



IOT BASED ANIMAL DETECTION SYSTEM

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Abstract : Traditional methods of detecting animals from the certain distance close to the paddy fields and farms include the use of human eyes to witness animal movements. It is not possible for human beings to monitor animal movements continuously throughout the day. So there is a need for specialized detection of animals particularly which enter the paddy fields and farm land of human beings. Due to the unavailability of any detection system these attacks kill villagers and also destroy their crops. The methods used for the recognition of the animals include Image Processing technique. Animal attacks are a common stories in nowadays. Due to the unavailability of any detection system these attacks kill villagers and also destroy their crops. Therefore a proper detection system could help save their lives and also to the preservation of crops.

IndexTerms – Arduino Microcontroller, Node MCU, IR Sensors, Laptop Cameras, Motion detection sensor.

I. INTRODUCTION

Its main objective is to detect the presence of the animal using sensors. It compares the image with the pre – stored image using image processing techniques. It send alerts to the authorized person about their entry and in addition it starts a sound buzzer to deny their entry. In this system the animals are composed of automotive electric fence using light sensor and Thermal sensor. The light sensor will activate the fence when the sun goes down and the thermal sensor will detect the elephant and activate the fence during the daytime. When the elephant breaks the fence and enter, laser sensor will activate the siren. The electric fence was not controlled by any external factor so a high voltage of electric current is passed in the electric fence it may lead wild animals to dead. The farm fields are protected from elephants only.

II. DEFINITIONS

Arduino Microcontroller

The microcontroller is the brain of the Arduino board. It's a small computer on a single integrated circuit (IC) 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 other components such as voltage regulators, crystal oscillators, and input/output pins. Arduino boards come in various shapes and sizes. Common examples include Arduino Uno, Arduino Nano, Arduino Mega, and more. Arduino boards have a set of digital and analog input/output (I/O) 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.

Node MCU

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

Relay

A relay 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 electrical circuits using lower-power control signals, making them integral to many electronic and electrical systems.

Solar Panel

Solar panels can be utilized in animal detection systems to provide a sustainable and energy efficient power source for various components. Solar panels 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.

Laptop Cameras

Laptop cameras, 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 video communication, 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.

III. LITERATURE SURVEY

1.1 Animal Intrusion Detection System

A Review S Jeevitha Research Scholar Dr. Venkatesh Kumar Assistant Professor

Deforestation, lack of natural prey and habitat loss has forced wild animals to live closely with human settlement prey on domestic livestock. So animals are started attacking humans for their food. Compared with other tiger, elephant entry are in extreme form of conflict and responsible for killing human's lives in India. Due to human and animal conflict and increase in population humans started demolishing the forest for their existence these leads to harm animals and its habitats. Animals started entering nearby villages due to the rapid growth of industrialization in forest areas. Losing subsistence and dryness makes them raving mad and pretend to attack crops, livestock, sometimes human and farming lands. Usually, farmers use the electrical fence to protect the field from animals which cause electrocution with cramp makes them behave unusual manner. The safety of animal and human is identically important. To overcome this problem an intelligent monitoring system is required to monitor automatically and recognize the image of animal entry and gives an alert message to human.

1.2 Review Paper on Crop Protection From Wild Animal

Dr Senthil Kumar.M, Suryeah V M, Swetha B, Tharani S

The aim of 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 the wild animals often come into contact with the agricultural crops in search of food especially in the night-time. Some of these animals attack those crops which results in the increase of human-wildlife conflicts. As a result, our project attempts to establish an Internet of Things model for protecting crops from wild animal encroachment in order to discover a solution. So, a monitoring system is provided to prevent the potential damages in agriculture from the wild animal's attack. This is achieved by using an Arduino Boards and PIR sensor surrounding the paddy field. The presence of wild animals is detected. In response to the detection of wild animals, lights and alarm will be produced. By the sudden warning, the animals get frightened and run away from the field leaving the crops undamaged.

1.3 Intrusion Detection and Repellant System For Wild Animals

Hardiki Deepak Patil, Dr. Namrata Farooq Ansari

A 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. In order to initiate safety for both wild animals and humans, some mitigation plan is required to solve this issue. While there are various IoTbased Animal Surveillance and repellent systems in market, a touch of Artificial Intelligence can make it more reliable and efficient. This will certainly push forward the bars that are kept limited with the use of IoT alone. The proposed system aims in protecting human habitation and livestock at the outskirts of the forest area/ fields by developing an automated system that detects the intrusion of wild animals and repels them back to the forest without causing any harm; Hence minimizing the dangerous consequences caused by the Human Wildlife conflict.

1.4 Crop Protection And Animal Detection System

Shashank H N, Subash S, Suhas R,Vithesh Gowda A R ,Savitha M M

In forest zone agricultural fields humans and animal conflict is a major problem where large amount of crops is lost and farmers life is in danger. Because of this farmer lose their crops, farm equipment, and sometimes farmers live. So this zone is to be watched continuously to protect the agricultural field from the entry of wild animals. With regard to this problem, we have developed the system which will monitor the field. That is at first it will detect intrusion around the field using camera system capture the image if there is an unauthorized entry and classifying them using image processing and then takes suitable action by detecting the type of the intruder. Finally sends notification to farm owner and forest officials using Message.

1.5 Smart Crop Protection System

Mohit Korche, Sarthak Tokse, Shubham Shirbhate , Vaibhav Thakre , S. P. Jolhe

Agriculture is the backbone of the economy but because of animal interference in agricultural lands, there will be huge loss of crops. This article provides a comprehensive review of various methods adopted by farmers to protect their crops. The article also discusses use of modern technology in agriculture. Finally, this article reviews smart crop protection system using sensors, microcontroller and gsm module.

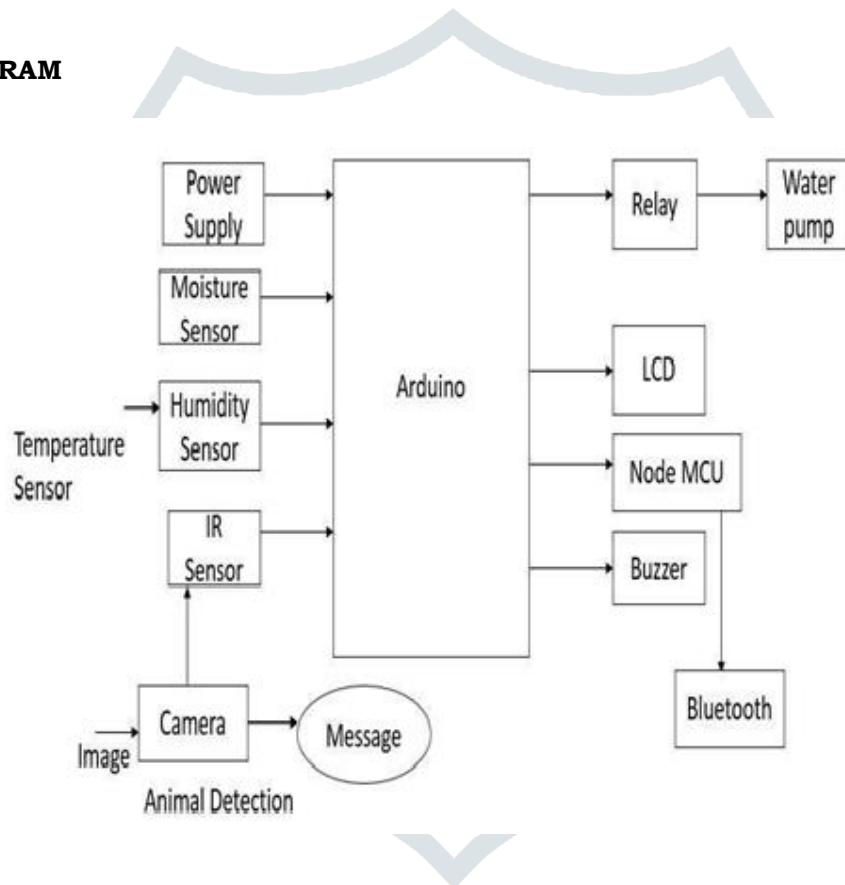
IV Software Requirements

- Arduino Suite
- Embedded C
- Python IDE3.7

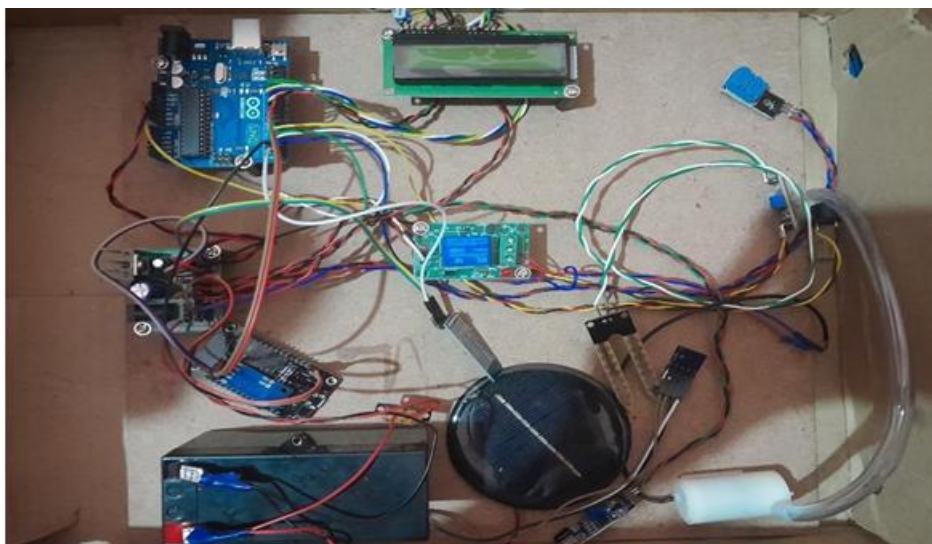
Hardware Requirements

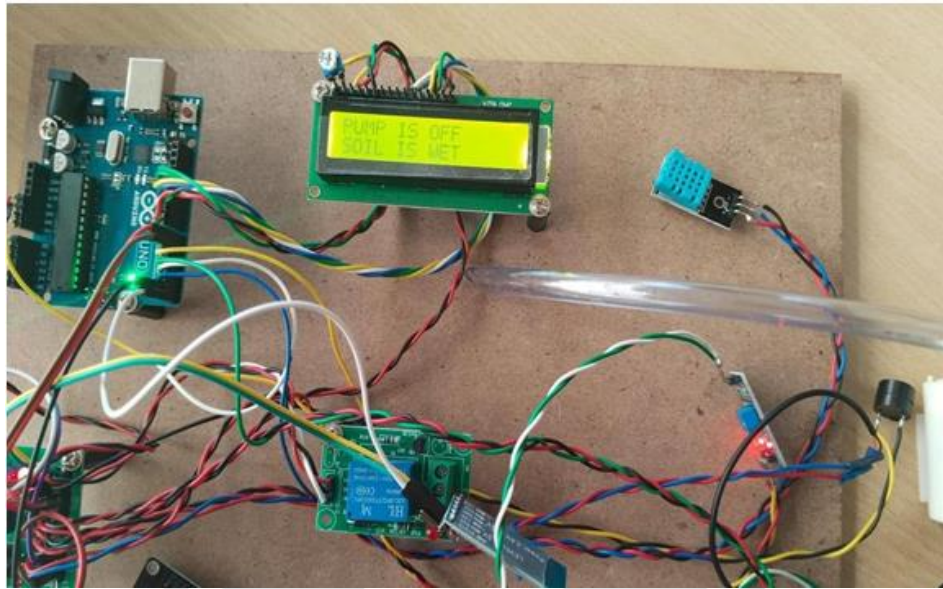
- Arduino Controller
- Water Pump
- Power Supply
- Soil Moisture Sensor
- LCD
- Relay
- Node MCU
- IR Sensors

V BLOCK DIAGRAM



VI RESULTS AND SNAPSHOTS





VII APPLICATIONS

- **Automatic switching of pumps:** This goal involves implementing an automated system for controlling the operation of a pump. Instead of manual intervention, the system would use sensors, timers, or other automated mechanisms to turn the pump on or off based on specific conditions such as water levels, time of day, or environmental factors..
- **Maintainance and cost reduction:** This goal aims to minimize the costs associated with maintaining equipment, such as pumps and other components of a water management system. Automated systems can contribute to maintenance cost reduction by optimizing the operation of equipment, detecting faults or issues early, and reducing wear and tear through efficient scheduling.
- **Reduction in labor:** This goal involves minimizing the need for manual labor in tasks related to water management or irrigation. Automated systems can replace or assist human efforts in tasks such as turning on/off pumps, adjusting irrigation schedules, and monitoring system performance, leading to reduced labor requirements.
- **Energy saving:** 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. For example, pumps can be turned off during periods of low demand or when environmental conditions favor natural water replenishment.

VIII REFERENCES

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