

Wildlife Vehicle Collision Avoidance System

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Abstract: The idea is to prevent wildlife vehicle collision to avoid accidents. The below proposed system is to detect the approaching wildlife species along the road. The system consists of a lamp set on road sides which has solar panels for gaining energy and PIR sensors to detect the wildlife. Once the wildlife species is detected by the sensor the LED lights attached to the sensor gets ON. The sensed data is transmitted using a RF transmitter to a RF receiver placed inside the vehicle. The PIR sensor can sense approximately from 5 meters to 12 meters distance. No external supply is required as the sensors work on solar energy. This develops a smart and highly sensitive detection system to prevent unnecessary wildlife-vehicle collisions.

INTRODUCTION

Roadkill is a major threat to wildlife. Despite the advancement in vehicular technology there hasn't yet been a safety solution to this problem. The problem of crossing highways in forest areas are major part in wildlife vehicle collisions. Therefore, finding well grounded method for preventing the collision is a challenging event. Ministry of road transport and highways says that animal crossing national highways cause about 7,734 accidents between 2012-2014. As per the road ministry's information, Uttar Pradesh recorded the maximum accident cases at 1,865 followed by Andhra Pradesh and Jammu and

Kashmir. The existing methods do not ensure any protection measures other than monitoring at the outskirts of the forests. Speeding vehicles in Indian states are killing many animals annually mostly Chital Deer, mouse deer, Fox, birds, snakes and nocturnal animals such as India civets, black-naped hare and mouse deer and some time the big cats include including tiger and leopard. Many wild animals have been killed due to road accidents and speeding vehicles passes through the wildlife protected area. Big animals like sloth bears, striped hyena, blue bull and small creatures such as snakes, monitor lizards and Jackal are getting endangered due to road kill. This paper deals in developing a smart and highly sensitive detection system to prevent wildlife vehicle collisions. The largest protected area in southern India has two national highways (NH-67) and (NH-212) passes through the park and the road has been a major concern for wild animals as speeding vehicles have killed many wild animals including tiger, leopard, elephant calf, Indina Civet and deer. National highway NH 209 connecting Dindigul and Bengaluru passes through sathyamangalam STR forests is a major concern for wildlife.

RELATED WORK

A radar based wildlife vehicle collision avoidance system is implemented using LADS. LADS (Large Animal Detection System) consists of two parts: one part tracks large animals as they approach the road and

travel through the monitored region, while the other part warns the driver by activating flashing beacons. The tracking part of LADS includes a radar and associated processor, while driver warning system is achieved using flashing beacons with wireless links. When an animal enters the monitored area, it is sensed by LADS radar. The processor examines the radar's signal and determines it to be a large animal. The driver warning system then activates flashing beacons connected over wireless links. LADS not only detects animals but also detects and distinguishes between animals and vehicles. LADS delivers high reliability by reducing false alarms in detecting animals. This is achieved by combining a radar with advanced tracking algorithms that can accurately track large animals – as well as people and vehicles – moving anywhere within its monitoring range. A WSN-based system for the prevention of road accident because of wildlife road crossing is proposed. The proposed system is composed by a network of sensors and actuators in order to detect wildlife approaching the road and to warn the driver in real-time by means of light signal devices. The nodes of the network are installed on the road sides and wirelessly interconnected in order to share the sensed data. The last ones provide real-time alert to the drivers by means of light alarms controlled by actuators. The data acquired by the sensors are sent to the remote control unit that triggers the signaling procedure according with the implemented strategies. The WSN nodes are interconnected by means of multihop wireless links in order to increase the network coverage and the vigorousness of the system. Each node is connected with a solar panel for energy management and lifetime optimization. The adopted radar modules recognize the movements in the direction of the sensor. The electromagnetic waves in the microwave range are reflected from the moving object and the frequency of the received signal is proportional to the speed. Moreover, information about the size and the distance of the target from the sensor can be extracted from the amplitude of the signal. The sensitivity of the sensors can be online adjusted according with the characteristics of the environment.

PROPOSED SYSTEM:

This system consists of a lamp set on road sides which has solar panels for gaining energy and PIR sensors to detect the wildlife. Solar panels are used for generating power. The energy from the solar panel is given as source to the system. The PIR sensor is controlled with the help of Arduino UNO. The PIR sensor senses the animals at a distance 5-12m and covers a range of 108 degree. Once the wildlife species is detected by the sensor the LED lights attached to the sensor gets ON. A strip of LED's are placed to indicate the presence of animals.

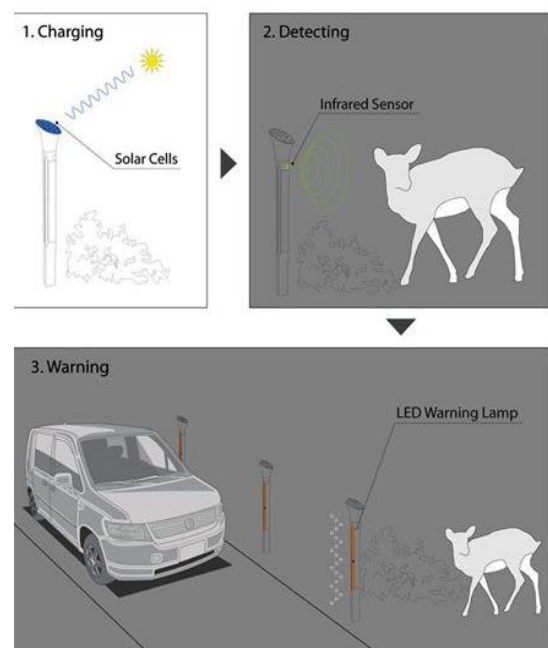


Fig: LED warning system



Fig: Arduino UNO



Fig2. PIR sensor

The sensed data is transmitted using a RF transmitter to a RF receiver placed inside the vehicle. 433Mhz RF module is used to transmit and receive the data.

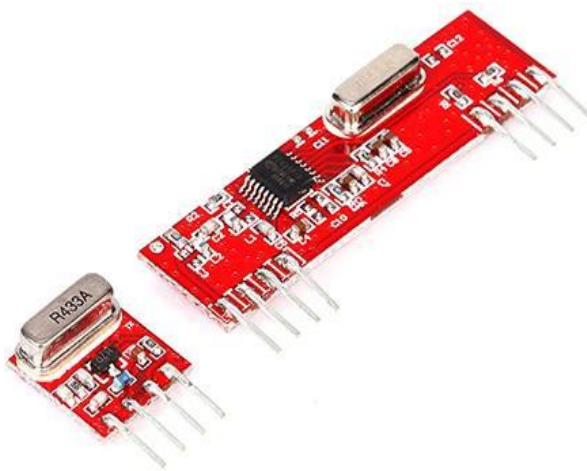
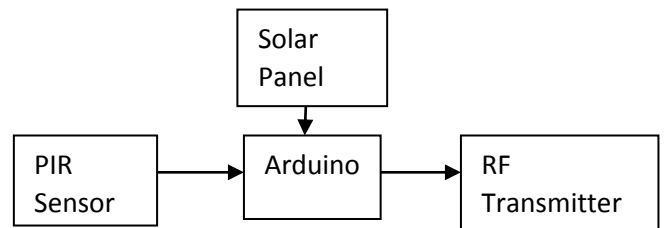


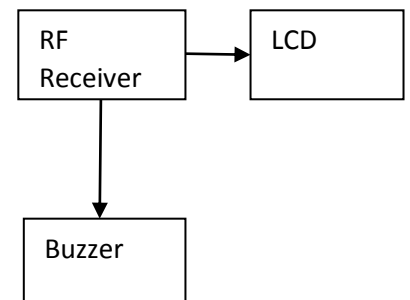
Fig3: 433Mhz RF transmitter and receiver

It covers a range of 100m. The data from the sensor are given as input to the RF transmitter. The RF receiver is placed in the vehicles. Once the animal is sensed and the data is given to the transmitter as input and the output is seen at the vehicle with the help of RF receiver. LCD screen is used to display the output. When the animal is sensed "ANIMAL IS DETECTED" message is displayed in the LCD screen. And buzzer is placed at the receiver side to indicate the animal presence.

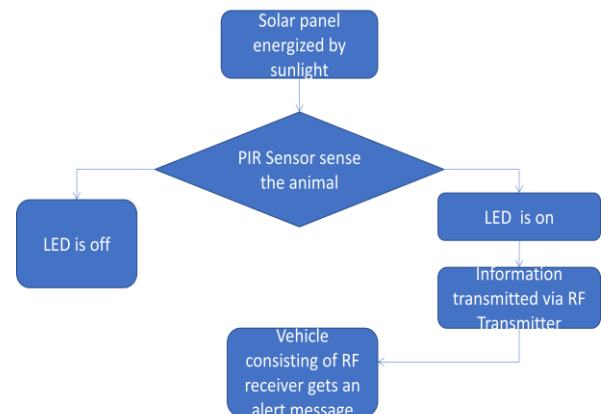
BLOCK DIAGRAM: TRANSMITTER:



RECEIVER:



FLOW CHART:



RESULT AND DISCUSSION:

The proposed system has 2 main sections: Animal detection using PIR sensor, Transmitting the data and displaying it using an LCD. The sensor output is given to a series of LED's which is switched ON when the animal is detected. The LCD displays an output as "ANIMAL IS DETECTED" and a buzzer placed at the receiver is ON when animal is detected.

CONCLUSION:

Thus, this paper proposes a system which detects wildlife animals along the road sides to avoid unnecessary accidents. PIR sensors senses the animals and a strip of LED's are used to indicate animals' presence. The sensed data is transmitted using a RF transmitter to the vehicle consisting of a RF receiver. AN LCD is used where a message is indicated to the drivers. A buzzer is also used to intimate the drivers.

REFERENCES:

- [1] A.Deepak¹, M.Sriramprasath², R. Lokesh, M. Sarath Kumar "Automotive Collision Avoidance System"- *International Journal of Modern Engineering Research (IJMER)*
- [2] John A.Bissonette and Silvia A.Rosa
"Road Zone Effects in Small-Mammal Communities"-
- [3] Prof. Latha Venkatesan, S.Omar Farooq, J.Faisal Imraan, K.Jegan Kumar, J.Naveen Kumar
"Animals and Vehicle Collision Avoidance Using Wireless Sensor Actuator Network"- *International Journal of Scientific & Engineering Research*, Volume 4, Issue 5, May-2013 1856 ISSN 2229-5518
- [4] F. Viani, P. Rocca, L. Lizzi, M. Rocca, G. Benedetti, and A. Massa, "WSN-based Early Alert System for Preventing Wildlife-Vehicle Collisions in Alps Regions"-[Antennas and Propagation in Wireless Communications \(APWC\), 2011 IEEE-APS Topical Conference](#)
- [5] Varuna C.A, Amritha Babu, "A Wireless Sensor Network Based Habitat Monitoring for Protection of Endangered Species"- *International journal of Innovative Research in Science, Engineering and Technology*, Vol.6 , Issue 6 , June 2017
- [6] S.R.Mohanasundaram, D.Dane,
"PREVENTION AND MONITORING OF WILDLIFE BY USING WIRELESS NETWORKS"- *IJARIE*- ISSN(O)-2395-4396, Vol-3 Issue-2 2017.