Smart Animal Detection and Alert System Using IOT

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Abstract- **On account of farmlands or rural terrains reconnaissance is vital to keep unapproved individuals from accessing the region as well as to shield the region from animals. Different techniques point just at observation which is basically for human interlopers, yet we will quite often fail to remember that the primary adversaries of such ranchers are the animals which obliterate the harvests. Crop damage brought about by animal assaults is one of the significant dangers in lessening the harvest yield. Because of the extension of developed land into past wildlife territory, crop striking is becoming one of the most alienating human-wildlife clashes. Effective and solid checking of the wild animals' right in their natural habitat is fundamental. This project fosters an algorithm to identify the animals that intrudes into the agriculture land. Since there are enormous number of various animals physically distinguishing them can be a troublesome undertaking. This calculation arranges animals in view of their pictures so we can screen them all the more proficiently. This can be accomplished by applying yolo v3 algorithms which is a powerful real-time object detection algorithms.**

Keywords---Image Processing; IOT; PWM; Controller

I. INTRODUCTION

One of the significant issues that is faced by farmers are their yields get damaged by wild animals that intrudes their crops. Wild animal interruption has forever been a continuing issue to the ranchers. A portion of the animals that go about as a danger to the yields are wild boar, deer, wild buffalo, elephants, tiger, monkeys and others. These animals might benefit from crops and furthermore go around the field without any rancher and accordingly make damage those yields. This may thus bring about critical misfortune in the yield and will make extra monetary security all together arrangement with the result of the damage. In any case, wildlife-friendly cultivating regularly brings about lower effectiveness. In this manner, endeavors have been made to foster programmed frameworks fit for identifying wild animals in the harvest without superfluous discontinuance of the cultivating activity. For instance, a recognition framework in light of infrared sensors has been answered to lessen wildlife mortality in Germany [1].

In [2] a UAV-based framework for roe deer grovel location is introduced. The creators show that warm imaging can be utilized to identify roe deer grovels based on elevated film, but the location is as yet performed physically. Here we are using Real-time object detection algorithms which detect an object with the help of deep convolutional neural network. It helps in identifying wild animal intrusion to the crops. For this project we need some cameras affixed at agricultural areas, so that it is clearly visible that who is entering to the particular area. Our system will identify the animal and send a warning notification to the farmer that particular animal has been entered to his crops. Now this will be easy for farmers to perform he next step to distract those animals from his crops.

II. PROPOSED METHOD

The proposed animal interruption system uses a variety of sounds to deter animals from specific areas, enhancing human-animal coexistence in sensitive environments. The system operates by detecting the presence of animals using sensors such as motion detectors or cameras. Once an animal is identified, the system emits pre-programmed sounds tailored to the target species. For instance, high-frequency sounds are effective for rodents, while predator calls deter birds or larger mammals. These sounds are alternated and randomized to prevent habituation, ensuring long-term effectiveness. Additionally, the system can integrate ultrasonic frequencies imperceptible to humans but effective for certain animals. Solar-powered units make the system eco-friendly, while wireless connectivity allows for remote control and real-time monitoring. This method offers a humane and non-invasive solution for preventing crop damage, vehicle collisions, or property intrusion, contributing to both animal welfare and human safety. It is adaptable for use in farms, urban areas, and conservation zones.

III. BLOCK DIAGRAM

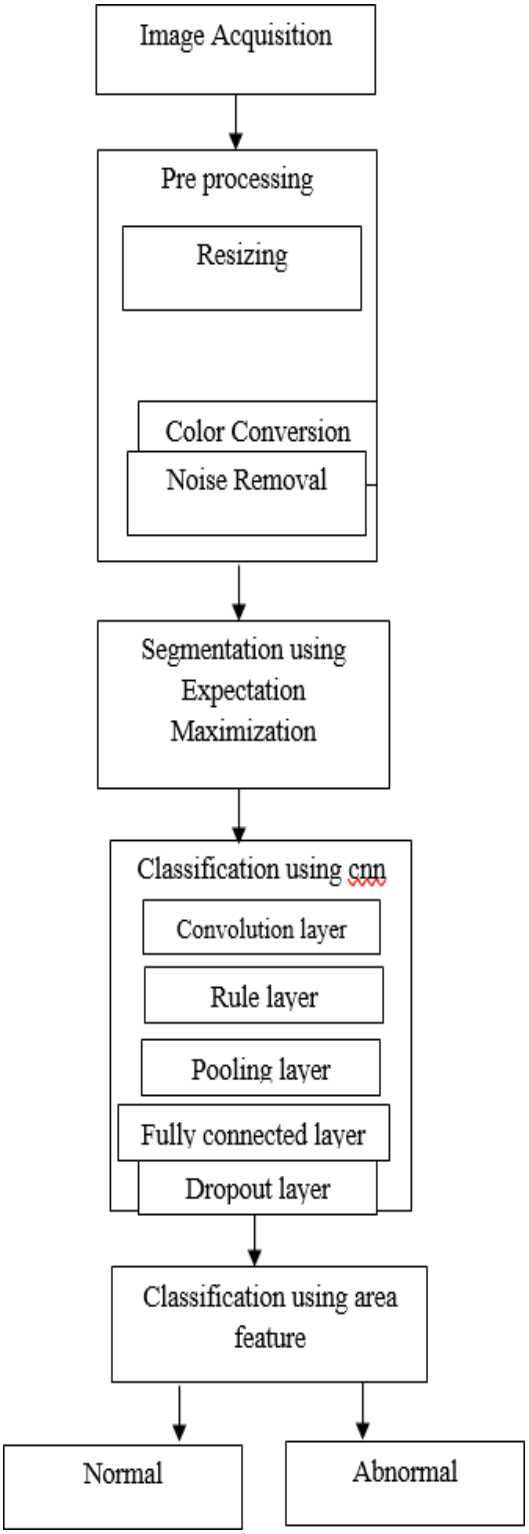


Figure 1. Block diagram

This block diagram outlines a process for image analysis and classification, which is commonly used in applications like medical imaging, object recognition, or defect detection. The process begins with image acquisition, where images are captured using sensors, cameras, or imported from a dataset. The acquired images are then pre-processed to ensure they are suitable for further analysis. Preprocessing includes resizing the images to a uniform size, converting them into the desired colour space (e.g., grayscale or RGB), and removing noise using techniques like Gaussian blur or median filtering to enhance image quality.

After preprocessing, the images undergo segmentation using the Expectation-Maximization (EM) algorithm, which divides the image into meaningful regions or objects, allowing the focus to shift to areas of interest. This is followed by classification using a Convolutional Neural Network (CNN), a deep learning model designed for feature extraction and classification. The CNN consists of layers such as a convolution layer (which extracts features like edges or textures), a rule layer (applying specific decision criteria or activation functions), a pooling layer (reducing the spatial dimensions of feature maps to enhance efficiency and prevent overfitting), a fully connected layer (combining all extracted features), and a dropout layer (preventing overfitting by randomly deactivating neurons during training).

Once the CNN has processed the image, an additional classification step is performed using area features, which evaluates physical attributes like size to refine the classification further. Finally, the image is classified as either normal or abnormal, depending on whether anomalies or significant deviations are detected. This structured process ensures accurate and efficient analysis of images, making it valuable in fields such as medical diagnostics, defect detection, and automated visual recognition systems.

IV. WORKING

The training images is done to obtain the images of animals and train the own database set. By this the animals which intruded into farming fields are detected through cameras located on the fields. Here various animals which are common for the field intrusion are considered such as deer, cows, wild boar, elephants, monkeys etc. Kaggle is used for downloading image dataset for detection of animal intrusion.

The data collected had been separated into two categories as healthy and non-healthy ones. Further, the images are of different dimensions so they are converted into the same dimensions of 224*224.

Classification of brain MRI images from tumour to non-tumour is done using the Convolutional neural network. The classifier used for classification is done by CNN itself. It is highly accurate while dealing with image related datasets. It is used for classifying tumour or non-tumour MRIs

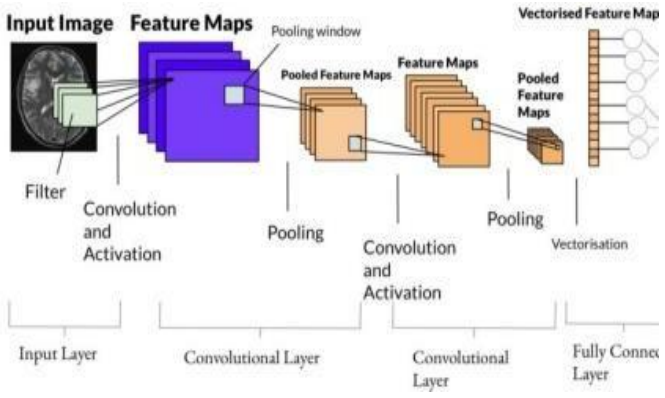


Figure 2. Simulation

The technique used for making this model work is CNN(Convolutional Neural Network). The different stages by which CNN is applied on the dataset are

1. At first, the required packages are imported.

2. Then the folder where the dataset is stored is imported.

3. Image reading is done after that it is labelled (such as 0 non-tumour and 1 for tumour image) and then the images are stored in the data frame.

4. Then the size of the image is changed to 224*224 and the shape of the image.

5. Image normalization is completed.

6. The data was split into 2 parts –

• Training

• Test

7. Sequential model creation is completed.

8. The model compilation is completed.

9. Then the model is applied to the training dataset and a validation dataset was used for evaluating the model.

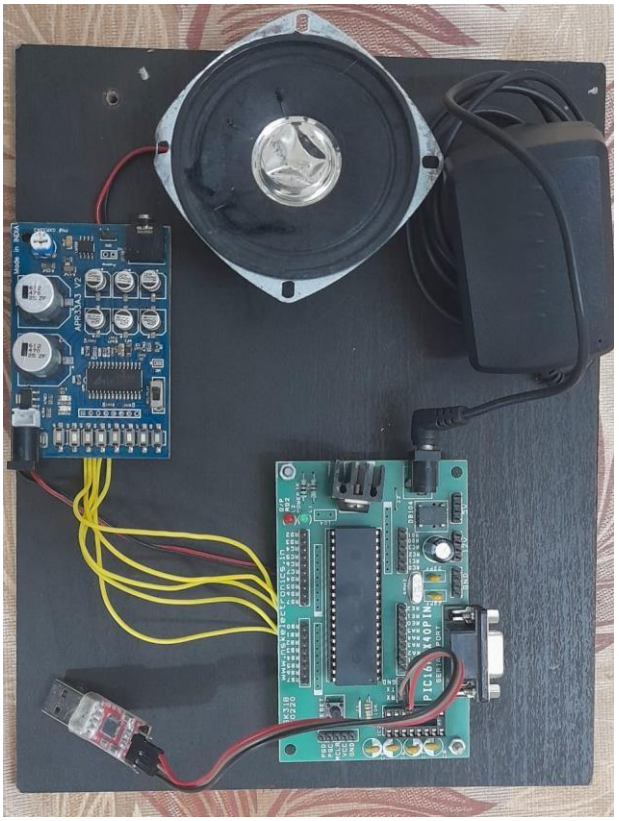
10. Then the accuracy of the model is evaluated using the test images.

11. The loss graph and the accuracy graph are plotted.

V. RESULT

The intension of this project was to obtain results similar to the results given by a specialist. There are many software available to perform deep learning but the most feasible would be MATLAB as there are functions available like the image processing tool box and the deep learning tool box. One can practice or test functions on MATLABs pre- trained networks such as alex net. The tumor which was detected after segmentation. The results show that with the help of this system single as well as multiple animals can be detected with greater accuracy.

VI. HARDWARE IMPLEMENTATION



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