

# BORDER ALERTING SYSTEM FOR FISHERMEN USING GPS MODULE

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**Abstract** – Fishing is one of the oldest occupation, perhaps it is older than agriculture. Fishing in India employs about 14.5 million people. In this modern, fast moving insecure world, it has become a basic necessity to be aware of one’s safety. The maximum risks occur for fishermen in situations where they travel on a boat for fishing. In some situations, they should not enter into another country area. There is a real necessity in designing a system that can help our fishermen to avoid such situations. This paper proposes a system where a GPS module plays a major role. Here GPS and GSM are used in the same module, where GPS tracks the exact location of the boat and its value is given to the microcontroller and is continuously compared with the predefined values and the current location and its value is displayed on the LCD. When the boat crosses the predefined location (latitude and longitude), it alerts the fishermen through the buzzer and also the speed of the motor is controlled. We have practically implemented the project and tested this module at Lingambudhi lake which is located in the city of Mysuru, Karnataka.

## 3. PROPOSED SYSTEM

In the proposed system, module (like SIM808) which consists of GPS and GSM modules integrated on a single board. The GPS receiver is used to find the current location of the fishing boat. Using GPS, the current latitude and longitude values can be determined and is then sent to microcontroller unit. Later the microcontroller unit finds the current location by comparing the present latitude and longitude values with the predefined value. For some set of threshold value, we consider it as normal zone and for some set of values its warning zone. Then from the result of the comparison, if the boat is in the warning zone, this system alerts the fishermen through the buzzer interfaced to the microcontroller, that they are about to reach the nautical border, and the speed of the boat can be controlled.

## 4. BLOCK DIAGRAM

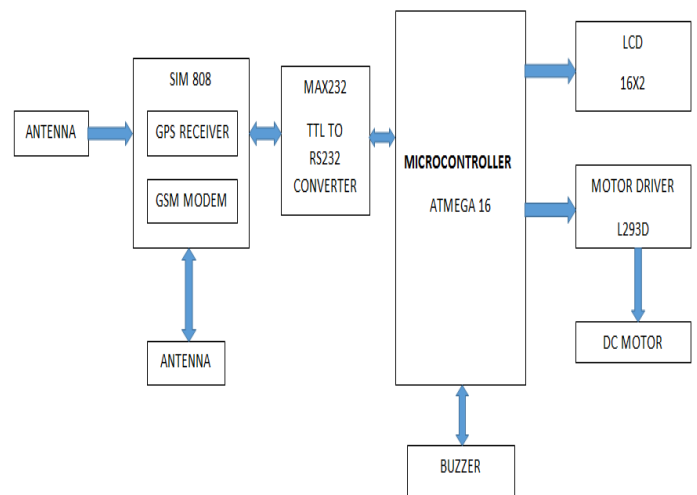


Fig-1: Block diagram

## 5. BLOCK DIAGRAM DESCRIPTION

- 1. GPS Receiver:** A Global Positioning System (GPS) receiver continuously receives the signal from the satellites through the antenna. It contains information regarding time (GMT), latitude, longitude, altitude, etc. This information is in the standard NMEA protocol and data format. This data will be in RS232 protocol, whereas the

**Key Words:** GPS, GSM, microcontroller, motor, buzzer.

## 1. INTRODUCTION

The person’s livelihood in coastal areas, purely depends on the fishing occupation in the sea. Due to unawareness of the boundary limits, the fishermen cross the maritime border. This is treated as a serious offence. They are being arrested or killed and their boats are being captured by the neighbouring countries of coast guards. Under such situation the lives of the fishermen continue to be in danger. This factor leads to the human loss and affect the country’s economic relation with neighbouring countries. To eliminate such difficulty, a system has been developed which helps the fishermen to be aware of crossing the border line. A border alert system for fishermen using GPS is one such system which protects them by notifying the country border.

## 2. EXISTING SYSTEM

At present there are many proposed systems which will enable the fishermen to be aware of the country’s border line. This system includes GPS and radar system which continuously notify the fishermen.

microcontroller supports TTL logic, therefore MAX232 is used, which acts as a protocol converter.

2. **GSM:** Global System for Mobile communication (GSM) is used to add an SMS alert facility to the system. If the boat tends to move closer to the border, an SMS is sent to the control room to alert.
3. **Microcontroller:** Microcontroller receives the data from the GPS module through MAX232. This data which contains latitude and longitude values will be compared with the predefined latitude and longitude values. The threshold values are divided as normal and warning zone. Based on the comparison, further action is taken.
4. **LCD:** The latitude and longitude values are continuously displayed on a 16X2 LCD that indicates a normal zone and warning zone.
5. **Motor:** In the normal zone, the motor will be running at regular speed. If the boat is in the warning zone, the speed of the motor is reduced through PWM technology and the direction of the boat can be changed mechanically or through programming.
6. **Buzzer:** If the boat is in the normal zone, the buzzer will not be functioning. If the boat is in the warning zone, the buzzer will alert the fishermen.

## 6. GPS

Global Positioning System technology became a reality through the efforts of the American military, which established a satellite-based navigation system consisting of a network of 24 satellites orbiting the earth. GPS is also known as the NAVSTAR (Navigation System for Timing and Ranging). GPS works all across the world and in all weather conditions, thus helping users track locations, objects, and even individuals. GPS technology can be used by any person if they have a GPS receiver.

## 7. GSM

A Global System for Mobile communication module is used to establish communication between a computer and a GSM-GPRS system. GSM is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. A GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc.) for computer. The MODEM is the soul of such modules. A GSM/GPRS module assembles a GSM/GPRS modem with standard communication interfaces like RS-232 (Serial Port), USB, etc., so that it can be easily interfaced with a computer or a microprocessor / microcontroller based system. The power supply circuit is also built in the module that can be activated by using a suitable adaptor.

## 8. MICROCONTROLLER

Atmega16 is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. Atmega16 is based on enhanced RISC (Reduced Instruction Set Computing) architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle. Atmega16 can work on a maximum frequency of 16MHz. Atmega16 has 16 KB programmable flash memory, static RAM of 1 KB and EEPROM of 512 Bytes. Atmega16 is a 40 pin microcontroller. There are 32 Input/output lines which are divided into four 8-bit ports designated as PORTA, PORTB, PORTC and PORTD. Atmega16 has various in-built peripherals like USART, ADC, Analog Comparator, SPI, JTAG etc. Each Input/output pin has an alternative task related to in-built peripherals.

## 9. MOTORDRIVER

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a high-current signal. This high current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

## 10. FLOWCHART

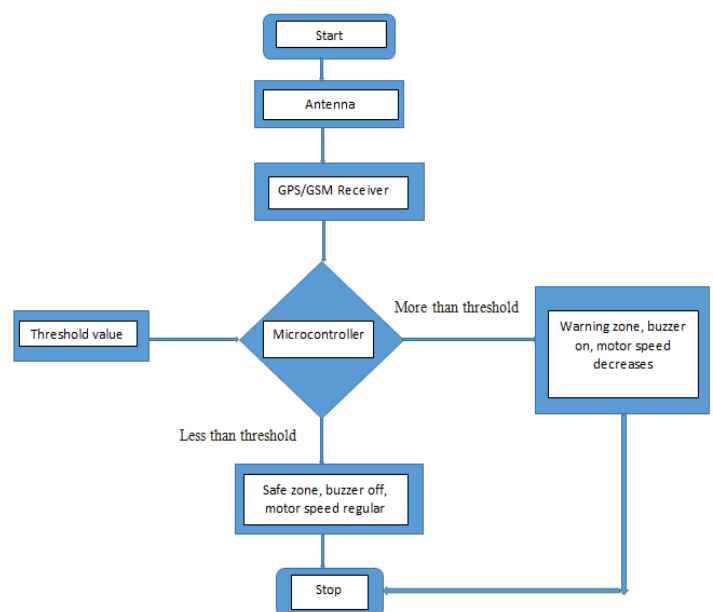


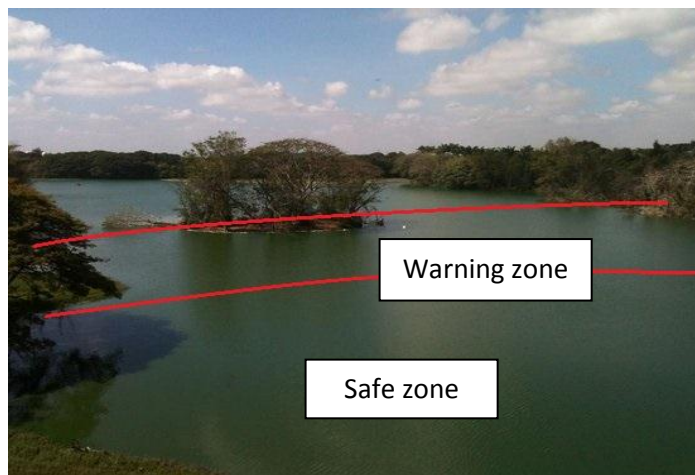
Fig-2: Flowchart

### 11. OUTPUT

We tested this module practically on Lingambudhi lake. This module worked upto our expectation and the result obtained is tabulated as follows:

**Table-1:** Output Table

Sl. No.	Latitude	Longitute	Buzzer Status	Motor Speed
1	<1217.384, N	<7633.1586,E	off	255
2	1217.384,N - 1218.485,N	7633.1586,E - 7636.3587,E	off	150
3	>1218.485, N	>7636.3587,E	on	105



**Fig-3:** Lingambudhi lake

### 12. APPLICATIONS

1. The lost vehicle can be detected.
2. The lost ship wrecks due to the natural calamities can be identified.
3. The hijack of the ship can be prevented.

### 13. FUTURE WORK

1. The accuracy of the system can be improved using Differential Global Positioning System (DGPS).
2. Voice or audio processing can be done.

### 14. CONCLUSION

This paper generates alarm which will not allow the fishermen to cross the border by mistake. With the simple circuitry and the use of sensors (low cost sensors) makes the module a low cost product, which can be purchased even by a poor fisherman. This system provides high accuracy and high precision values of the latitude and longitude. The

process of routing the fishermen will be more efficient with the help of this system.

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