

INTRODUCTION

Forests are vital ecosystems that support biodiversity and contribute significantly to the environmental balance of the planet. However, these regions face increasing threats due to human encroachment, illegal poaching, and unauthorized logging. Ensuring the safety of wildlife and preventing such activities require robust monitoring systems that can operate efficiently in vast and often remote areas. Traditional monitoring methods, such as manual patrolling and the use of stationary camera traps, are time-consuming, labor-intensive, and prone to human error. To address these challenges, advanced technologies like deep learning, and the Internet of Things (IoT) can be integrated to develop an intelligent, automated surveillance system. The Human and Animal Detection in Forest Areas system is designed to automate the process of identifying and classifying human and animal presence in forested regions. This system is built using computer vision and deep learning techniques, specifically leveraging MobileNet, a lightweight and efficient neural network model for object detection. The project employs real-time image and video processing to analyze data from surveillance cameras deployed in forest areas. Whenever a human or an animal is detected, the system classifies the entity and sends an immediate alert to the relevant authorities using IoT-enabled communication via NodeMCU. This ensures that forest officials can take prompt action in case of unauthorized activities, potential threats to wildlife, or human-wildlife conflicts.

The system works by continuously processing live feeds from cameras placed at strategic locations in the forest. These cameras capture real-time images and videos that are then fed into the deep learning model for analysis. Using MobileNet, the system detects objects in the video stream and classifies them into predefined categories such as 'human' or 'animal.' The lightweight nature of

MobileNet ensures that the detection process is efficient even on limited hardware resources. Once a human or animal is detected, the system generates an alert and transmits the information to forest authorities using an IoT-based notification system via NodeMCU. These alerts can be sent as messages notifications. The system operates 24/7, eliminating the need for continuous manual supervision. This feature significantly reduces workload, improves accuracy, and ensures timely responses to potential threats. The system is designed to be deployed in multiple locations and can be integrated with existing forest surveillance networks. Its low-cost, high-efficiency nature makes it suitable for large-scale implementation.

This system offers a cost-effective, scalable, and reliable solution for forest conservation and surveillance. It provides a technologically advanced approach to wildlife protection and forest security. Through automated monitoring, the system ensures that illegal activities such as poaching, deforestation, and unauthorized human presence can be detected early, allowing authorities to intervene before significant damage occurs. The Human and Animal Detection in Forest Areas system thus serves as a crucial step toward enhancing forest management strategies, protecting wildlife, and ensuring environmental sustainability.

MOTIVATION

Forests are home to countless species of flora and fauna, playing a vital role in maintaining the planet's ecological balance. However, illegal human activities, such as poaching, deforestation, and unauthorized encroachments, pose severe threats to these ecosystems. Wildlife populations are declining due to habitat destruction, and forest authorities often struggle to monitor large areas efficiently. Traditional methods of surveillance, such as manual patrolling and camera traps, are time-consuming, expensive, and limited in scope.

The increasing cases of human-wildlife conflicts further emphasize the need for an advanced, automated monitoring system. With the rise of artificial intelligence and IoT technologies, real-time detection and alert systems have become feasible solutions for forest conservation. This project is motivated by the need to create an efficient, accurate, and cost-effective method to monitor forest areas, ensuring both wildlife safety and forest security.

By leveraging deep learning and real-time object detection, this system significantly reduces manual efforts and response time while improving the accuracy of surveillance. The ability to instantly notify authorities allows for quick intervention, preventing illegal activities before they escalate. This not only aids in wildlife protection but also supports sustainable forest management and law enforcement.

OBJECTIVES

To develop an automated system that can detect and classify humans and animals in forest areas using MobileNet and IoT-enabled alerts for improved forest surveillance and conservation.

- Detect human and animal presence in real-time using deep learning.
- Notify forest authorities instantly in case of unauthorized activities.
- Reduce reliance on manual patrolling and minimize human errors.
- Enhance wildlife protection by monitoring forest areas continuously.
- Provide a cost-effective and scalable solution for forest conservation.