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Android Controlled Wildlife Observation Robot

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Abstract: *Wildlife observers need to get a close footage of wild animals by getting into their habitats. Well it is not always safe to get close to all wild animals. So, for this purpose we put forward this wildlife observation robot with night vision capability. This robot can be operated wirelessly by users using just their android phones. The robot also has a wireless camera that sends footage stream wirelessly to the user PC. So, wildlife observers can safely get close footage of wild animals by operating this robotic vehicle from a safe distance. This system consists of an 8051-family microcontroller unit used for processing user sent commands. These commands are received by the system through a Bluetooth modem. The microcontroller then processes this data and passes on signals to driver motors. The driver motors now in turn operate the motors by providing desired signal outputs to drive the vehicle movement motors. Also, when the microcontroller receives the camera directional change signal through Bluetooth modem, it then forwards this signal to the camera motor to achieve desired camera angle. Thus, this wildlife observation robot allows for safe wildlife observation using an android device control.*

I. Introduction

Android controlled wildlife observation robot is an autonomous robot or android controlled robot used of better observation of wildlife. Nowadays poaching and smuggling of animals have caused a threat to the wildlife and has led to the endangerment of most of the species. Many of the endangered species have threat of becoming extinct. Wildlife observers need to get a close footage of wild animals by getting into their habitats. Well it is not always safe to get close to all wild animals. The use of automatic equipment for observing wildlife has become very common and there are several advanced cameras used for this purpose. Biology field work is highly labor intensive; however, it is becoming more sophisticated.

There are thousands of wildlife photographers exploring the beautiful forests around us and capturing stunning pictures of animals. To obtain superb shots, it becomes important to keep the camera in places where it may seem impossible. Conventionally, camera traps have been used, which are stationary cameras triggered whenever an animal breaks an invisible infra-red beam. This method requires a lot of luck, patience and time.

Tele-operated and automated equipment increases observation potential greatly while at the same time avoids the disturbance of human presence. Use of new and advanced technologies to make such automated devices. They use embedded system-based robots, night vision camera and technologies such as android application, Bluetooth module and servo motor to control them.

II. Motivation and background

The ability to track wildlife in natural environments while remaining undetected poses many technological challenges. Observing an animal's behavior in the wild can be a daunting task for researchers. They may have to wait hours, days or even months to record a new or unusual activity.

Something as simple as the observer's sound, scent or sight may also influence the animal's natural behavior and in turn invalidate the information gained from the research. But when it all works out, the footage and knowledge gained can be highly rewarding.

By developing the technology to allow our robot to contend with the issues of maintaining constant observation of a target, we needed the robot to be able to move silently and purposefully when tracking a natural target without being detected.

In existing systems, Dual Tone Multi-Frequency (DTMF) and Global System for Mobile communications (GSM) based technology robots were used but they have many drawbacks such as the system needs more energy, there must be straight path between controlling unit and robotic vehicle, in order to use different mobile phones the controller must be reprogrammed, so it is mobile phone dependent. To get rid-off these problems a new system is suggested in which the robotic vehicle is controlled by using a smartphone and Bluetooth module. This makes the device more applicable for remote locations.

III. Objective

Android based wildlife observation robots have great potential for natural wildlife and environmental researchers, who could use this technology to assist in their information gathering. It becomes easy for the

observer to discover habits and patterns about wildlife we never knew existed.Human safety for people involved in Wildlife observation is also one of concerns in making of this project. Manually conducting the observation procedure is difficult and risky. Also, presence of humans affects the behavior of the animal and their natural habitat is not known sometimes. Using this robot solves this purpose.

Use of android device for the cause makes it advance compared to other trending technology. Moreover, it becomes cost efficient and easily available. The app used is quite simple and easy to understand and use by layman. Android sends messages to controller via Bluetooth module hence no issue of networking occurs. Thus, it is also applicable in remote locations. It has inbuilt batteries, so no urgency of electricity is required.

IV. Block Diagram

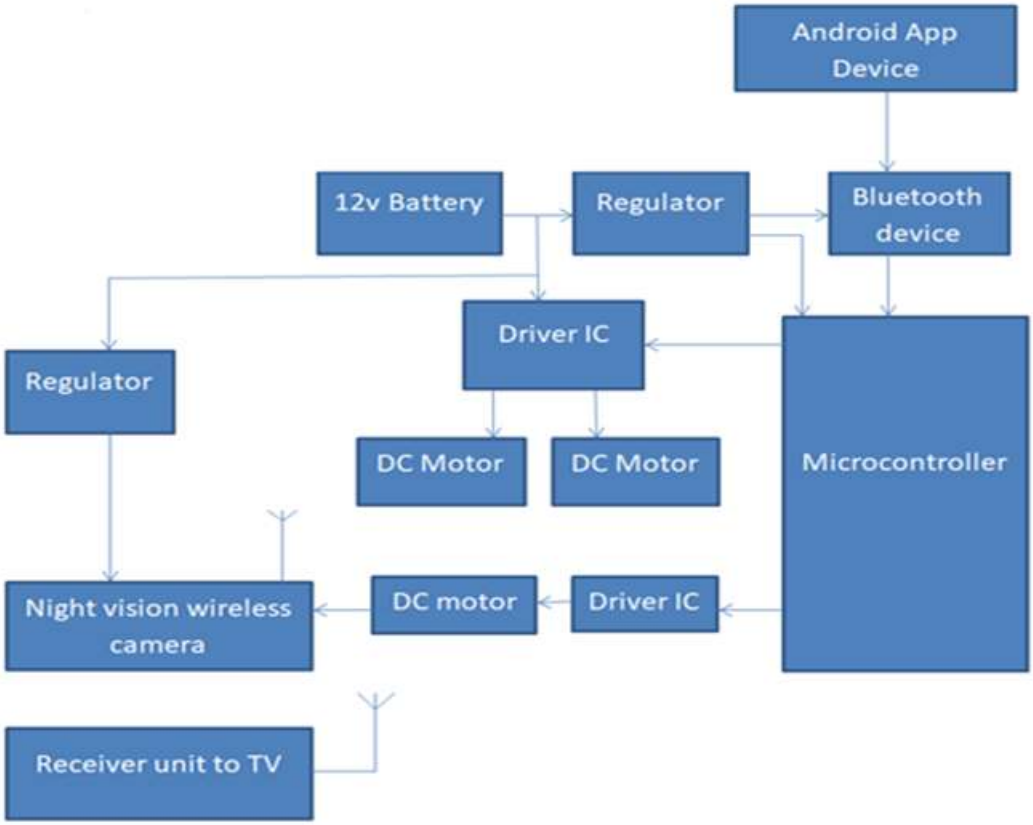


Fig. 1. Block Diagram of Android Controlled Wildlife Observation Robot

A. Transmitter side

1. Battery: It is used to supply power to the entire component.
2. Microcontroller: It is used to control the direction of the motor and camera angle given by android device.
3. Bluetooth module: It is used to for communication between microcontroller and android device.
4. Driver IC: It is to control the motors for the robotic vehicle.
5. Servo motor: Used to manipulate the angle of camera as per guided by android device.
6. Night Vision wireless camera: To capture close footage of animals in day as well as night time.

B. Receiver

1. Receiver Unit: It receives signals from the transmitter unit and displays on the display screen.

V. Circuit Diagram

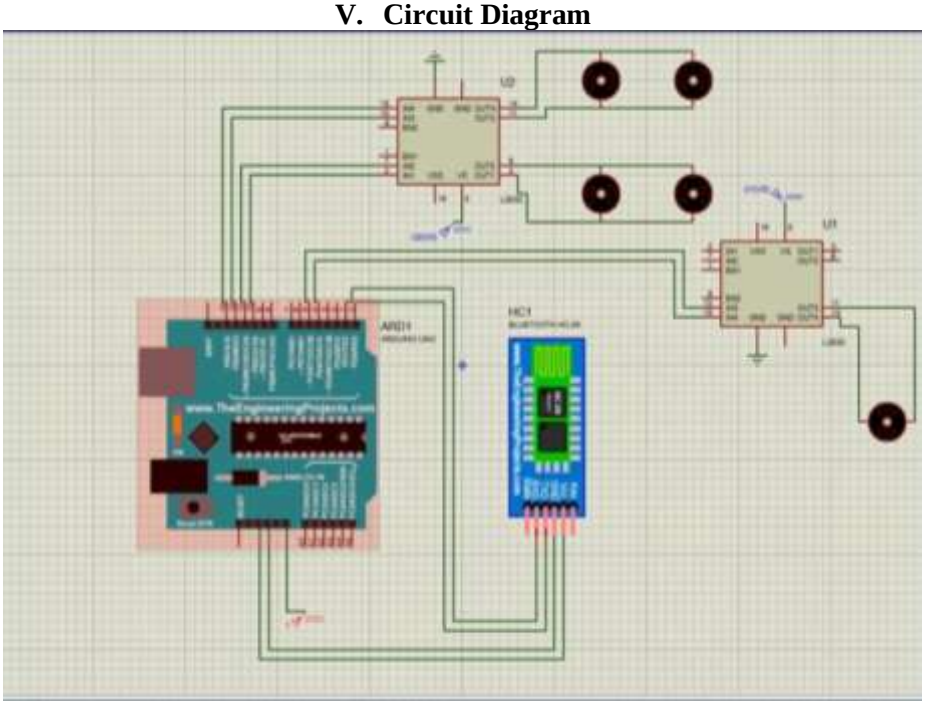
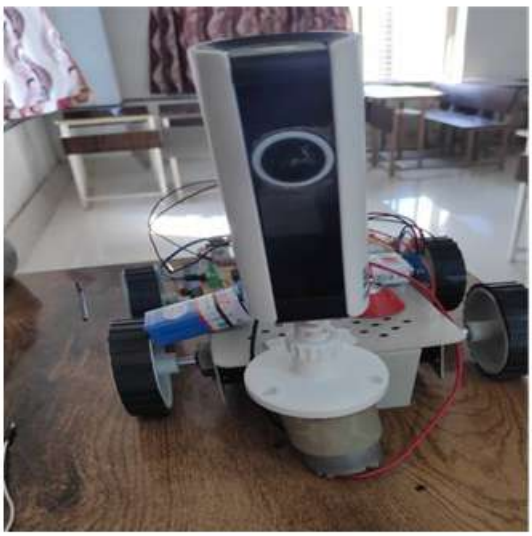


Fig. 2. Circuit Diagram of Android Controlled Wildlife Observation Robot

VI. Output Images



VII. Conclusions

This study therefore concludes that if we use Android controlled wildlife observation robot will solve many issue related to wildlife observation. The new blend of all the trending technologies will help the observers and analyst to study the wildlife habitats closely. This will help them save the animals that are on verge of extinction or contribute in helping them survive better. It will also reduce the threat to humans caused when they manually try to observe or collect footage of dangerous animals. This device is like a friend to human. Its easy operation allows every layman to use it efficiently. Also, it is cost efficient to be affordable by

most of the people in need of it. So if this project is implemented it will be a gift for the wildlife protection society.

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