

IOT BASED ANIMAL DETECTION SYSTEM

1st Dr K Venkata Rao, 2nd Pallavi E, 3rd Anjali R Shastry, 4th Dakshayini D S, 5th J Bindu Priya

Professor and Head, Student, Student, Student, Student Department of Computer Science & Engineering

Abstract The escalating threats to global biodiversity demand innovative approaches to wildlife conservation. In response, this paper introduces an Internet of Things (IoT)-based Animal Detection System (ADS) designed to revolutionize wildlife monitoring and protection. The system employs smart sensors strategically placed in diverse ecosystems, continuously collecting and analyzing data for real-time detection and identification of animals. Leveraging advanced machine learning algorithms, the ADS ensures high precision and accuracy in species recognition, minimizing false positives and negatives. Its adaptability allows deployment in various environments, and energy-efficient design promotes sustainability in remote areas. Collaborating seamlessly with conservation strategies, the system aims to provide instantaneous data for informed decision-making. The scalability of the IoT-based ADS makes it a versatile tool for safeguarding wildlife, contributing significantly to global conservation efforts.

Index Terms Arduino Microcontroller, Node MCU (IoT) Applications, Solar Panel, Laptop Cameras, Humidity Sensors.

I. INTRODUCTION

The global decline in wildlife populations due to various threats, including habitat destruction, poaching, and climate change, has underscored the urgency of innovative conservation solutions. In response to these challenges, there is a growing interest in leveraging advanced technologies such as the Internet of Things (IoT) to develop more effective and efficient wildlife monitoring systems. One critical component of this technological evolution is the development of an IoT-based Animal Detection System (ADS) designed to enhance the real-time monitoring and protection of wildlife habitats. The IoT-based Animal Detection System aims to overcome the limitations of existing methods by providing real-time detection and identification of animals in their natural habitats. This system utilizes a network of smart sensors strategically placed in wildlife areas, continuously collecting and analyzing data to identify and track animal movements. By leveraging advanced machine learning algorithms, aiding in the conservation efforts focused on protecting endangered and at-risk animals. It does not harm the animal.

LITERATURE SURVEY

S Jeevitha Research Scholar Dr. Venkatesh Kumar Assistant Professor [1] The survey paper is based on various wired and wireless applications used to alert human from animal intrusion. Researches regarding animals in image processing have been an important field for numerous applications. IoT (Internet of Thing) becomes a recent emerging technique all over the world. It furnishes the capabilities with a large number of applications, only a few are currently applicable to our society.

Hardiki Deepak Patil, Dr. Namrata Farooq Ansari [3] The prominent conflict observed between growing masses and wildlife in India. Few of the major consequences are: Injury, loss of life, damage to human property, crop damage, destruction of human habitats and many more. Adaption of temporary solutions like electric fences, trenches, manual surveillance, guard dogs, etc. are used to protect the habitat but are not economic and proven to stay as an unsafe solution for wildlife as well the humans.

Dr Senthil Kumar.M, Suryeah V M, Swetha B, Tharani S[2] This aim in every farmer is to yield a potential crop production every year. So, it is the responsibility of the farmer to protect the crop fields from the wild animal's attack. Most of wild animals often come into contact with the agricultural crops in need for food especially in the night-time.

Shashank H N, Subash S, Suhas R, Vithesh Gowda A R, Savitha M M [4] This project presents an Embedded System designed using WiFi technology aimed at addressing the challenges faced by farmers in protecting their crops from heavy rainfall and mitigating human-animal conflicts in agricultural zones. With a focus on the agricultural landscape of India, where agriculture is the backbone of the economy, the system combines rain sensors and automated covering mechanisms to shield crops during heavy rainfall.

Mohit Korche, Sarthak Tokse, Shubham Shirbhate, Vaibhav Thakre, S. P. Jolhe [5] Agriculture, serving as the backbone of many economies, faces persistent challenges, with animal interference posing a significant threat to crop yields. This article provides an in-depth review of traditional methods employed by farmers to protect their crops and explores the integration of modern technology in agriculture. In particular, it focuses on the implementation of a Smart Crop Protection System that leverages sensors, microcontrollers, and GSM modules to mitigate losses caused by animal interference in agricultural lands.

METHODOLOGY

- Use sensors to determine when the field needs water. Connect these sensors to microcontroller that can then turn on or off water pump/motor accordingly.
- Over time, the use of renewable energy can lead to reduced energy costs. The initial investment can be offset by long-term savings.
- Deploy infrared cameras around the fields. These devices can be linked to an alarm system or notifications to alert the owner when an animal is detected.
- Reducing water wastage in agriculture involves implementing efficient methods, to deliver water directly to plants with minimal loss. Employing soil moisture sensors helps optimize watering schedules, ensuring crops receive adequate hydration without excess usage.

DEFINITIONS

(1) *Arduino Microcontroller*

Microcontroller is the brain of the Arduino board. It's a small computer on a single integrated circuit that contains a processor core, memory, and programmable input/output peripherals. Common microcontrollers used in Arduino boards include Atmel AVR series (e.g., ATmega328P) and ARM-based processors (e.g., SAMD21). The Arduino board is a physical platform that hosts the microcontroller, along with components such as voltage regulators, crystal oscillators, and input/output pins. Arduino boards come in various shapes and sizes. Arduino boards have a set of digital and analog input and output pins that can be used to connect external components like sensors, LEDs, motors, and more. Digital pins can be either HIGH (5V) or LOW (0V), while analog pins

(2) *Node MCU*

It is an open-source firmware and development kit that helps you build Internet of Things applications. It is based on ESP8266 Wi-Fi module, and it includes the firmware that runs on ESP8266 and the hardware features necessary for IoT development.

(3) *Relay*

electrical circuits using lower-power control signals, making them integral to many electronic and electrical systems. It is an electrically operated switch that uses an electromagnet to mechanically control the switching of one or more circuits. Relays are commonly used in various electronic and electrical systems to control high-voltage circuits with low-voltage signals. The coil is an electromagnet that, when energized, produces a magnetic field. It is typically wound around a core made of iron or other ferrous material. The armature is a movable component within the relay that is attracted to or repelled by the magnetic field generated by the coil. The contacts are the switch components of the relay. Relays are crucial components that provide a safe and efficient way to control high-power

(4) *Solar Panel*

It can be utilized in animal detection systems will provide sustainable and energy efficient power source for various components. It can supply continuous power to surveillance cameras used for animal detection. These cameras can be strategically placed in wildlife habitats or on farms to monitor animal behavior, track movement patterns, and detect potential threats. By incorporating solar panels into animal detection systems, researchers, conservationists, and farmers can benefit from sustainable, off-grid power solutions.

(5) *Laptop Cameras*

It is also known as webcams, are integrated cameras that come built into laptops or are externally attached to them. These cameras serve various purposes, primarily for videocommunication, online meetings, and content creation. Integrated webcams are typically located at the top center of the laptop's screen or display panel. They are designed to be compact and unobtrusive, allowing for a seamless appearance in the laptop.

II. PROBLEM STATEMENT

In regions experiencing a surge in human-animal conflicts due to habitat loss, deforestation, and urbanization, the absence of an effective and proactive monitoring system results in substantial property damage, crop losses, and poses threats to human safety. Traditional methods prove inadequate, necessitating the development of an IoT-based Animal Detection System capable of providing real-time alerts and early detection of animal intrusions, thus mitigating conflicts, preserving biodiversity, and ensuring the well-being of both communities and wildlife.

III. PROJECT GOALS

The goal of project, we require proper planning of the system. The implementation of automated systems in agriculture has helped to successfully cut back the cost. The implementation of automated system helped revolutionize the irrigation

IV. APPLICATIONS

The Application of the IoT based animal detection system are:

- This goal involves implementing an automated system for controlling the operation of a pump.
- This goal aims to minimize the costs associated with maintaining equipment, such as pumps and other components of a water management system.
- The aim is to optimize energy usage, especially in the context of pumping systems. Automation can help in efficient scheduling and operation of pumps, reducing unnecessary energy consumption.
- Deploy motion sensors or infrared cameras around the fields. These devices can be linked to alarm system or notifications to alert the owner when an animal is detected.

V. CONCLUSION

In conclusion, with this project represents a significant leap forward in addressing the challenges associated with wildlife monitoring and conservation. By leveraging advanced technologies such as Internet of Things (IoT), sensors, and data analytics, this system provides a robust and efficient solution for detecting and tracking animals in their natural habitats.

VI. REFERENCES

- [1] S Jeevitha, Dr.Venkatesh Kumar “Animal intrusion detection system” International Journal of Engineering Research & Technology (IJERT), Vol. 9 Issue 05, May – 2021
- [2] Dr Senthil Kumar, M Suryeah V M “A Review paper on crop protection from wild animals” 2022 IJCRT, Vol. 10 Issue 05, May - 2022
- [3] Hardiki Deepak Patil, Dr.Namrata Farooq Ansari “Intrusion Detection And Repellent System for Wild Animals” 2022 INDIAN INSTITUTE OF TECHNOLOGY BOMBAY | Issue 15 June 2022
- [4] Shashank H N, Subash S, Suhas R “Crop Protection And Animal Detection” International Research Journal of Engineering and Technology (IRJET), 2021 IRJET | Volume 7, Issue 7 July 2021
- [5] Mohit Korche, Sarthak Tokse, Vaibhav Thake “Smart Crop Protection System” International Journal of Latest Engineering Science (IJLES) | Vol 04 Issue 04 August 2022

