

Crop Protection Against Animals Based on Voice Recognition

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Abstract

Crops in farms are often harmed by animals such as buffaloes, pigs, goats, birds, and wild elephants. Farmers suffer significant losses as a result of this. Farmers are unable to secure their fields for a full 24 hours. To address this problem, an animal identification device has been developed that detects the presence of animals and provides an alarm before diverting the animal without causing any damage. In this paper, we propose a new method using machine learning in a voice recognition kit, for insects and animals these voices are stored in the recognition module, as a training part. After this while testing, the detecting insect will have a reaction on the voice playback module and the speaker will automatically play an anti- voice. This is beneficial for the protection of crops in fields where constant monitoring is not possible.

Keywords— *insect; crop; protection; agriculture; GSM*

I. INTRODUCTION

Animal interference in suburban areas is growing, threatening human life and property, resulting in human-animal violence. But, according to nature's rules, any living being on this planet plays a significant role in the eco-system. Agriculture is the cornerstone of the economy, but animal intrusion in farm fields can result in massive crop losses. Elephants and other animals who come into contact with humans have a detrimental effect in a variety of ways, including crop depredation, damage to food stores, water sources, homes and other possessions, and human injury and death. Farmers in India face major threats from pests, natural disasters, and animal destruction, resulting in lower yields. Farmers' traditional techniques are ineffective, and it is not practical to employ guards to keep an eye on crops and deter wild animals. Since the welfare of both humans and animals is equally important. As a result, an animal detection system is needed in farm areas.

Agriculture has always been India's most important economic field. About the fact that agriculture employs the majority of India's population, farmers face numerous challenges. [1] Deforestation happens as a result of overpopulation; deforestation deprives woodland areas of water, food, and shelter. As a result, the influx of animals into suburban areas is the day by day, disrupting human life and property and causing tension between humans and animals. Agriculture is the bedrock of the economy; however, animal attack in agricultural land will result in massive crop loss. [2] Elephants and other animals interacting with humans have a detrimental effect in a variety of areas, including crop loss, disruption to food stores, water sources, homes and other resources, illness, and human death. [3] Human-to-human conflict can also be a major concern, wasting vast sums of resources and putting people's lives in danger. In recent years, the number of such disputes has increased. [4-7]

Food is the most basic necessity for all living things. Agriculture produces the majority of our calories, either directly or indirectly. [8] Nowadays, agricultural field defence is critical. Birds causing crop harm is a major issue in most parts of India. According to field surveys, wild birds lost an average of 36% of the grain. [9] Damage was common in crop fields adjacent to woodland areas, resulting in direct confrontation between humans and birds. [10] Farmers face a variety of

agricultural challenges on a daily basis. Various types of animals used to invade crop fields, causing damage to the crops. They use a variety of techniques to address these types of issues. [11-15] Birds are a big issue in agriculture these days. Birds are swooping in on seed and devouring it. We are solving certain problems in this research article. Each animal or group of animals has a unique set of hearing frequencies. A basic logic is to predict the annoying frequency. During the day birds make obnoxious noises in agricultural and other areas. Birds dropping on crops and consuming rice seeds, rabi crops, corns and wheat etc., so we can make annoying sounds for birds, and then they can fly outside of the area. [16]

Agriculture is one of the most important financial sectors in our country; many ranchers and workers depend on agriculture to build and grow our country's economy. [17] To communicate the status of the sector, we use a number of remote correspondence modules. To use smart water system procedures effectively, we use the smart water system platform, the smart detecting framework, and a variety of other sensors. [18] The placement of various sensors in various fields to determine the true state of the ground. As a result, we can water the crop and run different engines without doing any manual labour. [19] The fundamental components of this concept are to use sensors and to achieve a productive yield in the horticultural field. [20]

Transfers are used where it is necessary to operate a circuit with a low force signal (with full electrical disconnection between the control and controlled circuits) or when a number of circuits may be limited by a single signal. [21]

II. LITERATURE REVIEW

Technology is an integral part of our daily lives. The market for Internet of Things (IoT) has increased in all the fields. There are various examples of scalable IoT application-oriented studies in the literature. In [4,] an example of control network and information network integration with IoT technologies is analysed using an actual agricultural production scenario. It is suggested to use a remote monitoring system that combines internet and wireless communications. In addition, an external knowledge processing sub-set is planned with the system in mind. The information gathered is presented in a format appropriate for agricultural testing facilities. Paper [9] suggested a home embedded monitoring device that tests the construction of a low- cost protection system based on a compact PIR (Piezoelectric Infrared) sensor mounted around an ultra-low warning power microcontroller. The device detects the presence of individuals that are not in thermal equilibrium with the ambient atmosphere by sensing the signal provided by the PIR sensor. [11] When it detects the presence of an unwanted user in some given time frame, it raises an alert and initiates a call to a predefined number via a GSM modem. After the MCU sends sensor signals to the embedded device, the software launches the Web camera, which takes photographs that can later be displayed and analysed.

According to paper [12], the protection mechanism is built on an embedded framework, as well as GSM and sensor networks.

[15] PIR cameras are used to track human activity. The device raises an alert when it detects the presence of an individual at a given time period and simultaneously sends the number of intruders to SMS via GSM Modem. When the surveillance system is turned on, the CCTV camera is turned on as well. This highly reactive approach necessitates little computational effort. As a result, it is ideally suited for use in a home surveillance scheme. [17] This surveillance protection system was built with a PIC microcontroller, a camera, GSM, and sensors.

We reviewed previous field work on these kinds of programmes. Agriculture is the cornerstone of the Indian economy, and it is compared in various methods. Since agriculture is the primary source of food for us, life will be difficult without it. However, in today's world, the supply of labour to care for agricultural operations is scarce. Automation in all sectors promotes industrial productivity. The agricultural process is automated in this location. In this proposed scheme, all devices operate on their own with the aid of inputs obtained from sensors that track the agricultural land around the clock, and a single individual is sufficient to monitor weather everything is natural. A programmable logic controller [1-5] controls and monitors the whole operation. Author of paper [21] suggested a method for continuously tracking the rising status of the corn (maize) plant and informing the agriculturist using a wireless sensor network (WSN). In reality, however, cultivators face too much work on the farmland. This reference [19] paper simplifies the farmer's function in cultivated land by using various types of sensors. The two LDR sensors are linked to a PIC16F877A microcontroller, with the top array receiving solar radiation to supply current and the bottom array calculating leaf region index (LAI). The humidity sensor will calculate the moisture level in the corn field, and if the level drops, the DC motor will automatically turn on. Both farmland details are sent

to the farmer via GSM and shown on the LCD screen.

III. IMPLEMENTATION

The block diagram of implementation is shown in fig. 1. The intelligent alphanumeric dot matrix monitor has a resolution of 16 x 2 and can display 224 different characters and symbols. Serial LCD Firmware enables serial monitoring of the monitor. Microcontrollers may use firmware to display user instructions or readings on an LCD module. The block diagram shows that the Voice module recognizes this research project started with an investigation into the impact of bird and animal attacks on crop yield.

As part of the literature review, crop damage caused by numerous animal and bird species was investigated. For several years, sporadic attacks by whiteflies, bollworms, rats, plant hoppers, deer, elephants, and other animals have caused crop damage in various parts of the world, making the agriculture sector less profitable and riskier. This has heightened the need for crop management strategies that can help to protect crops from destruction while also increasing production. Crop yields can be greatly reduced if no crop management techniques are used.

In this section, implementation circuit is shown in fig. 2. In this work, Arduino is used as a microcontroller and coding is stored as per the algorithm. This Voice Recognition Module is a thin, easy control talking acknowledgment screen. This part recognizes the voice module through speaker-subordinate. It amplifies a total of 80 voice commands. This module will support up to 7 voice commands at the same time. As an order, every voice may be prepared. Clients must first schedule the module before receiving any voice orders. This board can be regulated in two ways: Surgical Input Pins, Serial Port (full capacity) (some portion of capacity). A few types of waves are generated while relevant voice order is interpreted through the board's General Output Pins. The most important aspect of this work is crop assurance; here, a voice module is used that has been loaded with data for the voice of certain creatures that pulverize the harvests, such as an elephant or an important creep

crawly cricket. The specified vermin speech can cause the voice module and speaker to produce a sound enemy for the molecule identified as annoyance.

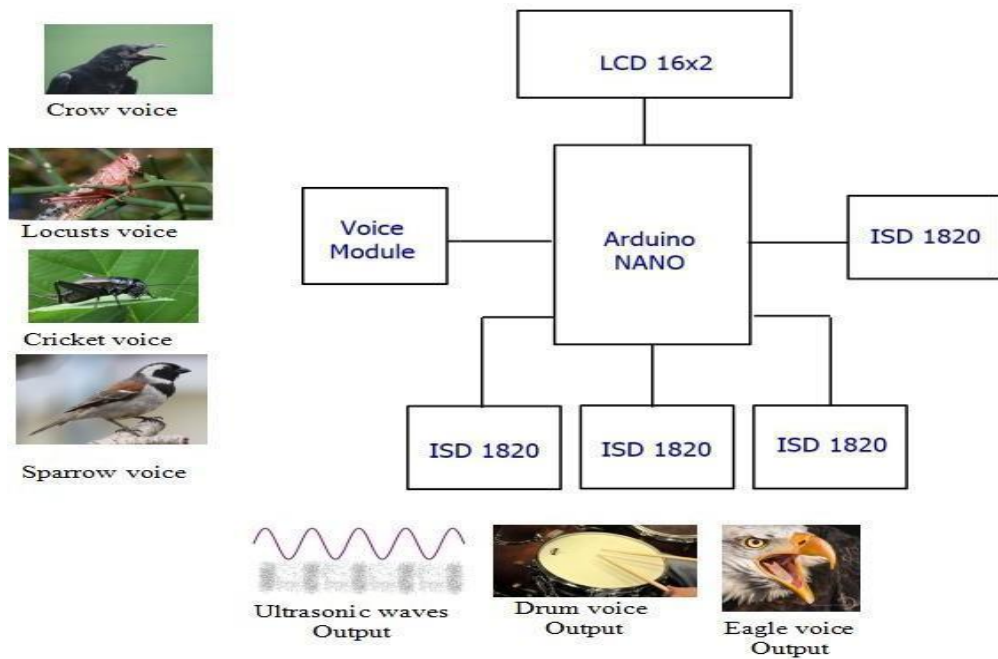


Fig. 1. Block Diagram for Crop Protection

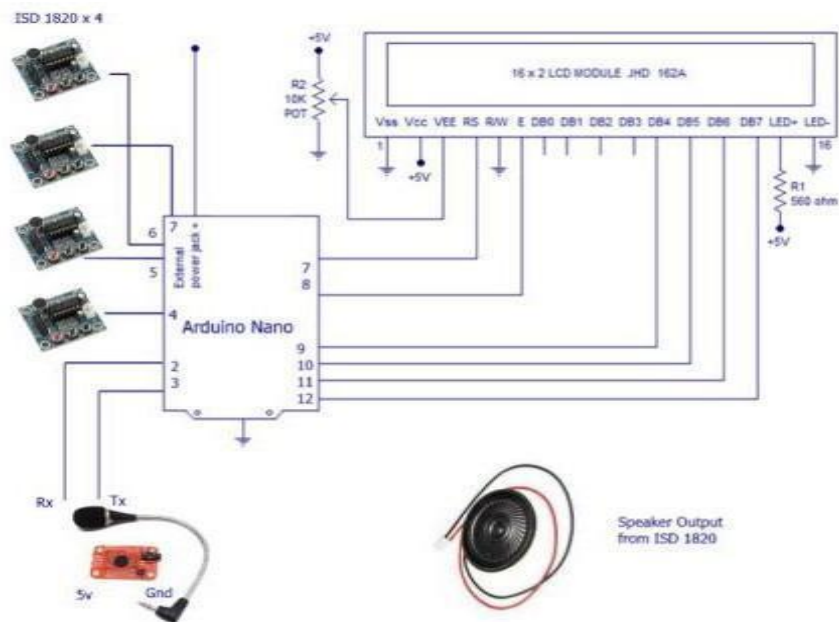


Fig. 2. Circuit Diagram

IV. RESULTS

The prototype hardware is shown in Fig 3 below, the voice recognition used to detect different voices and speaker modules to play the anti-voice. All of these processing is also displayed on the LCD.

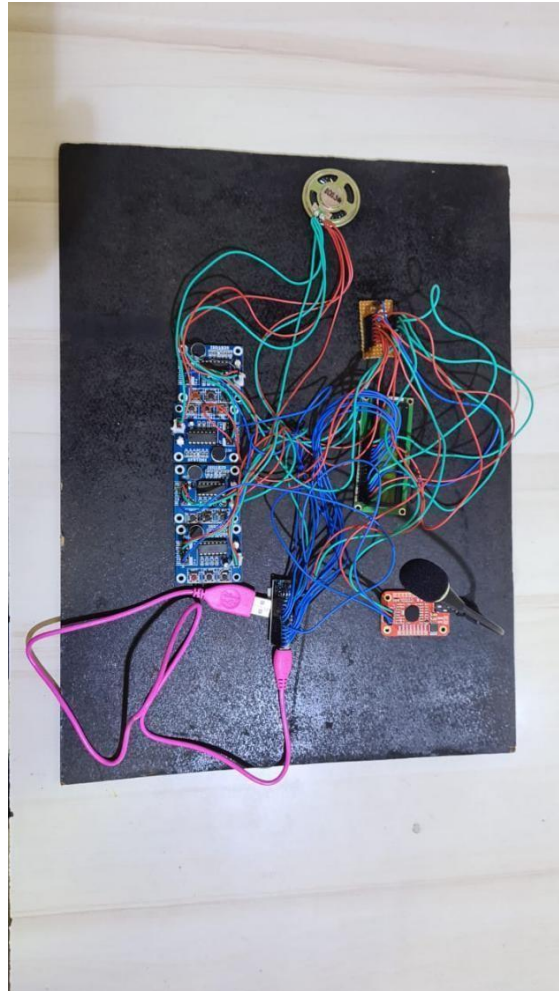


Fig. 3. LCD

V. CONCLUSION

Our project is an Arduino-based smart crop defence device. This project will assist the farmer in protecting his farm from animals and unknown people in the region. Crops in farms are often overrun by local animals such as buffaloes, pigs, goats, birds, and locust, among others. Farmers suffer massive losses as a result of this. Farmers cannot barricade whole fields or remain on the field 24 hours a day, seven days a week. As a result, we recommend an automated crop safety device against animals and flames. This is a microcontroller-based Arduino Uno device. The implementation and results show that the prototype was efficient and accurate in detecting the insects and its anti sounds.

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