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A Unique Methodology for Sea Border Intrusion Alert and Black Box System Using Lora WAN

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ABSTRACT: This paper presents how the protection of innocent fishermen's from the shooting and arresting by the other country navy is possible. An Embedded technology which uses GSM (Global System for Mobile), and LPC2148 Arm microcontroller and LORA WAN 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, 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. 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.

II. BACKGROUND OF LOCALIZATION

Localization is an important when the fishermen boat or ship is riding in the sea. Some of the peoples may not have the knowledge about the border area and there is a possibility of crossing the border. So they may be attacked or arrested by the alleged involvement of other country navy. It can be avoided by using this embedded technology which uses the GSM and LORA WAN. Localization is motivated by battlefield surveillance in military and navy applications. For localization there are number of techniques and algorithms but in the field of sea based locations, that has been proposed for a localized node. There are several key issues may arise during localization which include,

- Positioning is more important for accuracy.

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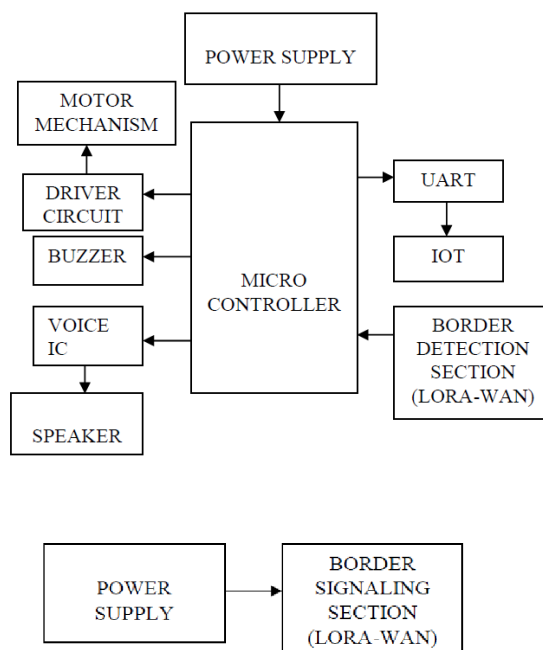
- High power is required.
- More security.
- Complication of both software and hardware devices.
- High cost.
- Problems in range of coverage.
- Sources are very limited.
- For large system applications scalability must required.

To overcome those of problems an embedded technology is proposed 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. The RFID is similar to bar coding in that, data from label or tag is captured by a database of a RFID reader.

III. IMPLEMENTATION OF FUNCTIONAL BLOCK

The diagram shows an embedded technology which uses GSM and Lora Wan, 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. The border is divided into three which are B1, B2, and B3. Border B3 is the final state original boundary of a border and remaining two borders B1 and B2 are comes under the parental country circumstances. Two indicators for safety purposes which are speaker connected with the voice board and an LCD display. The RFID tags are fixed under the boat/ship. One Emergency button of single relay switch is present in the boat/ship. All these elements are embedded with the LPC2148 ARM microcontroller which is an advanced controller.

IV. BLOCK DIAGRAM REPRESENTATION



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A) GSM MODEM:

Global System for Mobile communications from the *Group Special Mobile* is the most popular standard for mobile phones in the world. GSM is used in almost 210 countries and territories over 3 billion people. It makes an international roaming very common between mobile phone users/operators, and enabling of the subscribers to use their phones in many parts of the world. GSM differing from its both signalling and speech channels are digital, and is considered as a **second generation (2G)** of a mobile phone system. This has also meant that the data communication was very easy to build into the system. GSM EDGE is a 3G version of the wireless protocol system.

Module Name: Q2303A

Product Description:

- DB9 RS232 interface/interact with voice function.
- Based on Waveform module such as Q2303A.
- SIM card slot, capable of 3V.
- Input current 1.2A.
- SIM Toolkit for application.
- Double tone multi-frequency function (DTMF).
- Send and receive SMS/data.
- Standby current = 56mA (at most).
- Antenna which has high sensitivity.
- Compiled with ETSI GSM Phase 2plus (2+).
- Dual band operation.
- Class 42 W at 900MHz.
- Class 11 W at 1800MHz.
- Input voltage range 6V-36V DC.
- Working current = 100-140mA.
- Working temperature range is -20 to +55.
- Storage temperature range is -25 to +70.
- Accessories - AC/DC adaptor, DB9 RS232 (protocol) cable, antenna, 2 mounting plates, CD.

B) DC MOTOR:

The dc motor is embedded with the programmed software which describes the ON/OFF state that required for a particular time.

C) Model of Existing System Model

The existing system uses 8051 microcontroller which has a limited input and output ports and the number of usable I/O pins are very low in range. The operational speed is also low. To overcome the limitations of this existing system we might approach the LPC2148 ARM microcontroller. A KEIL compiler is software used to program for the obtaining of desired working conditions based on the priority. The KEIL compiler is like a C program.

V. RESULT OF THE SYSTEM

While the fishermen crossing the first two borders the warning messages from the warning 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. The secondary option for warning the fishermen will be from the LCD display. Signal may be transferred to the border regions from satellite also.

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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.

From this protection of the fishermen's from the shooting and arresting of Indian fishermen's from the alleged involvement other country navy especially Sri Lankan government. So the fishermen's are not a "orphans" in the mid sea while they are doing their work of Fishing.

VI. 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 only required.
- Long duration of lifetime.
- It will not be affected by natural disasters.
- For any climatic environment it will operate without failure.

VII. CONCLUSION

With an advanced technology of an embedded system containing these LPC2148 ARM Microcontroller, Lora Wan 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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