

ANIMAL TRACKING AND GPS SYSTEM

Sushant Nimbalkar

Student,
NCRD's Sterling Institute of
Management Studies, Nerul, Navi
Mumbai
sushantnimbalkar33@gmail.com

Kunal Mahajan

Student,
NCRD's Sterling Institute of
Management Studies, Nerul,
Navi Mumbai
kunalmahajan976757@gmail.com

Prof. Seema Bhuvan

Assistant Professor (MCA)
NCRD's Sterling Institute of
Management Studies, Nerul,
Navi Mumbai
seemabhuvan@ncrdsims.edu.in

ABSTRACT

Every living thing on this earth has the same importance in the ecosystem. But nowadays lifetime of untamed animals is in peril. Wild animals accustomed move freely within the forest or within the jungle. If any accident happens to them within the forest, physical injury or any disease may cause even death of animals within the forest. In such situations we cannot understand exact location of animal in such an oversized area.

To avoid such problems within the finding exact geographical location of animal within the jungle, parkland or in wildlife reserves, wildlife animal tracking system is utilized. this method utilizes technologies like Global Positioning System and Global System for Mobile Communication.

Keyword: *Wildlife animals, GPS modem, GSM modem, Low- power microcontroller, RISC CPU, Power supply, National parks etc.*

INTRODUCTION:

Now a day's wild animals are becoming less in number due to industrialization and cutting of trees in the forest area. Hence, it's important to save lifetime of wild animals within the sanctuaries. Animals move freely within the area of forest with none fear. Traditional methods such as the use of wireless transmitter and receiver pairs of these wild animals have been followed for many years. Here wireless transmitter is kept within the collar of animal and receiver is with forest officer. But when the forest area is too large to fall into the category of wireless transmitter-receivers, we cannot find animals. Usually area of sanctuaries is within the range of many kilometers long. Fig.1 shows a cheetah with a tracking collar around his neck.



Fig. 1: A cheetah showing the tracking collar

Hence, we require a tool which can work even when area of sanctuary is hundreds of kilometers. For this purpose, we must select technologies like GPS. this method uses this technology to locate location of animal in sanctuary. GPS modem receives string of information from the satellites and sends it to microcontroller. Low-power microcontroller extracts latitude and longitude information from string of knowledge received from GPS modem. It also measures temperature from temperature 2 sensor and send this information to GSM modem. GSM modem has SIM card, which is employed to send SMS to the forest authority or to any government authority [1]. This information is employed to locate current position of animal using any standard map or quickly by using Google map [6].

LITERATURE REVIEW:

They need interpreted the emotional state underlying canine behavior is essential in human-canine interactions, to achieve effective training, and to improve canine welfare. Together with the electrocardiogram (ECG), photoplethsmogram (PPG) and inertial measurement units (IMU), a non-invasive wearable sensor system has been developed by researchers to remotely and continuously monitor vital signs of dogs. To overcome the constraints imposed by the efficiently insulated skin and dense hair layers of dogs, they need investigated the use of assorted kinds of ECG electrodes and the enhancements of those by conductive polymer coatings. They also studied the incorporation of sunshine guides and optical fibers for an efficient optical coupling of PPG sensors to the skin. Combined with parallel attempts to use IMU to identify dog behavior, these physiological sensors will contribute to a canine-body area network to wirelessly and continuously collect data during canine activities with a long-term goal of effectively capturing and interpreting dogs' behavioral responses to environmental stimuli that will yield measurable benefits to handlers' interactions with their dogs. Using these methods, the guts rate (HR), heart variability (HRV) and rate was measured successfully. The

animal's skin or fur doesn't must be shaved and also the developed system is superior to the traditional system. But it's applicable only in certain conditions. and may be used for only one animal i.e. dog. And, this method can be used just for certain conditions such as while the dog is sitting or running [7]. during this paper, so as to attain early detection of every individual animal's illness, a wireless sensor network system is developed to watch the animal's feeding and drinking behaviors.

Electronic Radio Frequency Identification (EID) tags on feedlot animals to record and study animal husbandry and drinking behavior. IEEE 802.15.4(LW-WPANs) based ear tags are used for every animal. A directional antenna is employed to permit one router to watch multiple animals simultaneously, and an energy efficient mesh routing strategy is proposed to aggregate the monitoring data. The performance of the proposed system has been evaluated through numerical analysis and simulations [8]. In this paper we are discuss about animal tracking and health monitoring system.

PROBLEM DEFINITION:

There is no product within the marketplace for the real time animal health monitoring. Most veterinary staff check the physio-parameters themselves. Currently 3 livestock farmer's faces lot of problem on monitoring the health of livestock and thus modifications are being persistently recommended in instrumentation. Mostly available system focuses only on vital sign measurement to predict of the animals.

The circuit that we are using makes this system automatic, novel design goal of the animal health monitoring system with a capability to watch vital sign, body temperature, and rumination with surrounding temperature and humidity. This information provide to veterinary staff.

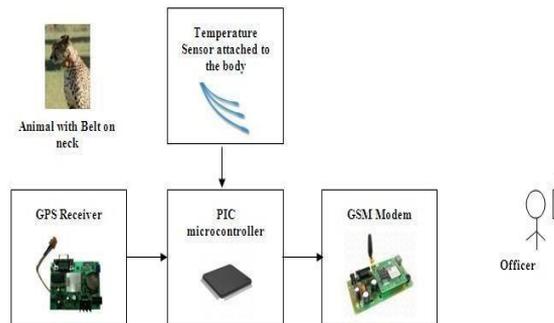
OBJECTIVES

The main aim of this paper is to develop an animal health monitoring system (AHMS) which is capable to the measuring of temperature, rumination, and rate parameters with environmental parameters (ambient temperature and humidity) and animal tracking conditions.

The animal health monitoring system designed during this project diagnosis the Health Problem of Animals. However, Human cannot able to identify the particular health problem associated with Animals, so this project will help to us. there'll be the possibility of robbery of Animals so tracking provision of Animals is involved in this system.[7]

RESEARCH METHODOLOGY

It involve GPS modem, body temperature sensor, PIC microcontroller, GSM modem etc.



A] GPS Modem

GPS stands for Global Positioning System. GPS navigation devices are used to accurately locate the Earth geographically by receiving information from GPS satellites. It is being used in automobiles and smartphones. It is a satellite-based navigation system that is available in the U.S. Includes 24 satellites placed in the orbit of the Defense Department (DOD).

Initially, GPS was invented only for military applications. But the U.S. in the 1980's. The government also decided to allow citizens to use GPS.[3]. Fig. 3 shows GPS modem is as shown in the figure.

The GPS receiver will receive a string of data from GPS satellites and sequentially transmit this data to the microcontroller using the RS232 protocol. Microcontroller on the the other hand extracts latitude and longitude information from the string. The GPS receiver receives data in the form of a GPGGA penalty. The data is extracted as follows.

Example:

```
$GPRMC, 132455.970, A, 2651.0145, N, 07547.7051, E, 0.50, 342.76, 301010, , , A*64
```

Where,

RMC – Recommended Minimum Sentence C 132455.970 – fix
taken at 13:24:55.970 UTC

A – Status, A=Active or V=Void

2651.0145, N – Latitude 26 degree 51.0145' N 07547.7051, E – Longitude 075 degree
47.7051'E 301010 – 30th Oct 2010

*64 – checksum data always begin with *

B] GSM Modem

GSM stands for Global System for Mobile Communication. The GSM modem is similar to a mobile phone, which has a SIM card. It is used to send an SMS to the Forest Authority [1]. The microcontroller extracts latitude and longitude information from the letter of the data, senses the body temperature of the animal and sends it as an SMS using a GSM modem. Thus, forest officer come to know the actual geographical location of animal and animal's body temperature. The output of the GSM modem is transmitted via RS232, so if we want the microcontroller to interface to the GSM modem, we need a level converter IC RS232 which will convert the RS232 levels to TTL level. Fig. 4 shows GSM modem [2].



Fig. 4: GSM Modem

C] Temperature Sensor

Temperature sensors are used to understand the body temperature of an animal to determine the health of the animal. Thus, it should be small in size and light in weight. The sensor node allows us to wirelessly monitor body temperature. We are using thermometric thermistors, which are NTC (negative temperature coefficient) type.

D] Control Unit

A low power microcontroller is used for this system as the entire hardware kit must be tied to the animal's neck for more than a week. PIC microcontroller more claims for this application. PIC stands for Peripheral Interface Controller. Developed by PIC Microchip Corporation. Free resource is available on the website www.microchip.com. The PIC microcontroller is available in various packages to suit the applications [4]. Since we need less weight, we prefer to use the quad flat package (QFP) as shown in Fig. 5.



Fig.: 5 PIC Microcontroller in QFP package

The MPLB C18 Compiler is available for free on this website. It is a low-energy, high-performance RISC CPU. It is based on Harvard architecture. RISC architecture sets short notice and Harvard architecture speeds up operation [5]. The features of PIC microcontrollers are as follows.

- Low-power, High performance
- Harvard architecture
- RISC processor, smaller instruction set
- Higher operating frequencies from DC to 40MHz
- In-built ADC with 10-bit digital output and 8 channels

- Serial Port for serial communication

ANALYSIS FINDINGS

Now A days animals are smuggled in the world so the animals in the forest are disappearing.

On June 21, 2020, Kolkata airport authorities arrested a man in South America and New Guinea who was a native of maize and parrots [9].

If the animal is sick, its information does not reach the forest officer and as a result, the animals die.

To the neck of animal this light weight designed system is attached such that temperature sensor are very close to the body of that animal as shown within the Fig. 6. In this way, the body is sensitive to temperature and sends it to the microcontroller properly. The GPS modem will receive wires from satellites and send them to the microcontroller. The microcontroller will then extract the latitude and longitude information from the string and send it to the GSM modem. After receiving the SMS



forest officer will come to grasp the vital sign and location information.

Fig. 6: Collar belt with GPS and temperature sensor attached to the neck of lion

LIMITATION

If the terrain does not adapt to the GPS signal, the unit will take longer to establish location, which will drain the battery. Long lasting batteries are required.

FUTURE SCOPE

The future of the proposed work will be in reducing the overhead of connecting hardware

to adapters and using the concept of wireless power transmission instead of rechargeable batteries. The purpose of the proposed work is to reduce energy. But without a wireless power transmission to charge the module, the sensor will be incorporated into the wearable device and will have a waterproof design. Wearable tool It was easier for man to move and move animals than to develop a tool like a BP machine.

CONCLUSION

This is a faster and more convenient method of locating animals than any other method. It is also automatic. Only when the battery goes down can we get into a situation. To avoid this situation, we need to use low power devices such as ICs, other components and microcontrollers to extend battery life.

By increasing the sensor, we can determine other health parameters of the animal. With the use of the Internet, it is easier to find animals on Google Maps and thus image representation is also possible. Therefore, it is very easy to find wild animals and monitor their health problems using GPS and GSM technology. In this way, we can rescue animals from a variety of accidents and save their lives.

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