

ANDROID CONTROL WILD LIFE OBSERVATION ROBOT

K T Navaneetha Krishnan¹, K Manoj Kumar², S Manjunathan³, Dr. K Kalaiselvi⁴

1,2,3 UG Scholar, 4 Associate Professor

*1,2,3,4 Department of Electronics and Communication Engineering,
Hindusthan College of Engineering and Technology, Othakalmandapam, Coimbatore, India.*

Abstract: *By entering the habitats of wild animals, wildlife watchers may get up close and personal with them. It is true that getting near to all wild creatures is not always safe. As a result, we propose this wildlife monitoring robot using IOT. Users may watch live activities using their android phones. So, by using this robotic vehicle, wildlife observers may get up and personal with wild creatures. An ESP32 is used in this system. The system receives these orders using a Wi-Fi module. We required our robot to be able to move silently and purposefully when monitoring a natural target without being recognised as we developed the technology to allow our robot to deal with the problems of keeping constant surveillance of a target. The data is subsequently processed by the microprocessor, which then sends signals to the motors to operate them. The motors are now operated by the driver motors, which provide necessary signal outputs to drive the vehicle movement.*

Key Words: **Wildlife Monitoring, live streaming, Fire Detection, Object Detection, Movement Tracking**

1. INTRODUCTION

Wildlife observation robot is an autonomous or android-controlled robot that is used to observe animals more effectively. Poaching and animal smuggling have posed a threat to biodiversity in recent years, putting the majority of species in jeopardy. Several endangered species are on the verge of extinction. The use of automated technology for wildlife observation has grown quite prevalent, and various modern cameras are now available for this purpose. Fieldwork in biology is time-consuming, but it is becoming increasingly advanced. Thousands of wildlife photographers are out and about photographing animals in the magnificent forests around us. It's crucial to keep the camera in situations where it can appear impossible to get great images. Camera traps, which are stationary cameras activated by motion, have been employed in the past. This strategy necessitates a great deal of luck, patience, and perseverance. Many significant data about the surroundings may be found through wildlife observation.

2. LITERATURE REVIEW

“ATT Squeeze U-Net: A Lightweight Network for Forest Fire Detection and Recognition” in this reference paper,

the author used ATT Squeeze U-Net for segmentation and recognition. The incorporated Squeeze Net architecture with modified Fire module on ATT U-Net, which enabled more effective feature learning based on limited data. Subsequently, another recognition model adopting a portion of the newly established encoding path was utilized for classification.

“A Dual-Isolation-Forests-Based Attack Detection Framework for Industrial Control Systems” in this reference paper, the cyber-attack detection framework is composed of two isolation forest models that are trained independently using the normalized raw data and a pre-processed version of the data using Principal Component Analysis (PCA), respectively, to detect attacks by separating-away anomalies. The performance of the proposed method is compared with the previous works, and it demonstrates improvements in terms of the attack detection capability, computational requirements, and applicability to high dimensional systems.

“A New Approach for Smoking Event Detection Using a Variational Autoencoder and Neural Decision Forest” in this reference paper, they present a wireless body area network-based system consisting of two off-the-shelf devices, one smartphone and one smart watch, to detect smoking events by mining the inertial sensor data from both devices. The variational auto encoder is adopted to learn the feature representation and deal with the class imbalance problem, and the stochastic decision forest is adopted

“An Attention Enhanced Bidirectional LSTM for Early Forest Fire Smoke Recognition”, in this reference paper, the ABi-LSTM has been inspired by the attention mechanism in neural machine translation, which can adaptively focus on discriminative frames. As a result, this framework may be suitable for early forest fire smoke detection. An interesting question is whether attention mechanism can be used in a single frame image to enable the model

“Evaluation of Random Forest for Complex Human Activity Recognition Using Wearable Sensors”, in this reference paper, the accurately recognizing human activities plays a central role in a variety of real-world applications that range from smart home and ambient assisted living

systems to human computer interaction and the elderly healthcare. Among the sensing units, the use of wearable sensors remains a priority in building activity recognizers and developing pervasive applications.

“Fault Detection in a Swarm of Physical Robots Based on Behavioural Outlier Detection” in this reference, the many real-world activities that robot swarms have the capacity to do require the ability to accurately detect flaws. The majority of swarm robotics fault detection research has been done solely in simulation and has focused on a single type of failure or a single activity. We created a robust fault-detection approach in which robots in a swarm learn to discern between normal and faulty behaviour online in a series of earlier research. We test three standard swarm robotics tasks while taking into account a variety of sensor and actuator defects. As a result, this work represents a significant step toward creating robot swarms stable and predictable enough for real-world applications.

3.PROPOSED SYSTEM

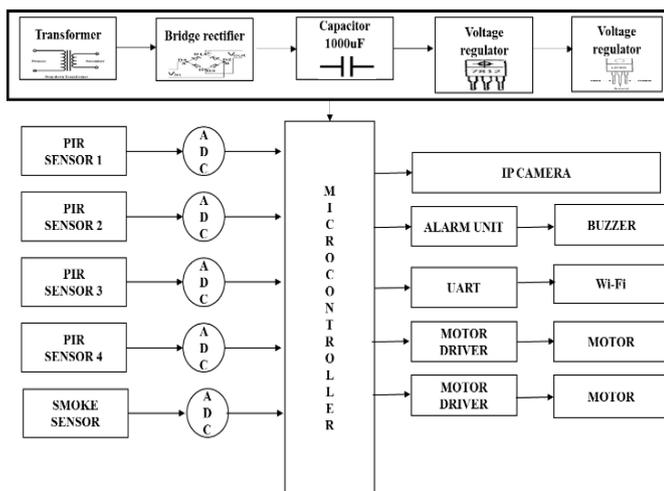


Fig - 1: Block diagram

From the Fig -1, PIR sensors are mounted to the corners of the Robot, and they are used to detect or observe the movements of wild animals or humans in forest zones. These sensors are connected to the drive motors, which will cause the robot to move in the direction that is being viewed. The speed is then controlled by the driving motor. Furthermore, whenever smoke or fire is detected in forest areas, the robot will attempt to contain the fire with water, which will be released through the water drive engine.

These modules are linked to the ESP32 Wi-Fi module, which transmits the data to the system's user. When the robot finds the things, the live broadcasting will be streamed to the authorized user.

3.1 Hardware and Software used

PIR SENSOR – 4, Gas sensor, Motor drivers, Dc motors – 2, ESP32 Microcontroller, Buzzer, Robot Chase, Arduino USB cable, Gear motors, Bridge Rectifier, Voltage Regulator IC 7812, Voltage Regulator IC 7805, Dot board, Arduino IDE, ISIS Proteus Professional, Embedded C programming are the hardware and software used in this system.

3.2 Advantages of the System

The Advantages in the system are it prevents other wireless devices from interfering with it, It consumes less electricity, It's simple to upgrade, A forest fire can be automatically detected, Sensor values are updated in real time, and live video is streamed.

3.3 Applications

Smoke detection, Forest fire control, Live streaming, Object Detection, Buzzer Intimation, Auto driving control, Movement Tracking, Making data available to users. These are the applications of this system.

3.4 Output

The robot was able to detect human and animal activity in the forest areas as a result of its output. When the robot detects movement using a PIR sensor, it moves towards the object and automatically streams the live activities using a mobile IP camera, sending the information to the administrator.

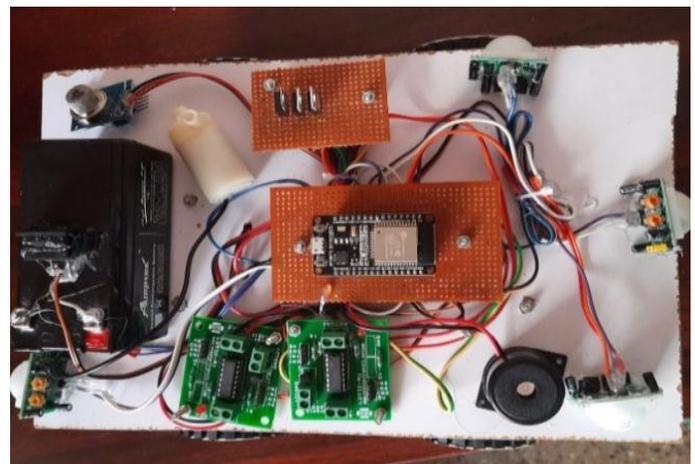


Fig - 2 : Circuit connection



Fig - 3: Complete Setup

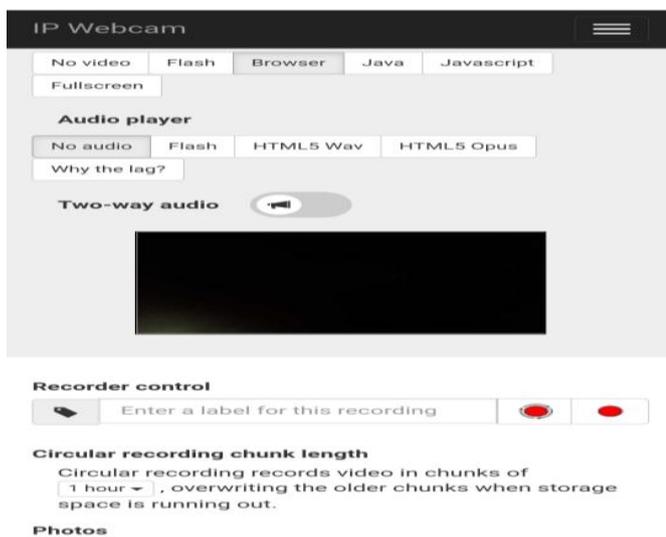


Fig -4: Streaming

4. CONCLUSIONS

Any problem relating to wildlife observation will be solved by the built Android-controlled wildlife observation robot. The novel combination of all current technology will aid observers and analysts in conducting in-depth studies of wildlife habitats. This will assist them in saving or improving the survival of species on the edge of extinction. It will also lessen the risk to humans posed by humans manually observing or collecting footage of dangerous animals. To humans, this technology is akin to a companion. Its simple operation allows even a layperson to use it effectively. It is also cost-effective, making it accessible to the majority of those who require it.

5. FUTURE ENHANCEMENT

The project's future scope includes aspects such as network connectivity and sensor range. Wildlife observation is a valuable resource for climatic balance and a potential solution to global warming. As a result, when a

forest fire happens, not only does the important forest resource suffer harm, but the fire also rips the environment apart, producing enough pollution by the same source that is supposed to keep it from happening.

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