

TRACK AND DETECTION METHOD FOR MONITORING WILD ANIMALS

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Abstract—Natural forest plays a vital role for animals to live in this earth. Without natural environment the animals can't able to live, because forest is the exact place for their food and shelter. There is a more relationship in between human beings and animals. Without them we are not able to lead our life. Animals started to attack human because of destroying their habitat. This leads to endanger to human life in forest. To overcome this problem, we need to take several monitoring works to prevent the man from animal attacking. By tracking, monitoring the activities and location of an animal. So if we have previous intimation on animals roaming it would be easy for them to take necessary prevention from animal attacking. We proposed a method for this problem. Here we used GPS device for tracking the animals and data were send using wireless communication. For network issues in area, we can communicate with GSM for giving alert to authorized person.

Keywords—GSM, GPS, LCD, PIC, Tracking and Detection

I. INTRODUCTION

Global Positioning System (GPS) provides a wide range of positioning and timing services. With the combined interlocked usage of GSM technology, it can be used as the tracking of wild animals across the forest lands. The current issue of human-wildlife interference in the forest villages is increasing nowadays which serves as a benefit for village people GPS and GSM will detect the

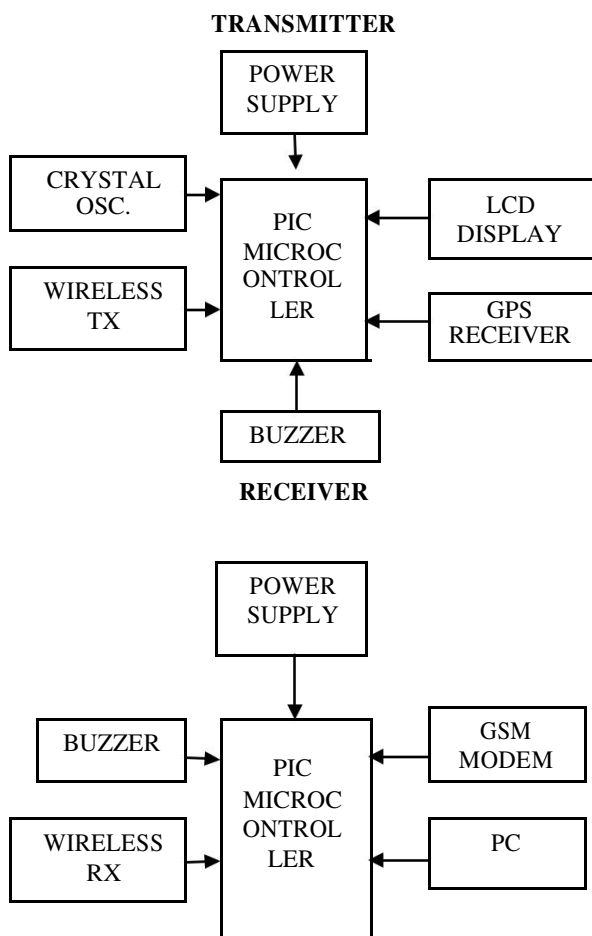
topographical location of wild animals which is going to entering in to the forest villages. The GPS receiver in the forest department office will receive the topographic location of the wild animal which crosses the certain boundary tries enter into the village. Topographic location of an elephant can be obtained with the information of latitude and longitude of the place and position of an elephant. The borders of both the forest land and village land are defined in two levels. The first level extends till a certain radius of distance from the center point of the village. The second level is the region between the boundary and the forest land. The additional advantage of this alert system is, the interlock of the GSM where minute by minute position of an elephant can be received through an SMS to the forest department officials through the GPS once it reaches the certain boundary of the forest village.

II. WORKING PRINCIPLE

The GPS modem will continuously give the signal which determines the latitude and longitude and indicates the position of an animal to them. Later it gives the output which gets displayed in the LCD and the same data will sent to the forest department as the text message. The hardware which is interfaced with microcontroller LCD display, GSM modem; GPS provides reliable information about positioning, navigating and timing services to the worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth. When the animal is crossing the certain boundary, the signal emitted by

the animal gives the latitude and the longitude information of it is displayed on the LCD. The use of GSM, the message will be received at the forest department official's cellular mobile. This is purely an embedded application, which would continuously monitors the animal's position and once it crosses the boundary, this whole operation will be done. The operation is performed by using PIC16F877A microcontroller which is interfaced to the GSM modem and GPS receiver by the use of UART.

III. BLOCK DIAGRAM



IV. BLOCK DIAGRAM DESCRIPTION

1. POWER SUPPLY

The power supply will generate the power required for the whole operation. It includes units like step down transformer, rectifier, regulator, input and output filter. It features short circuit protection and thermal overload protection.

2. CRYSTAL OSCILLATOR

A crystal oscillator is an electronic circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency. This frequency is commonly used to keep tracking of time.

3. LCD DISPLAY

Liquid crystal display (LCD) has material which combines the properties of both liquid and crystals. They have a temperature range within which the molecules almost act as mobile as they would be in a liquid, but when are grouped together, they are formed similar to a crystal.

V. SOFTWARES

- **MPLAB X IDE** is to write the program.
- **PROTEUS 8** is used to simulate the circuit for design.

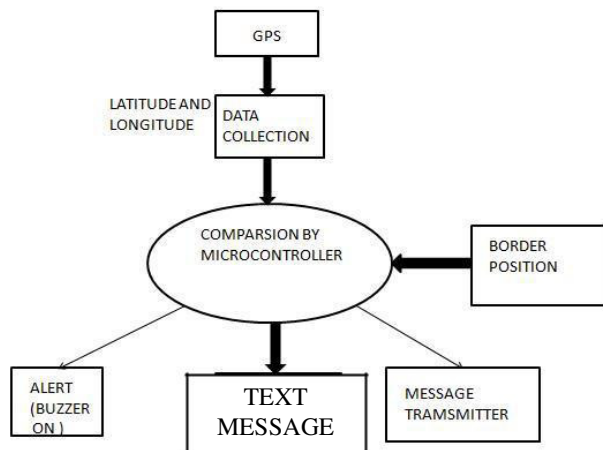
VI. EXISTING SYSTEM

At present, the system will detect the wildlife animals only after entering into the village. Some are using the thermal detection method to detect the presence of wildlife animals. These techniques will give only less chance to safeguard the people from the wildlife attack. Hence, there is no perfect alert system for preventing human-wildlife interference.

VII. PROPOSED SYSTEM

The proposed system uses a GPS receiver which receives signal from the satellite and gives the current position of the animal. The proposed system will detect the position of an animal which crosses the boundary of the village. The particular layer level i.e. border can be predefined and this can be stored in microcontroller memory. The current value is compared with predefined values and if these values are same, immediately the particular operation will be done i.e., the microcontroller gives instruction to the alarm to buzzer. By using GSM, the text message will be sent to the forest department.

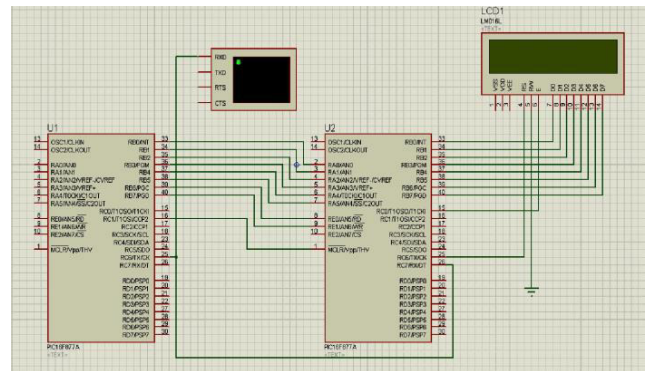
VIII. PROPOSED SYSTEM ARCHITECTURE



IX. PROPOSED SYSTEM FLOW DIAGRAM

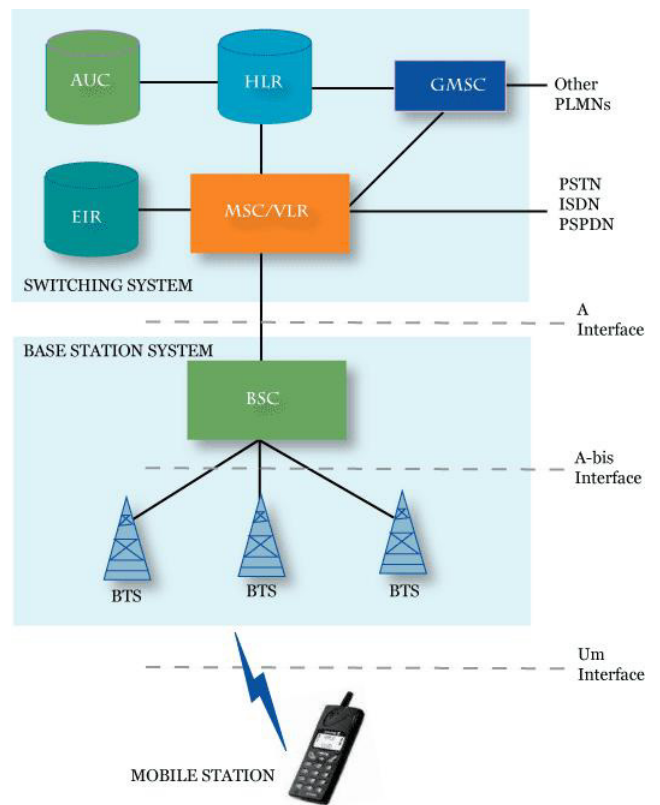
The GPS receiver receives the signal and converts it into desired data message. The data is sent to microcontroller and microcontroller extracts the latitude and longitude from the data. The area positions are compared with the stored boundary latitude and longitude positions. If the animal is found beyond the border, then an alarm is generated along with a message transmission by a GSM.

X. CIRCUIT DIAGRAM



XI. GSM

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS).



Sim 300 GSM module (GSM/GPRS: SIM300)

Sim300 is a Tri-band GSM GPRS module with a size of 40x33x2.85mm. It has a customized MMI,

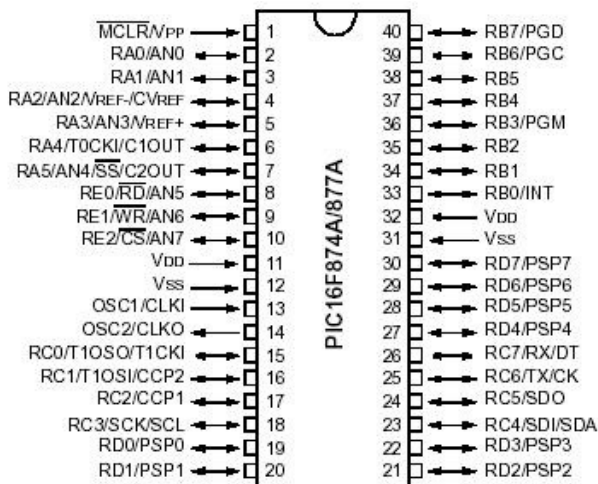
keypad LCD support and an embedded powerful TCP IP protocol stack. It is designed based upon mature and field-proven platform, backed up by our support service.

XII. PIC MICROCONTROLLER



Fig: PIC16F877A microcontroller

PIC16F877A is available in 40-pin package. All the devices in the family of PIC16F87XA share common architecture. It also has one half of the total on-chip memory. PIC16F877A have five I/O ports. It contains fifteen interrupts. It has eight A/D input channels. The parallel slave port is implemented on it. Higher memory than the PIC16F873A/874A.



General features:

- High-performance RISC CPU.
- Only 35 single word instructions.
- Operating speed: DC - 20 MHz clock input DC - 200 ns instruction cycle.
- Up to 8K x 14 words of FLASH Program Memory.
- Up to 368 x 8 bytes of Data Memory (RAM).
- Up to 256 x 8 bytes of EEPROM data memory.
- Low-power, high-speed CMOS FLASH/EEPROM technology.
- Low-power consumption.
- < 2 mA typical @ 5V, 4 MHz
- 20 μ A typical @ 3V, 32 kHz
- < 1 μ A typical standby current
- High Sink/Source Current: 25 mA.
- Commercial and Industrial temperature ranges.

XIII. OPERATION

Microcontroller receives the data from the GPS receiver through UART. The data received contains latitude and longitude. The current positions are compared with already stored latitude and longitude of village boundary locations. At first the latitude is compared with stored latitude which identifies if the current position is located near to the boundary. If the latitude matches then the adjacent latitudes and longitudes of the present latitude is retrieved from the microcontroller. The current position received from GPS is stored as S1 (latitude), S2 (longitude). The latitude S1 is compared with stored latitudes. If latitude match, then adjacent latitude and longitudes (X1, Y1 and X2, Y2) are retrieved from stored table and substituted in the equation given below:

Position	Latitude	Longitude
Position I	10 05''.0N	80 03''.0E
Position II	11 16''.0N	82 24''.4E
Position III	12 08'.4 N	82 09'.5 E
Position IV	12 33'.0 N	82 46'.0 E

By simplification, we get $ax + by = c$ Now, S1 and S2 are substituted in above equation of line. Here two cases are possible:

Case 1: If $LHS < RHS$, then an animal is inside forest's border. Latitude and longitude is extracted and manipulated with the new locations is done by the microcontroller.

Case 2: If $LHS > RHS$, then animal has crossed border. When animal crosses border, a buzzer is on and the message will be sent to the forest department. GSM module will transmit message to desired sender.

XIV. STATISTICS

Incidents of conflicts in Coimbatore September 2016 - August 2017

Ranges	Straying incidences	No. of driving Operations	No. of crop raids
Mettupalayam	626	620	198
Pooluvampatti	273	260	202
P. N. Palayam	265	188	90
Sirumugai	230	229	80
Coimbatore	211	183	102
Maduickarai	197	183	105
Karamadai	4	4	2



XV. ADVANTAGES

- Safeguard to the people in terms of early alarming about wild animals.
 - Easy tracking of animal's location.
 - Higher accuracy.

XVI. APPLICATION

- In forest department

XVII. FUTURE SCOPE

- We can use EEPROM to store the previous Navigating Positions up to 256 locations.
- We can reduce the size of the kit by using GPS and GSM on the same module of GPS navigator.

XVIII. CONCLUSION

The forest department will easily identify the crossing of wildlife animals over the boundary. The system provides high accuracy and high precision values of the Latitude and Longitude.

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