the most tragic phenomenon's seen (for example: between India and Srilanka & India and Pakistan). As of today, there is no system available (that is affordable and portable) for the fishermen that can help him in alerting him if he is venturing out of the country's border at sea.

Thus this project has been proposed which gives audio alert to fisher man when he tries to cross boundaries unknowingly and fisher man can send signals when he is at risk, The GPS location is sent to base station via GSM and sudden weather change information is sent to fisher man so that he can come back to shore immediately and fisher man will be provided with RFID tags so that system can acknowledge which fisher man is out at sea.

II. DESCRIPTION

Many embedded systems have substantially different designs according to their functions and utilities. In this project design, structured modular design concept is adopted and the system is mainly composed of a single microcontroller, LCD, GSM, RF transmitter, RF receiver, RFID, GPS, emergency switch, buzzer and android application. The microcontroller located at the centre of the

block diagram forms the control unit of the entire project. Embedded within the microcontroller is a program that helps the microcontroller to take action based on the inputs provided.

In this project, the main features are Border Determination and emergency message communication, The fisher man out at the sea will be provided with RFID tag, as he enters to ship, information about person is sent to base station and if the ship about to reach or cross other country boundaries alert is obtained through mp3 module, any emergency at sea is informed to base station using emergency switch, base station receives the GPS location of the ship and sudden change in the weather is intimated to fisher man from base station. Base station is represented by android application.

III. EXISTING SYSTEM

In the *Existing System*, Remote monitoring of vehicle diagnostics and location using smart box with GPS this system can be preprogrammed with the permitted speed limit using DC motor. When fisherman reach the border, boat will automatically stop and OTP is given to the opposite countries. The reputed person checks the OTP with fisherman id or may take any action for crossing border [2].

IV. PROPOSED SYSTEM

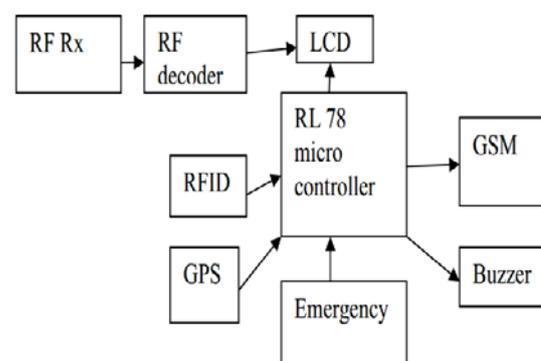


Figure. 1. Block diagram

The figure above contains essentially microcontroller, RFID, emergency, GPS, LCD, GSM, and an Android smart phone. Many embedded systems have significantly different designs depending on their functions and utilities. In this project design, the concept of structured modular design is adopted and the system is mainly composed of a single microcontroller, interfaced to RFID, GPS, emergency switch, LCD and GSM.

The microcontroller in the centre of the diagram forms the control unit for the entire project. A program integrated in the microcontroller helps the microcontroller act according to the inputs provided by the RF transmitter.

- In proposed system, it provides border alerting for the fisherman at sea. The system gives alert when fisherman about to reach other countries boundary through RF transmitter and RF receiver, alert is provided through buzzer and GSM module and fisherman will be provided with RFID tags so that system can acknowledge which fisherman is out at sea. At emergency conditions the location of ship is fetched through GPS and sent to base station via GSM.

- A LCD display is located in boat unit to display the current location of the boat. The output of the RF receiver is associated with the I/O pins of the microcontroller which is associated with the ADC unit introduced on-chip. On the off chance that the microcontroller will send the information to the Android Smartphone by means of GSM.

V. COMPONENTS

GSM Module (SIM 900)

SIM900 is a Tri-band GSM/GPRS engine that tackles frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. SIM900 highlights GPRS multi-opening class 10/class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. You can use AT Command to get information in SIM card. The SIM interface supports the handiness of the GSM Phase 1 detail and moreover supports the convenience of the new GSM Phase 2+ assurance for FAST 64 kbps SIM (expected for use with a SIM application Tool-kit). Both 1.8V and 3.0V SIM Cards are maintained.

The SIM interface is controlled from an inside controller in the module having apparent voltage 2.8V. All pins reset as yields driving low. The "AT" or "at" prefix must be set toward the begin of each summon line. To end a charge line enters <CR>. Summons are for the most part trailed by a response that includes "<CR><LF><response><CR><LF>". All through this record, only the responses are displayed, <CR><LF> are disposed of purposely.

Command	Possible responses
AT+CGMI	FLYFOT MODEM OK
Note: Get manufacture identification	Note: Command valid. FLYFOT modem
AT+CGMI=?	OK
AT+CGMI? AT+CGMI=1	+CME ERROR 3 Note: not support

Table. 1 Commands

RENESAS RL78x 16bit Microcontroller:

The Renesas Electronics RL78 microcontroller is a 16-bit CPU core with CISC architecture with abundant features with inbuilt ADC.

A. Max232:

The max232 is a dual controller / receiver that includes a capacitive voltage generator to provide EIA-232 voltage levels from a single 5V supply. Each receiver converts EIA-232 inputs into TTL / CMOS 5-V levels. These receivers have a typical 1.3V threshold and a typical 0.5V hysteresis and can accept 30V inputs. Each controller converts TTL / CMOS input levels to EIA-232 levels.

B. Alpha-numeric LCD Display:

A liquid crystal display (LCD) is a flat screen, an electronic visual screen, based on Liquid Crystal technology. It consists of a series of small segments called pixels that can be manipulated to present information. LCD screens are used in a wide range of applications, such as computer monitors, televisions, instrument panels, aircraft cockpit screens, etc.

C. Android:

Android is a Linux-based mobile operating system developed by Google. Android is unique because Google is actively developing the platform, but offers it free to hardware manufacturers and phone operators who want to use Android on their devices. It is a stack of software for mobile devices that includes an operating system, middleware, and key applications. The Android SDK provides the tools needed to start developing applications on the Android platform using the Java programming language.

D. RFID tags have several ranges of functions, which makes reading easier, and cards should simply be used in a reader instead of slipping. These cards are used for access and security, time and presence, network connection security, biometric verification, cashless payment and even event management.

ADVANTAGES

- The system guides them such that they are aware of the nation's boundary and when they have crossed it.
- With the incorporation of the alert / warning & distress systems, the fishermen can be assisted at times of disaster.

VI. CONCLUSION

To provide mobility to track fishermen's activities, the Smartphone is a convenient and appropriate device because of its rich features. In this project, we used the Smartphone and RFID interconnected with the microcontroller that can alert fishermen to cross borders without knowing it in case of emergency, an emergency

message sent to the base station and the most boats loved ones looking for help.

FUTURE WORK

For project demo concern, we have developed a prototype module. In future, this project can be taken to the product level. To make this project as user friendly and durable, we need to make it compact and cost effective. Going further, most of the units can be embedded along with the controller on a single board with change in technology, thereby reducing the size of the system.

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