

Preparation of Papers for Wildlife Observation Robot

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Abstract—as we know, now a days poaching and smuggling of animals have cause threat to the wildlife and has led to the endangerment of most of the species. Therefore, we are here with some new concepts i.e. Wildlife Observation Robot. The robot has night vision camera which is being mounted at 360 degrees' angle. This allows the user to control the robotic vehicle wirelessly and get required angle of this wild animals. The video can be recorded or photos can be clicked and can be viewed on pc for reference later. By using this observation robot, we can gradually observe the activity that are held in forest lives. Also we can make use of this innovative system in order to get close footage of wild animals. This module contains raspberry pi-3 CPU unit which is connected to an android unit or a laptop using WI-FI. The commands which user will give; it will be fetched by raspberry pi circuit mounted on the robot. The raspberry pi-3 then processes this data and passes on signals to motor drivers to control the robot. The driver motors now in turn operate the motors by passing required signal outputs to drive the vehicle motors. Also when the raspberry pi-3 receives the camera direction change signals, it then forwards this signal to the camera module in order to achieve required camera angles. Thus, this wildlife observation robot with night vision capability system helps to get a closer view of wildlife with the help of raspberry pi-3 circuit.

1. INTRODUCTION

Nowadays poaching and smuggling of animals have cause 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.

To keep a count of this endangered species and their movement conventionally we have been using Geo tagging method which allows us to keep a track of the movements of the particularly tagged animals. But this method of Geo tagging doesn't provide us a true data and where about of the particular animal.

It only shows the location and movement but does not provide the information related to the threat of the animals from hunter and poachers or natural calamities.

As in this era, wireless communication is very important concept and it plays an important role in various industries of automation field. Today the application of wireless communication in industrial automation is increasing rapidly. We can make use of this innovative system in order to get close footage of wild animals. As with the help of this system the user doesn't have to go close to the wild animals in order to get the close footage. Here the wildlife observation robot with night vision capability system makes use of raspberry pi to operate the robotic vehicle on which the night vision camera is being mounted. This allows the user to control the robotic vehicle wireless and get desired angled of these wild animals. This video is being live streamed and can be viewed on PC for reference. So wildlife observers can now safely get close footage of wild animals by operating this robotic vehicle from a safe distance. This system consists of a raspberry pi-3 unit used for processing user sent through the rpi transmitter circuit. These signals are received by the Raspberry receiver mounted on the robotic vehicle. The raspberry 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 raspberry receives the camera directional change

signal, it then forwards this signal to the camera motor in order to achieve desired camera angle.

2. SYSTEM OVERVIEW

Here in this system, one can control the robot from remote end i.e. mobile or laptop with the use of Wi-Fi as well as Internet and also we can get the live streaming of video from the robot for the purpose of observation, this video is obtained on web browser of the remote device from where we are operating the device also we are able to control the robotic movement. DC motors are being used for the movement of robotic wheels and stepper motor is used for camera movement. Raspberry Pi-3 is used for video processing and sending the processed video to user PC with the Help of Wi-Fi as well as internet.

3. SYSTEM DESCRIPTION

The basic block diagram of wildlife observation system using Raspberry pi-3 system is shown in the figure below. Mainly this block diagram consists of the following essential blocks:

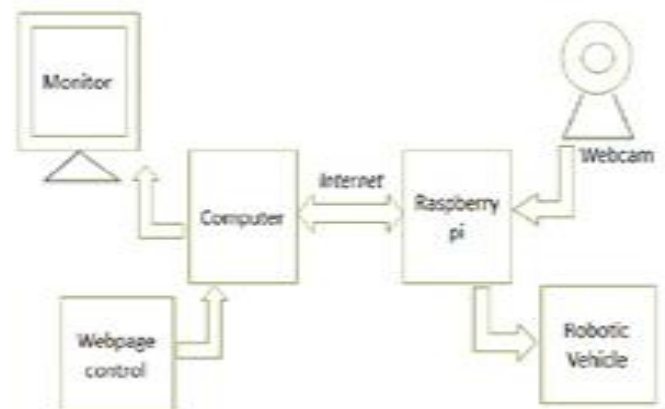


Fig 1. Block Diagram of Robotic Unit

i. Raspberry pi-3

The Raspberry Pi is a minicomputer computer which can be used in electronic applications or projects, and for many of the things that your desktop PC does, like browsing, text editing and games. It also plays high-definition video and it has a built in Ethernet Connection so one gets easy connectivity, at least for the most common boards. And we can easily add Wi-Fi connectivity by plug in a Wi-Fi dongle on one of the USB port. Raspberry Pi B+ has a strong processing capacity because of using the ARM11 architecture and Linux-based system there are simple and easy-used open source peripheral driver libraries. The wheels of robot are controlled by DCmotors and the movement of camera by the stepper motors. With the help of web browser, one can easily control the robotic unit and can monitors video streaming of the surrounding environment of that robotic unit. At the robotic unit, Raspberry pi is used for the control of DC motors and stepper motors. Raspberry Pi requires 5 volt supply with minimum of 1500-2000mA current. This raspberry pi is powered through micro USB cable. ARM11 requires 3.3 volt of supply which it takes with the help of linear regulator. 5 volts is required for the USB ports. It operates at 700 MHz. We can use python to write the code into the raspberry pi.

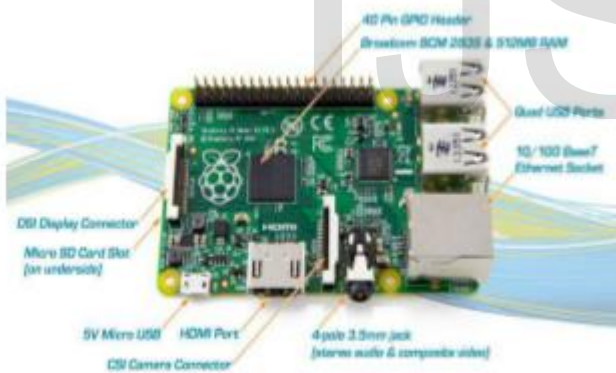


Fig2. Raspberry Pi Development Board

ii. Motor Driver

Here we can use L293D IC to control motors or L298 IC to control the motors. Normal DC gear-head motors requires current greater than 250-300mA. if we connect directly the motors to the ICs like timers, ATmega16 Microcontroller, 74 series ICs it will get damage because they cannot supply this amount of current, so that we should not connect motors to the output of any of the above given IC's, they might get damaged. There is a need of a circuitry that can act as a bridge between the above mentioned ICs and the powerful devices like motors. So this is done Using L293D. L293D is dual H-bridge motor driver ICs. We can control the direction of rotation of two motors in both clockwise and anti-clockwise direction. Here L293D IC is used for controlling the

motors, used for wheels. The L293D IC connection with dc motors is as shown below.

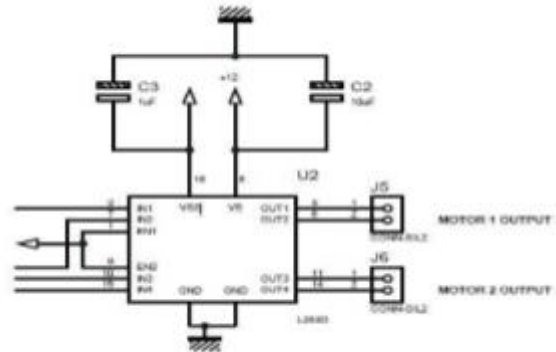


Fig3. Circuit Diagram for L293D Motor Connection

The logic for moving the motors in different Directions are as shown below.

Table1. L293D Motor Logic Table

Input 1	Input 2	Input 3	Input 4	Action
1	0	0	1	Clockwise rotation
0	1	1	0	Anti clockwise rotation
0	0	0	0	Idle
1	1	1	1	Idle (high Impedance)

Night Vision Camera

Our Raspberry Pi Night Vision Camera plugs directly into the CSI connector on the Raspberry Pi, and features two high intensity Infrared LED spotlights for night time recording! The IR LED's are powered directly from the CSI port, and are capable of lighting an area at a distance of up to 8m! In testing, the best images were captured at a distance of 3m to 5m. The camera also features an adjustable 3.6mm focal length lens and 75.7 degree viewing angle.

This Raspberry Pi night vision camera uses the same OV5647 as the standard Raspberry Pi camera, and is therefore able to deliver a crystal clear 5MP resolution image, or 1080p HD video recording at 30fps!

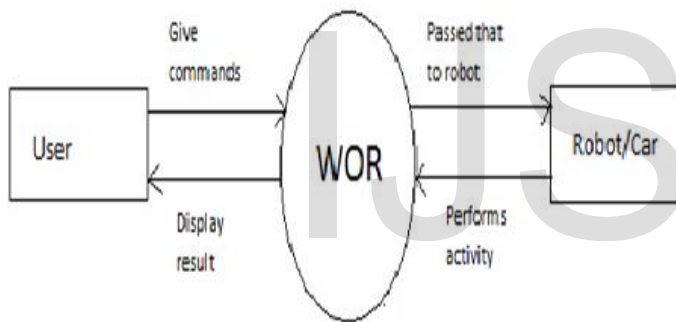
to wildlife and can also be used for tracking the wild animals and is helpful for researchers.

1. Features

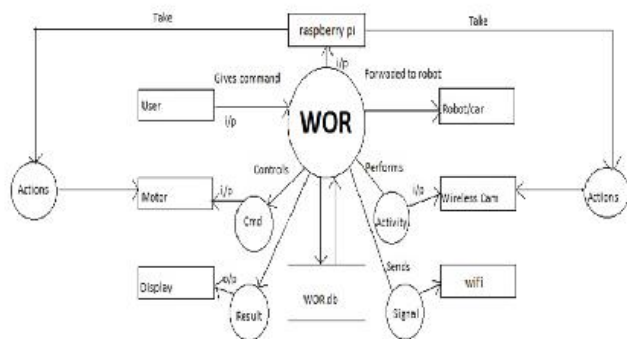
- Raspberry Pi Night Vision Camera. Compatible with all revisions of the Raspberry Pi
- 5 Megapixel OV5647 Camera
- 2 x 3W high-power 850 infrared LEDs:
 - Onboard photoresistor to detect ambient light
 - Onboard adjustable resistor, for controlling the ambient light threshold of toggling the infrared LED.

4. FLOW DIAGRAMS

Level 0:



Level 1:



5. CONCLUSION

In this project, we have derived that the close footage of wild animals can be taken easily from every angles without any harm

6. ACKNOWLEDGEMENT

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