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SOLAR BASED BIRDS REPELLER TO PROTECT THE CROPS

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Abstract: This work suggests a novel method for real-time bird recognition in live video feeds by using image processing. Using Arduino technology, the device automatically activates deterrents meant to discourage birds that are spotted. When the device detects the presence of birds, it triggers a pre-programmed sound via a speaker and launches a motorized scarecrow to scare away birds. The procedure is to record video feed, use image processing algorithms to search for bird-like traits in the frames, and then start deterrent devices. This device provides an effective and non-invasive way to manage birds, especially in urban or agricultural environments where bird infiltration is a concern. The suggested method offers a scalable approach to bird management by fusing image analysis with automation powered by Arduino. Through the reduction of human interference and environmental damage, this research helps to establish long-term solutions for alleviating bird-related problems.

IndexTerms **- Agricultural settings, Bird Control, Deterrent mechanisms, Real-time bird detection, Video feed, etc.**

I. INTRODUCTION

Although birds can be a lovely sight in their natural habitat, they can also cause harm and pose health problems when they invade certain regions, such as metropolitan areas or agricultural fields. Utilizing technology, creative solutions are being created in answer to this dilemma. Using image processing methods in conjunction with Arduino-based automation is one such way to successfully identify and discourage birds. The idea is to use real-time video streaming to identify bird presence in real-time using image processing techniques. To do this, video stream frames are analyzed using computer vision algorithms to determine the forms, patterns, or movement characteristics of birds. The system continuously monitors the video stream to detect when birds are approaching particular areas and react accordingly. When the system identifies birds, an Arduino-based automated procedure is started with the intention of discouraging them. This method effectively scares birds and discourages them from lingering around by combining visual and auditory signals. The audio component consists of sound waves being emitted through speakers positioned strategically across the room. By imitating predator cries or other unpleasant noises that are known to frighten birds, these sound emissions can successfully warn of danger and cause them to take flight. The system may potentially include motor-based scarecrow devices that are managed by Arduino in addition to audio cues. These scarecrow gadgets can be fitted with visual deterrents that are intended to frighten birds and disturb their comfort zones, such whirling reflectors or flapping flags. The technology efficiently inhibits birds from nesting in the protected area by creating a multi-sensory environment that combines visual and audible deterrents. Combining visual analysis with automation powered by Arduino provides a flexible and adaptive approach to bird deterrent. Tailored bird control tactics may be implemented using the system to accommodate various bird species and settings. Additionally, proactive intervention is made possible by its real-time monitoring capabilities, which maximize effectiveness while limiting potential harm. In conclusion, a viable strategy for reducing bird-related problems is the integration of image processing to identify birds through live video streaming, along with motor-based scarecrow devices and Arduino-based automated sound.

II. REVIEW OF LITERATURE

Matthew Hiron, Dianarubene [1] Granivorous birds causing crop damage in a western Kenyan sorghum field, despite human bird scarers' best attempts to prevent it. The impact of avian agricultural pests on small-scale farmers is highlighted in this study. Even with employees that put in a lot of effort during the day, a significant amount of the crop was still destroyed. Simultaneously, varying phenology and cropping patterns may mitigate this type of harm at the landscape level.

Koyuncu, T. and Lule F. [2] Create, Produce, and Evaluate a Solar-Powered Audio Bird Scarer by -The concept of a solar-powered bird scarer is briefly discussed in this publication. This work, which was published in Turkey, offers four major insights in addition to a general overview. This experiment uses a total of eighteen sounds because it is linked to an MP3 player.

Nadimpalli et al. [3] concentrate on bird identification and examine the Viola-Jones Algorithms for bird identification, template matching for bird identification, and motion identification with image subtraction. Among these techniques, the Viola-Jones Algorithm produced the best results for bird identification, with an accuracy rate of 87% and a lower negative rate. It would be ideal if this image-processing technology was combined with hardware to create a smart scarecrow system. Despite the long training process of the object classifier, the real detection speed is high, leading to several web browser and mobile

implementations. As long as a large number of comparable positive photos are available for the classifier to be trained, almost anything may be taught using the Viola-Jones technique.

Christiansen et al. [4] used digital image processing techniques to the video footage in order to automatically recognize and analyze the animals. The analysis of thermal radiation reveals that on occasion, radiation exceeds background levels, making the item appear brighter in video images. However, during the day, there could be less of a thermal disparity between the animal and the surrounding area, and certain grass areas might radiate at a temperature that is almost identical to the animals'. Taking everything into account, filtering techniques might be used to increase animal presence. They thus favored using the Gaussian filter's Laplacian for pre-processing to improve the look.

III. PROPOSED SYSTEM

By using live video streaming and image processing techniques, the suggested system seeks to identify birds. It then uses an Arduino-based system to sound an alarm through a speaker and turn on a motorized scarecrow to scare the birds away. To successfully eliminate bird-related difficulties, this integrated system integrates hardware automation, computer vision, and unpleasant stimuli. Using a camera module interfaced with an Arduino microcontroller board, the system will first record live video broadcasts. To identify if birds are present, real-time image processing methods will be used to the video frames. To precisely identify birds in the video feed, methods such as contour detection, background removal, and machine learning-based object recognition can be utilized. The Arduino microcontroller will initiate an autonomous reaction upon identifying a bird. In order to discourage birds from the region, this response will entail turning on a speaker that will produce unpleasant noises. These noises can effectively scare away birds by mimicking predator cries or other sounds that they perceive as threatening. Alongside the sound emission, a motor-based scarecrow device will also be incorporated. The Arduino will be used to control the scarecrow, which is made up of moveable elements and structures. The scarecrow will move in a preset way when the Arduino detects the presence of a bird, providing visual cues to further prevent bird activity. The system will be improved and tested iteratively to achieve optimal performance and reduce false positives. Based on feedback and real-world observations, parameters including sound frequency, scarecrow movement patterns, and detecting sensitivity will be changed. All things considered, this technique provides a complete answer for bird deterrent by combining sophisticated image processing, automation driven by Arduino, and unpleasant stimuli. The system offers a flexible and efficient way to handle bird-related problems in a variety of settings, such as gardens, urban areas, and agricultural fields, by combining these technologies.

IV. WORKING

A number of structural design factors need to be taken into account in order to manufacture products cheaply and effectively. All of them hold true for both subassemblies and the entire structure, and many of them also hold true for alternative connecting techniques. A microcontroller basis is used in the construction of this suggested system. Using a power bank that will be further charged by a solar panel, we are powering a microcontroller. Through the use of the Solar Charge Controller, the Rechargeable Battery receives power generation from the Solar Panel. The Real-Time Bird Detection Module and the Sound Sensor Module's output are continually monitored by the Arduino. The Arduino activates the DC motor and audio module when the Real-Time Bird Detection Module detects a bird and the background noise level is higher than a certain threshold, signifying a peaceful atmosphere. The birds are discouraged by the Audio Module's loud noises. Concurrently, the DC Motor starts its rotation, offering further movement to frighten the birds away. To avoid constant disruption, the system runs until a certain time or unless the Arduino chooses to turn it off.

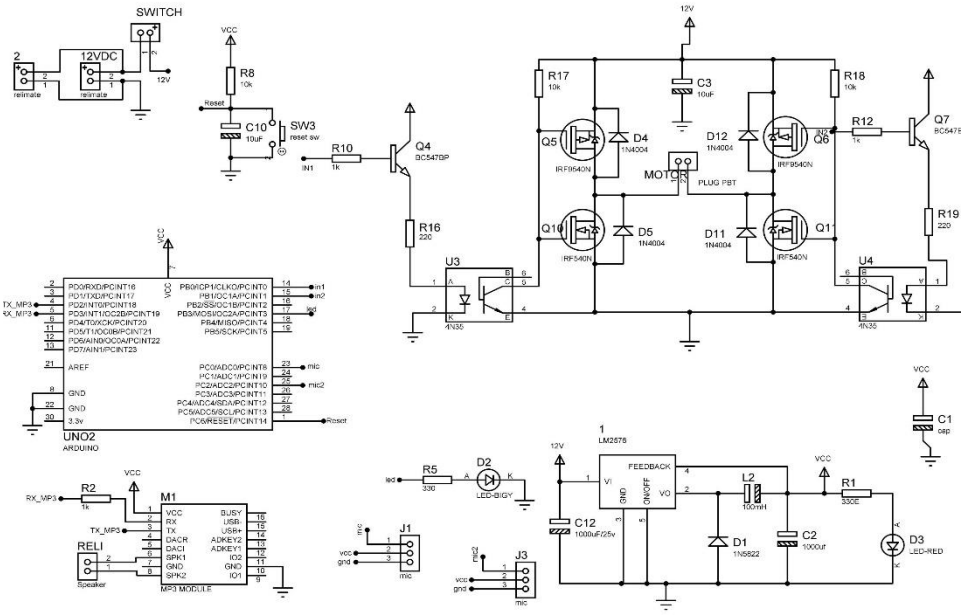

Fig -2: block diagram

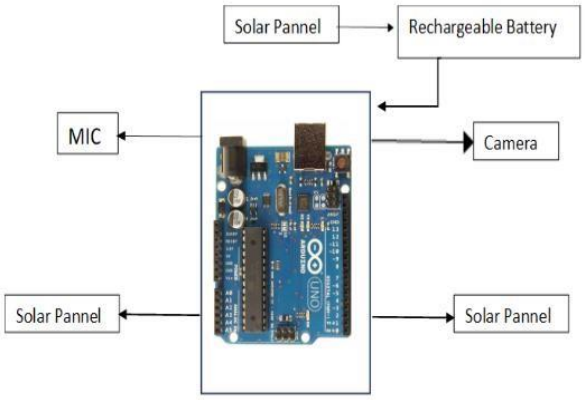

Fig -2: block diagram

V. RESULT

The camera captures the image, while the microphone module records the sound of the birds. This input is provided to the Arduino, which then provides input to the motor and speaker. This system is powered by a solar power bank that receives its charge from solar panels. A loud sound is produced by the speaker, and a motor causes the moving machine to begin moving. After a few minutes, this machine is turned off, and the identical procedure begins when the input is received once more. The animals and birds flee as a result of this.

Fig -3: working model

VI. CONCLUSION

In conclusion, an inventive approach to bird control is shown via the combination of image processing and live video streaming for bird recognition, together with an Arduino-based system for automated sound emission through speakers and motor-driven scarecrow deployment. This system provides a proactive method of reducing bird-related problems in a variety of locations, including metropolitan areas, airports, and agricultural fields, by utilizing contemporary technology. It maximizes efficiency and efficacy by reducing the need for manual intervention in addition to offering real-time detection and reaction capabilities. Additionally, this solution's adaptability enables modification to meet unique requirements and settings. Overall, this strategy supports the sustainable management of ecosystems, agricultural resources, and infrastructure in addition to helping to repel birds.

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