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COAST GUARD ALERT AND RESCUE SYSTEM FOR INTERNATIONAL MARITIME LINE CROSSING OF FISHERMAN

G.Sivagnanam [1], A.J.Midhun[2], N.Krishna[3], G.Maria Samuel Reuben [4], A.Anguraj[5]
[1]*Assistant Professor,* [2, 3, 4,5]*UG Scholars*
Department of Electrical and Electronics

Abstract— This paper introduces a design which deals with an innovative handheld device which would transform the fisherman community as the eyes and ears of the Indian Coastguard. Upon sighting an intruder or poacher, the device allows fisherman to calculate its exact location using the integrated GPS receiver, and radiates the information to the nearest coastguard station via GSM communication.. If a fisherman navigates beyond the country's border, an alarm is generated indicating that the fisherman has crossed the border. Additionally, a GSM transmitter interface will send a message to base station located on the shore indicating that a vessel has crossed the border. Thus guards in the shore can assist and provide additional help to those fishermen if needed. Keeping in mind about lives of Indian fishermen, this device has been created to help them not to move beyond Indian. On the whole, it is an attempt to build a suitable device for the fishermen at a reasonably low cost.

Keywords—ATMEGA 162,SERVO MOTOR,GPS TRANSMITTER,GSM RECEIVER,COMPASS SENSOR,RELAY & DRIVER CIRCUIT,SERVO DRIVER,LCD DISPLAY

I. INTRODUCTION

The Indian Coastguard was formally inaugurated on 18 august 1978. It is set as an independent armed force of the Indian Union, through an act of parliament. It is the fourth armed force under the Ministry of Defense- the first three being the Army, the Navy and the Air Force. It has a specific character for nonmilitary security but addresses to National Defense. It normally deal with marine safety, maritime security, lifesaving, law enforcement, maritime environmental security and fisheries. These call for monitoring, control, surveillance and response.

The Coastguard has multiple responsibilities and strengthening the safety of fishers. Fishers are vulnerable to disasters of several kind-accidents, casualties, abduction, and alien interventions. The Indian coastguard cannot assist fishers exclusively but concern for fishers is central to its aims.

The strategic role of the Coastguard is to protect the maritime zones from illegal activities including infiltration through maritime routes and environmental damage and provide humanitarian and scientific assistance within the maritime domain.

The Indian Coastguard too has its exclusive duties and functions as spelled out in the Coastguard Act 1978, include,

- Safety and protection of islands and offshore structure
- Protection and preservation of maritime environment and endangered species
- Prevention and control of pollution in maritime zone
- Assistance to the customs in anti-smuggling operations
- Assistance to fisherman in distress at sea
- Safeguarding life and property at sea
- Preventing poaching in Indian water
- Assisting in ocean research
- Enforcing maritime law

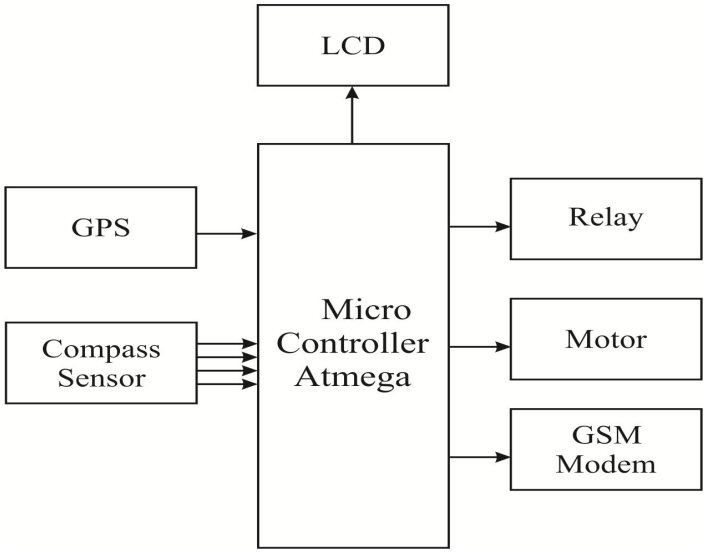
Even though we have this much of coastguard security, all things happening opposite to our thinking. Indian Coastguard has openly admitted its failure in failure in preventing Mumbai attack even after getting a warning from intelligence sources prior to the attack. This clearly shows that our sea defense is weaker than we believe. The foreign trawler easily overcoming our coastguard security force.

Every day we hearing news about fishermen killed or imprisoned when they cross the national sea border inadvertently. The most outstanding problem is being going on for trans border fishing i.e., on the Indo-Srilankan border. Here two distinct issues are arising. First is the movement of Indian boats into Srilankan water without any intimation or prior information that they crossed the border area. Historically there is no border problem which is being raised and fixed in 1974 and having no conflicts till civil war in 1983. After this both country authorities restricted due to security concern..

II. EMBEDDED SYSTEMS

The general purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment or machinery. The word "Embedded" means that they are an integral part of the system. An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. Embedded systems are very sophisticated many have minimal requirements for memory and program length, with no operating system, and low software complexity. Typical input and output devices include switches, relays, solenoids, LEDs, small or custom LCD displays, radio frequency devices, and sensors for data such as temperature, humidity, light level etc. Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers and largely complex systems like hybrid vehicles MRI. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals.

III. BLOCK DIAGRAM



III PROTEUS:

Proteus provides adaptive fault tolerance via software replication for distributed CORBA applications. From the perspective of the application developer, it can be thought of as a sophisticated CORBA 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 CORBA service. Proteus places communication in between CORBA method invocations, unlike the traditional framework for a CORBA service. Additionally, the object does not interface with Proteus directly, but instead interfaces with the 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 replication and passive replication.

PIC MICROCONTROLLER:

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory.

The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques.

PIC (16F877):

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

PIC START PLUS PROGRAMMER:

The PIC start plus development system from microchip technology provides the product development engineer with a highly flexible low cost microcontroller design tool set for all microchip PIC micro devices. The PIC start plus development system includes PIC start plus development programmer and MPLAB IDE .The PIC start plus programmer gives the product developer ability to program user software in to any of the supported microcontrollers. The PIC start plus software running under MPLAB provides for full interactive control over the programmer.

WORKING

It is normally working on the basis of embedded system. A GSM transmitter is fixed on the ship or boat, accordingly a GPS receiver is fixed on the sea shore areas. When the ship or the boat cross the international maritime sea line or passed over the sea area of each Nation, the transmitter senses the position(compass sensor) and the predefined longitudinal and vertical values will send to the controller which values are compare by the micro controller with pre stored by image processing technology. And suddenly the warning message alert will get display on the LED Display in coast guard office also in the ship and Alarm will blow. Also a servo motor drive and servo motor is controlling by the controller which is directly connected to the steering system of the ship or boat. The controller provides the signal and initiates to get back the ship in to safety location.

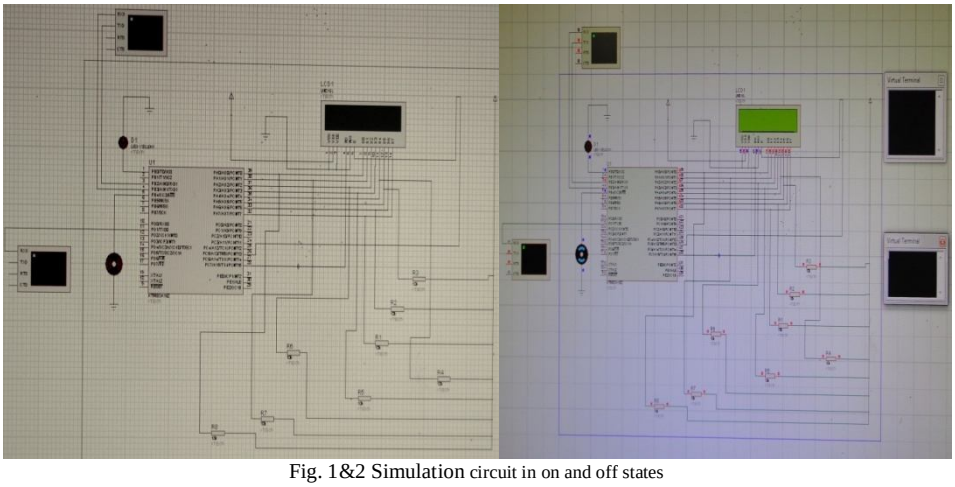


Fig. 1&2 Simulation circuit in on and off states

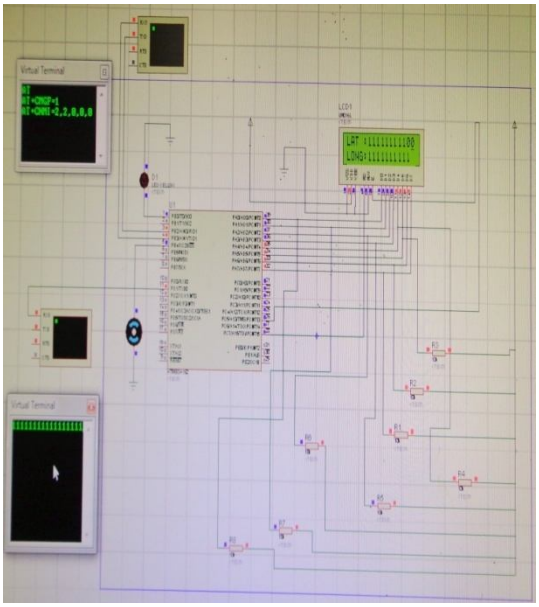


Fig. 3 simulation- input

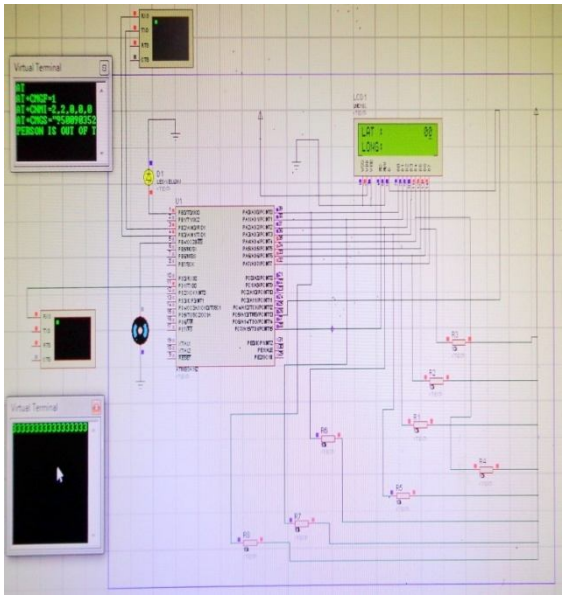
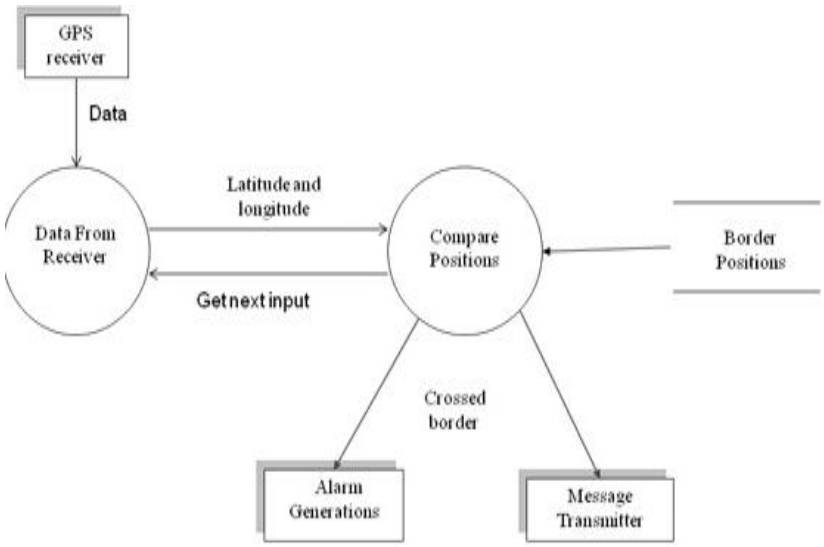


Fig. 4 simulation output

FUNCTIONAL BLOCK DIAGRAM



PROGRAM:

```
#include<avr/io.h>
#include<avr/interrupt.h>
#include<inttypes.h>
#include<util/delay.h>
#include"ATM_LCD4.h"
#include"ATM_serial.h"
#define relay_on PORTB |= 0X01
#define relay_off PORTB &= ~ 0X01
#define motor_on PORTB |= 0X10
#define motor_off PORTB &= ~ 0X10
unsigned char rcv[50],r;
unsigned char lat[10];
unsigned char lon[10];
void Gsm_Init();
void msg_send();
ISR(USART1_RXC_vect)
{
rcv[r]=UDR1;
if (rcv[5]=='C')r++;
else if (rcv[4]=='M')r=5;
else if (rcv[3]=='R')r=4;
else if (rcv[2]=='P')r=3;
else if (rcv[1]=='G')r=2;
else if (rcv[0]=='$')r=1;
else r=0;
}
main()
{
relay_off;
motor_off;
cli();
DDRA=0XFF;
DDRC=0XFF;
DDRB=0X11;
sei();
Lcd4_Init();
Serial1_Init(9600);Receive1(1);
Serial0_Init(9600);Receive0(1);
Gsm_Init();
Lcd4_Command(0x01);
Lcd4_Display(0x80,"LAT :",5);
Lcd4_Display(0xC0,"LONG:",5);
while(1)
{
Lcd4_Decimal2(0x8e,r);
if(r>50)
{
for(r=20;r<=28;r++)
lat[r-20]=rcv[r];
for(r=32;r<=41;r++)
lon[r-32]=rcv[r];
Lcd4_Display(0x85,lat,9);
Lcd4_Display(0xc5,lon,10);
if(lat[0]=='3')
{
relay_on;motor_on;
msg_send();
}
else
{
relay_off;motor_off;
}
r=0       ;
}
}
}
void Gsm_Init()
{
Serial0_Conout("AT",2);
Serial0_Out(0x0D);
Serial0_Out(0x0A);
_delay_ms(1000);_delay_ms(1000);
Serial0_Conout("AT+CMGF=1",9);
Serial0_Out(0x0D);
Serial0_Out(0x0A);
_delay_ms(1000);_delay_ms(1000);
Serial0_Conout("AT+CNMI=2,2,0,0,0",17);
Serial0_Out(0x0D);
```



```
Serial0_Out(0x0A);
_delay_ms(1000);_delay_ms(1000);
}
void msg_send()
{
Lcd4_Display(0x80,"SENDING MESSAGE ",16);
Lcd4_Display(0xc0,"              ",16);
_delay_ms(1000);
Serial0_Conout("AT+CMGS=",8);
Serial0_Out("");
Serial0_Conout("9500903529",10);
Serial0_Out("");
Serial0_Out(0x0D);
Serial0_Out(0x0A);
_delay_ms(1000);
Serial0_Conout("PERSON IS OUT OF THE ROOM",25);
Serial0_Out(0x0D);
Serial0_Out(0x0A);
_delay_ms(1000);
Serial0_Out(0x1A);
Lcd4_Command(0x01);
Lcd4_Display(0x80,"LAT :",5);
Lcd4_Display(0xC0,"LONG:",5);
}
```

IV. CONCLUSIONS

GPS COASTGUARD 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. THIS APPROACH DESCRIBES THE INTRUDER POSITIONING IS BEING IMPLEMENTED WITH THE HELP OF GPS BY INTEGRATING THE CODE GIVEN BY IT AND THE CODE GENERATED IN ARM MICROCONTROLLER THROUGH TIMER. IT IS A USEFUL DEVICE FOR SAFER NAVIGATION, ESPECIALLY FOR FISHERMEN. SINCE SRI LANKA AND INDIA HAVE GOT LOTS OF PROBLEMS REGARDING THE MARITIME BOUNDARY OF THE COUNTRY, THIS DEVICE IS MADE TO IDENTIFY THE MARITIME BOUNDARY AND TO PROVIDE ASSISTANCE IF NEEDED. THE MAIN ADVANTAGE OF THIS PAPER IS COMPACT AND LOW COST. OUR PAPER CAN BE EXTENDED TO ADVANCE FUTURE COMPONENTS AND PIC MICROCONTROLLER, SO THAT IT CAN BE WIDENED TO LARGE APPLICATIONS WITH MORE ACCURATE RESULTS. THE DESIGN OF THE DEVICE CAN BE MADE EVEN SMALLER THAN PROPOSED BY MODIFYING THE DESIGN SPECIFICATIONS. EFFICIENCY CAN BE IMPROVED BY IMPLEMENTING MORE ACCURATE GPS SYSTEMS. THIS APPLICATION CAN BE INTEGRATED WITH MOBILE PHONES, PDA SO AS TO MAKE IT PORTABLE. THIS HELPS IN EXTENDING ITS SCOPE NOT ONLY TO MARITIME BOUNDARY IDENTIFICATION, BUT ALSO TO OTHER IDEAS.

V. REFERENCES

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