



Boat localization and warning system for border identification

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Abstract-This paper proposes a global localization system based on ZigBee technology. A reader, installed on the boat measures the received signal strength indication (RSSI). This paper focuses on implementing border identification system for all boats. However, the existing system is not powerful enough to prevent the crime against fishermen as it gives only the information about the border identification but not about the exact distance that the boat has travelled from the border. It provides lesser possibility to know about their location in case of any danger. The proposed system's transmitter section includes PIC microcontroller RSSI ZigBee module, voice playback circuit and DC motor and the receiver section includes RSSI ZigBee, PC as monitoring database in the control room of port. Finally, results of our system were discussed in this paper.

Index terms- PC, PIC, RSSI ZigBee, PIC16F877A.

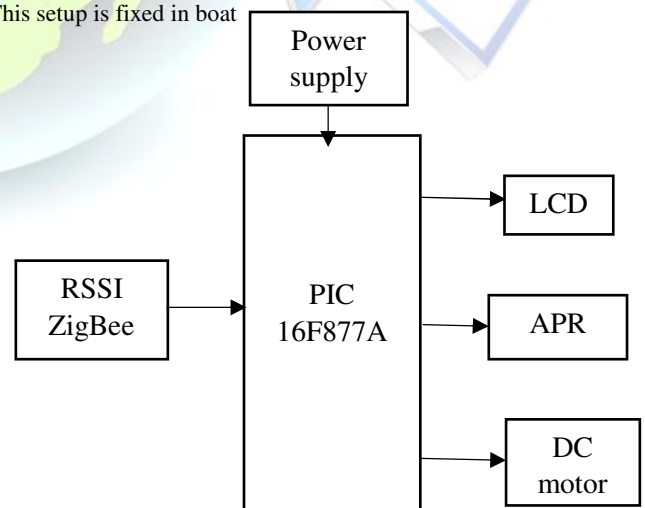
I. INTRODUCTION

Border identification system is widely used all over the world to assure government that their fishermen are safe from suspicious actions. The proposed system includes measuring the distance that the boat has crossed from its

border. The information pertaining to crossed boat is sent to control room of the port as well as to the fishermen, if they move beyond their coverage area. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The technology used in PIC 16F877 is flash memory, so that data is retained even when the power is off. Easy programming and erasing are other features of PIC 16F877. RSSI technology is used to measure distance travelled beyond its border and to provide the alert for the fishermen in boat.

II. SYSTEM DESIGN

This setup is fixed in boat





This setup is in port control room

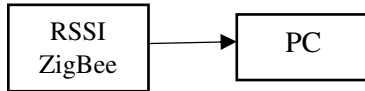


Fig 1. Block diagram of proposed system

This section describes the location of the boat and identify the sea border. The warning information is transmitted and received using RSSI technology. The boat module act as transmitter which includes PIC microcontroller, APR voice playback circuit, LCD, DC motor, RSSI ZigBee. The receiver section consist of RSSI ZigBee, PC. The PIC controller sends the data to PC using RSSI. When the boat crosses the border, voice playback circuit is triggered by PIC microcontroller and motor will get turned off. The intimation about the corresponding boat is sent to PC in control room.

III.HARDWARESYSTEM DESIGN

a. PIC Microcontroller:

The microcontroller that has been used for this project is from PIC series. PIC stands for peripheral interface controller as coined by microchip technology. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) that uses separate bus for instructions and data allowing simultaneous access of program and data memory. The main advantage is the low power consumption resulting in a very small chip and cost is less when compared to other microcontrollers. PIC make use of flash technology, so that data is retained even when the power is switched off. High performance RISC CPU provides

enhanced interfacing features with external devices. Easy programming and erasing are other features of PIC16f877. Christo Ananth et al. [3] proposed a system about Efficient Sensor Network for Vehicle Security. Today vehicle theft rate is very high, greater challenges are coming from thieves thus tracking/ alarming systems are being deployed with an increasingly popularity. As per as security is concerned today most of the vehicles are running on the LPG so it is necessary to monitor any leakage or level of LPG in order to provide safety to passenger. Also in this fast running world everybody is in hurry so it is required to provide fully automated maintenance system to make the journey of the passenger safe, comfortable and economical. To make the system more intelligent and advanced it is required to introduce some important developments that can help to promote not only the luxurious but also safety drive to the owner. The system "Efficient Sensor Network for Vehicle Security", introduces a new trend in automobile industry.



Fig 2. PIC 16F877A

b. ZigBee:

ZigBee is a high level communication protocols used to create personal area networks built from small, low power digital radios. ZigBee is based on IEEE802.15 standard and it can transmit data over long distances. ZigBee is a wireless technology developed as an open global standard to address the unique needs of low cost, low power wireless networks. ZigBee is used in application that require only a low data rate, long battery life and secure networking and it operates in unlicensed bands including 2.4GHz.



Fig 3. ZigBee module

c. APR voice:

APR9600 is a low cost high performance sound record/replay IC incorporating flash analogue storage technique. Recorded sound is retained eve after power supply is removed from the module. The replayed sound exhibits high quality with a low noise level. Sampling rate for a 60 second recording period is 4.2KHZ. The IC can be controlled simply using push button keys.

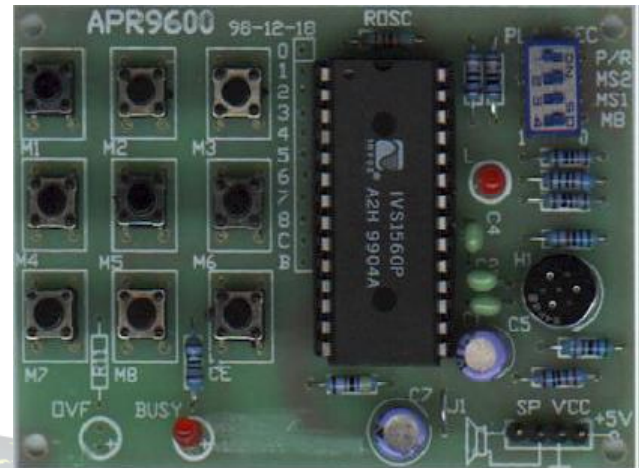


Fig 4. APR voice playback circuit



Fig 5. Liquid Crystal Display

c. Display unit:

Liquid Crystal Display (LCD) is an electronic display module. Each character is displayed in 5*7 pixel matrix and it is has sixteen cross two LCD module. LCD standard requires 3 control lines and 8 I/O lines for data bus. Here we make use of LCD for continuous display of distance.

IV. SOFTWARE DESIGN

a. Embedded C

This software is mainly used to activate PIC (PIC16F877) microcontroller according to the input received by it. "Embedded C" code is written using this work bench. In this project, coding is written for voice play back circuit, LCD, DC motor which is interfaced with PIC board at the transmitter end. As per the code embedded in the controller the interfaced modules generate appropriate output at the receiving end.

b. Proteus:

Proteus provides adaptive fault tolerance via software replication for distributed COBRA applications. From the perspective of the application developer, it can be thought as a sophisticated COBRA dependability service. Proteus replaces the need for the naming and life cycle services, since object binding and object creation must be managed directly. However, proteus should not be considered a COBRA service. Proteus places communication in between COBRA method invocations. The object does not interface with proteus directly, but instead interface with QuO runtime. Fault tolerance via software replication can be used to tolerate a variety of faults. Two common schemes that can be used for software replication are active and passive replication.

V. RESULT

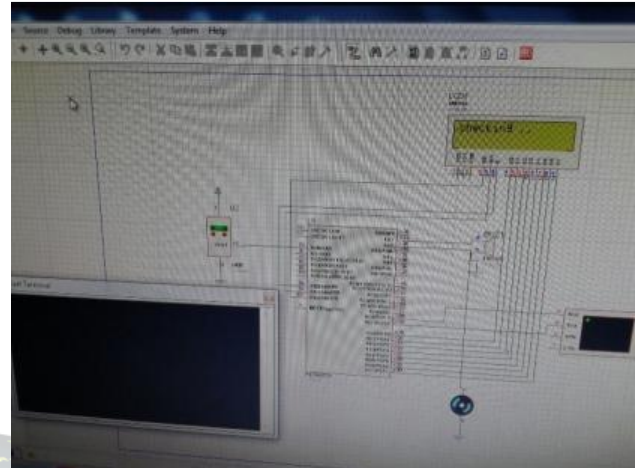


Fig 6a. Checking is made whether the boat is crossing its border or not.

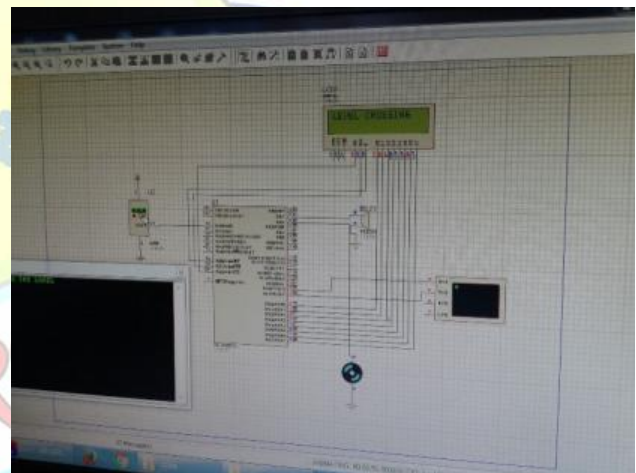


Fig 6b.Alert is displayed on LCD when the boat crosses its border.

VI.CONCLUSION

RSSI ZigBee is used to alert the coastguard when an intruder or poacher is found within the protected sea water area using an innovative technology. It also warns and prevents the fishermen in not crossing the national sea border. It is useful device for safer



navigation for fishermen. Since Sri Lanka and India have lot of problems regarding the national sea boundary of the country, this device is made to identify the sea border and to provide the assistance if needed. It is low cost and wireless system. The main advantage of this paper is to provide security and save the fishermen from imprisonment and fine payment.

VII. REFERENCES

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