

Applications of GSM and RFID Technologies for Protecting Fishermen

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Abstract—While fishing in large sea the fishermen often cross the county nautical border without their knowledge. Due to which sometimes the country they accidentally enter misunderstand them for terrorist. That results in either killing or custody of them due to lack of identification documents and pre warning while crossing the border. The protection of innocent fishermen's from the shooting and arresting by the other country navy is possible due to the GSM and RFID technology. An Embedded technology which uses GSM (Global System for Mobile), and LPC2148 ARM microcontroller and RFID (Radio Frequency Identification) can avoid this. There are three boundaries of borders taken. Final state boundary will be the border between the two countries and other two borders before that comes under the parental country circumstances. First two border crossing will be monitored by Indian government. The fishermen's are warned by the warning devices such as speaker (a buzzer) and an LCD display while they crossing the first two borders. If warning system fails there is another option. While crossing third border, the motor in the boat turns off automatically. Now Information about the fishermen's will be acknowledged to both the government.

Keywords - Fishermen, Sea border, GSM, RFID, Buzzer, Message to Navy, UART, ARM Microcontroller, Emergency.

I. INTRODUCTION

In modern world, Wireless Sensor Networks (WSNs) are significant current research subject in the world. It is a collection and combination of distributed devices with the ARM Microcontroller for monitoring environmental conditions and objects through sensing devices. Radio Frequency readers play a major role in advanced techniques because the radio frequency signals might not be affected by the environmental conditions such as in various climatic conditions and also in case of natural disasters [1], [4]. In real world applications, WSN is used to provide tremendous facilities in deployed surrounding such as environmental detection, assisted living, site security, Military applications, automation, defense, health monitoring, and etc [2].

An RFID is a technology which uses one or more readers and number of tags and a backend database. The object of a boat/ship is identified physically and the information about the owning person of a boat and the persons who are in the boat/ship also contained in the RFID tags. This RFID tags are tuned for a particular frequency and has a different unique ID numbers [1]. The GSM unit is used for the transmission and reception of signals which contains information about the fishermen and object (boat/ship) to identify the location of them. In RFID, the main part is database contains all secret information for security purposes [6].

II. ISSUES OF LOCALIZATION

- Positioning is more important for accuracy.
- High power is required.
- More security.
- Complication of both software and hardware devices.
- High cost.
- Problems in range of coverage.
- Sources are very limited
- For large system applications scalability is required.

To overcome those of problems we are using an embedded technology for the security with very low cost in practical environment where is digital data encoded in RFID tags or smart labels are captured/ read by a reader through radio waves [1].

III. BLOCK DIAGRAM OF SYSTEM

The diagram shows an embedded technology which uses GSM and RFID (RF Identification), LPC2148 Arm microcontroller which are embedded with various components like motor, switches, a buzzer, an LCD display. The motor control is also incorporated with the relay switch where is control unit in secondary controller.

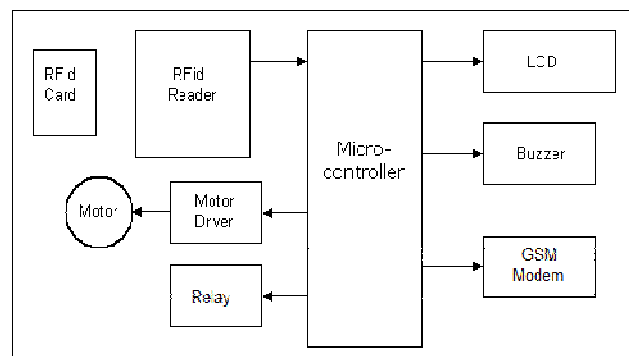


Fig 1. Block diagram of system

IV. VARIOUS COMPONENTS OF SYSTEM

A) GSM MODEM:

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries [2]. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.
 2. Read, add, search phonebook entries of the SIM.
 3. Make, Receive, or reject a voice call.
- [6]



Fig 2. GSM module

B) RFID:

Radio-Frequency Identification (RFID) is the use of radio waves to read and capture information stored on a tag attached to an object. A tag can be read from up to several feet away and does not need to be within direct line-of-sight of the reader to be tracked [4].



Fig 3. RFID System

1) THE RFID READER:

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader.

RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID

technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items [2].



Fig 4. RFID reader

2) THE RFID TAG:

A Radio Frequency Identification Tag (RFID tag) is an electronic tag that exchanges data with a RFID reader through radio waves. Most RFID tags are made up of at least two main parts. The first is an antenna, which receives radio frequency (RF) waves [5]. The second is an integrated circuit (IC), which is used for processing and storing data, as well as modulating and demodulating the radio waves received/sent by the antenna. A RFID tag is also known as a RFID chip [4].



Fig 5. Types of RFID tags

V. WORKING OF SYSTEM

When the boat/ship is crossing the borders the RFID reader reads the RF tag. When the boat is crossing the first two borders, warning held to the fishermen through voice board and LCD display.

Now messages about the fishermen under area will go to the Indian government authorities. The warning message for the first two border is "you are crossing first border/second level of the boat will lose the contact from the relay switch" and an emergency button in the boat will help the fishermen to comeback inside the safety zone. If it fails at the crease of third border, two messages will go to both the governments. From that, the two governments can acknowledge about the fishermen.

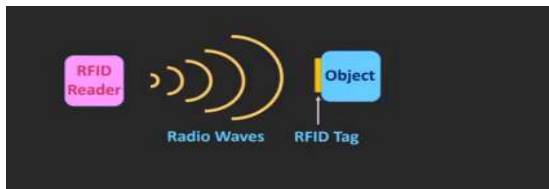


Fig 6. Working of system

VI. RESULT OF THE SYSTEM

While the fishermen crossing the first two borders the warning messages from the waning devices which are speaker (interfaced with the voice board) and LCD display depending upon the level which is shown by the following pictures. In the first two border level the alert systems provide a simple warning messages but it might be very useful for the innocent fishermen's in the war of saving their life and in protection of their living rights.

By chance of crossing third and original boundary of sea border, the boat motor is been turned off automatically. By pressing the Emergency button the boat/ship gets back into the safety zone. An RF signal may be transferred to the border regions from satellite also.

This may be preferred while in case of fixing an RF transmitter in the mid-level of the sea which may provide efficient detection during any unhealthy climatic conditions such as heavy rain, cloudy environment, under storm periods. Because of an RF signal will not affect by any of the above said conditions. This option is for secondary rather than the first one in real time applications.

VII. ADVANTAGES

- In this technology we can obtain continuous position values.
- Power consumption is very low.
- Very low cost.
- Improved security.
- Rescuing the fishermen's.
- Less maintenance required.
- Long duration of lifetime.
- It will not be affected by natural disasters.
- For any climatic environment it will operate without failure.

VIII. CONCLUSION


With an advanced technology of an embedded system containing these LPC2148 ARM Microcontroller, GSM and RFID implementation will help the fishermen's in the mid sea at the day time as well as in night time from unfortunately crossing the sea border and also from the legal actions of arresting and illegal actions of killing,

shooting by the other country navy can be avoided and enabling the protection of the innocent fishermen's might be possible


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