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IOT Controlled Wildlife Observation Robot

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ABSTRACT: The main objective of this working concept is to observe and monitor the wild life for the secured preventing measures of the residencies. In this working model a robot is used for the monitoring purposes. The monitoring robot is been provided with the RF transmitter so that the information grasped from the forest location can be transmitted through it. After receiving the information from the transmitter through the camera it can be monitored by the users at the station. The robot consists GSM module so that the communication is applicable flexibly without any deviation. The robot can be operated by the relay drivers interfaced in to it. Through the GSM module the robots locomotion can be controlled and in case of any emergency the exact location of it can be examined further or periodically as per the user's convenience. The LCD display is used to describe the status of the working model and in case of the emergencies and critical situations the message can be send to the station through the GSM module.

KEYWORDS: GSM module , 8051 Microcontroller Wireless camera, Relay drivers , Robot, RF transmitter and receiver, 16*2 LCD, PC or Television.

I. INTRODUCTION

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 or Joystick. The robot also has a wireless camera that sends footage of wild animals by operating this robotic vehicle from a safe distance. This system consist of an Arduino (ATME ATMEGA 328) unit used for processing user sent commands. These commands are received by the system through a GSM module. The Arduino then process this data and passes on signals to driver motors. The driver motor now in turn operate the motors by providing desired signal outputs to drive the vehicle movement motors. Also when the Arduino receives the camera directional change signal through GSM module, it then forwards this signal to camera motor in order to achieve desired camera angle. Thus this wildlife observation robot is allows for safe wildlife observation using an android or Joystick device control.

The advent of this technology has brought a revolutionary change among wildlife observers. Today in the global market, smart phones also have brought a revolution in changing people's lifestyle and providing various applications .Android operating system is an open source which has made a huge impact providing many applications for robotics to help people and other wildlife observers. The important technology used in our project for serial communication with the robot is the Bluetooth technology. Bluetooth is used to share data between two devices considering the range between two devices. Bluetooth module (HC-06) will be connected to the robot and the commands to the robot will be given through the android application [1]. The wildlife observation robot consists of arduino mega board as a controller board. It has L293D motor driver IC's along with a HC-06 Bluetooth module. Two DC motors are also used for the motion of the robot. A night vision camera is used at the top of the robot and it can be rotated 360 degrees via android application through a motor [2].
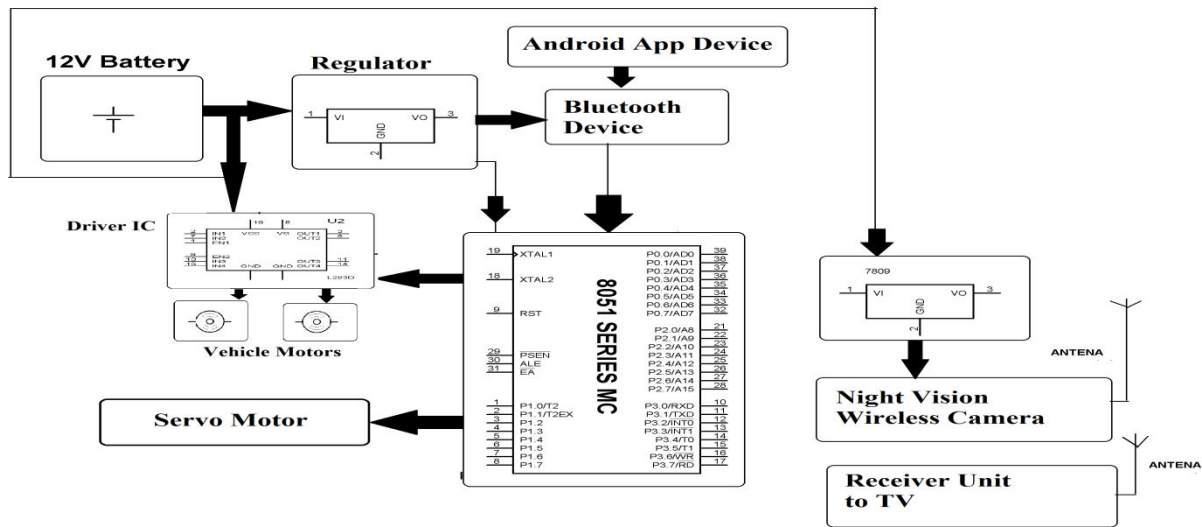
Fig1: **BLOCK DIAGRAM**

Android controlled wildlife observation robot is an autonomous robot or IOT 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.

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 smart phone and Bluetooth module. This makes the device more applicable for remote locations.

II. RELATED WORK

Various researches have been made by different researchers in developing this project. However, they serve a different application and have different technologies implemented. Some of those papers are mentioned below stating their technology and application.

Paper1: Have configured an android smart phone which can control a robot via Bluetooth technology. The phone uses motion sensors and records the gestures send via an android mobile phone. It also has an inbuilt accelerometer and Bluetooth module for controlling the moments of the robot.

Paper2: Has developed android controlled robot automation. Main of his project was the transfer of information wirelessly between a smart phone and the robot and developing the robot and its communication system underneath a low price and open source philosophy. He used 3D design technique to style the structure of the robot with the facilitation of parametrical modeling software. The style, when fed to the 3D printer can print the parts of the robot in a layered manner one by one and can then use this parts to assemble the robot simply. He has used Arduino microcontroller and Wi-Fi technology in this robot.

Paper3: Have invented a pick and drop robot. They wanted it to be used for diffusing bomb remotely with safety. For the robotic arm, they used a pair of motors and another pair as the wheels of the robot for controlling the moment. Connectivity is established using Bluetooth. The microcontroller used is LPC2148. They had also attached a wireless camera for remote surveillance. They have worked on this project mainly for industrial and military applications.

Paper4: In his paper has projected design to develop a robotic system which has a wireless camera attached to it for surveillance. Bluetooth was implemented in his project for providing connection between robot and smart phone. Wireless night vision camera was used for providing remote surveillance. The video which is recorded by camera is then transmitted to TV unit through radio frequency signal. He used 8051 microcontroller for the robotic unit.

Paper5: Has evolved the method of Bluetooth technology by developing an android app for a robot which is driven by a microcontroller . The central idea of his work is do show that one android app can be operated using totally different electronic devices. Vito M Guardi has invented a communication protocol for android smart phone and 1robotic platform over a Bluetooth.

Paper6: Have published a paper based on a project in which the smart phone is capable of IFLYTEKTEK voice as well as handwritten input. The design is therefore robust, suitable , and practical for use and it also ensure the reliability of the full system. For connectivity between the smart phone and robot, Wi-Fi is used. Use of Wi-Fi makes it easy and absolutely convenient for controlling the robot so that it can act according to the commands.

III. METHODS

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.

VOLTAGE REGULATOR

Fig: **VOLTAGE REGULATOR**

A voltage regulator is a system designed to automatically maintain a constant voltage. Depending on the design, it may be used to regulate one or more AC or DC voltages, voltage regulators control the output of the plant. voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage.

NIGHT VISION WIRELESS CAMERA

Fig3: **NIGHT VISION WIRELESS CAMERA**

Night-vision combines infrared illumination of spectral range 700–1,000 nm (just below the visible spectrum of the human eye) with CCD cameras sensitive to this light. The resulting scene, which is apparently dark to a human observer, appears as a monochrome image on a normal display device.
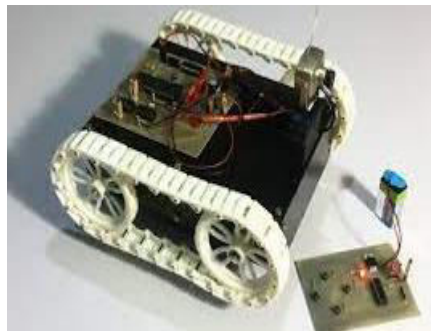

Fig3: work flow

We have presented a deployed IOT Controlled Wildlife Observation Robot system. The goal of the project was to collect environmental data, track badgers and deliver this information efficiently to the zoologists. We have devised an efficient duty cycling algorithm to adjust the on-time of the detection node to the activity of the animals, as well as an adaptive in-network storage and delay-tolerant delivery protocol. We have a deployed system in Wytham Woods, near Oxford, where we have been collecting data for many months.

IV. CONCLUSION

The progress of science and technology is a non-stop process. New things and new technology are being invented. As the technology grows day by day. We can imagine about the future in which thing we may occupy every place. The proposed system based on arduino microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform several tedious and respective tasks. Though it is designed keeping in mind about the need for industrial and domestic applications it can extended for other purposes such as commercial and research applications. Due to the probability of this technology "IOT BASED ROBOT USING ARDUINO FOR WILDLIFE. The future work for this working model can be enhanced by the employing several securities as robot models at the borders of the forest locations which can be preventive measure in greatest aspects for a secured life of residencies. The incorporation of sensors along with the robot model would be a preventive measure for the robotic models and their employments within the border levels in order skip and escape from the attacks of the wildlife behaviors.

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