Wildlife Animal Tracking Using GPS and GSM

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Abstract- **This research is meant for the design of wildlife animal tracking system using GPS and GSM. This explains the methodology to overcome the problem of animal injury and mortality due to straying of wild animals out of national parks and wildlife sanctuaries by the use of wildlife tracking system. Automatic tracking system has been implemented by incorporating GSM and GPS technology in the form of a device that would be attached to the body of an animal and would be continuously monitoring the position of the animal with respect to the GPS defined boundaries setup inside a wildlife sanctuary or national park. In case an animal strays out of the GPS defined zone, the coordinates specifying both the latitude and longitude information of an animal informing the concerned officer about the approaching danger. This system is flexible, low cost and simple to execute and can be beneficial for monitoring wildlife related complexities like poaching, railway and roadway accidents, destruction of vegetation and threat to life on the straying of wild animals out of their habitation area.**

Index terms- **Arduino UNO, GPS receiver, SIM COM GSM modem, Antenna, Service provider, Temperature sensor LM235**

INTRODUCTION

As per nature's rule, every living creature on this earth is important and has its role in ecosystem. Since human race, or human society is growing, the animals are in danger. They live in the protected forest or national park in a big area and when we need to know about the number of the special wild animals such as tiger or leopard, they become very hard to track or count them because they live in the big forest where there is no infrastructure for data communication. Fig 1 shows a cheetah with tracking collar on its neck.

Fig 1.A cheetah with tracking collar

Hence in order to track the location Global Positioning System receiver and Global System for Mobile communication is used. In this project a GPS modem helps to get the location. This modem requires minimum 4 satellites Global Positioning System modem receives location parameters like latitude and longitude from the satellite. We have also used GSM modem which sense these parameters to particular mobile number through SMS. This information is used to locate the current location using Google map. We have added a temperature sensor to this project. If the animal has fever or if there are some wounds on animal body and because of wounds temperature of animal rises, then it sends SMS to the forest officer so he can give immediate attention.

II.SYSTEM DESIGN

Fig.1. shows overall system design. It consists of SIM COM GPS modem. GPS receiver Arduino UNO body temperature sensor etc.
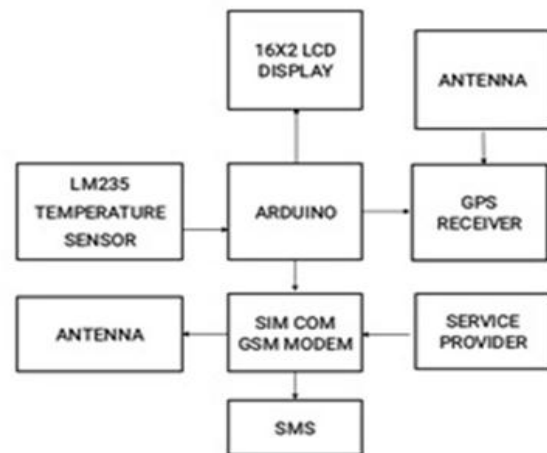

Fig.2. Block diagram of system design

GPS MODEM

GPS stands for Global Positioning System. A GPS, is a device that is capable of receiving information from

GNSS (Global Navigation System Satellites) and then to calculate the device's geographical position. Using suitable software, the device may display the position on map, and it may offer routing directions. The GPS is one of a handful of GNSS made up of a network of a minimum of 24, but currently 30 satellites placed into orbit.

A satellite navigation device can retrieve the location and time information in all weather conditions, anywhere on or near the Earth. GPS devices need to be connected to a computer in order to work. This computer can be a home computer, laptop, PDA or smartphones. Fig. 3 and 4 shows a GPS modem.

Fig 3. GPS module

A GPS receiver's job to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location.

Fig 4. GPS modem

This is based on a mathematical principle called trilateration. GPS receiver will receive s string of data from the GPS satellites and sends it to the microcontroller.

GSM MODULE

SIM COM GSM (Global System for Mobile Communication) modem sends the received latitude and longitude via SMS. A GSM module is a circuit that will be used to enable communication between a mobile phone and a GSM or GPRS system. Fig 5. shows a GSM

Fig 5. GSM Module

TEMPERATURE SENSOR

Temperature sensor is used to detect the body temperature of animal. LM235 temperature sensor is used for this system. This is a easily-calibrated, integrated circuit temperature sensor. Applications for the LM135 include almost any type of temperature sensing over a -550C to 1500C temperature range. This is used to monitor the health of the animal.

CONTROL UNIT

Arduino UNO is used in this system. Arduino UNO is a microcontroller based on the ATmega328P. It has 14 digital pins of which 6 can be used as PWM outputs, 6 analog inputs, a 16 MHz quartz crystal, a USB connection and a reset button. Low power microcontroller is used for this system and Arduino suits this application. Fig.6. shows the Arduino board.

Fig 6. Arduino microcontroller

Arduino microcontroller is available on various packages, it has features such as low power and high performances.

III.APPLICATIONS

Wildlife animal tracking to track the animals in the forest and in national parks

We can use it for domestic purpose to detect the pet animals.

In criminal cases many times we see that police department uses dogs to find the criminal, so this system can be used in such situations.

IV.ADVANTAGES

This system is fast and convenient when compared to other system.

This does not require human attention as it is completely self-independent and automated system.

V.RESULT

The main objective of wildlife monitoring system is to track the location of animals. It is achieved by the GPS and GSM module.

GPS antenna is used to track the location of animals. To monitor health of animal temperature is used. The measured parameters are helpful to analyse the animal disease or health condition of animal.

VI.CONCLUSION

Wildlife monitoring is important for protection, sustainable and scientific management of wildlife resources. Although there is currently a lot of work on building real sensor systems, very few attempts have been made to deploy them in the field and then maintain and develop them. The study on the animals through this system for their conservation.

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