

Bird Repelling System Using CNN

Sakshi Bhutada

PVG's College of Engineering and
Technology
Pune, India

ShubhamMarewad

PVG's College of Engineering and
Technology
Pune, India

Rounak Laddha

PVG's College of
Engineering and
Technology Pune, India

Rushikesh Nagtilak

PVG's College of Engineering and Technology
Pune, India

Prof. Neeta Shirsat

PVG's College of Engineering and Technology
Pune, India

Abstract-- People work as farmers in various countries throughout the world to make a living. Pests that are associated to plants are tied to farming, and when there are lots of plants, there must be pests—animals that cause damage to crops. Pests include both animals and birds, which can harm plants. Birds and monkeys are two examples of pests since they devour plants and their goods and hurt farmers. This system playing the bird repellent frequency for the harmful birds. In this task we are going to detect the bird from webcam. After detection we are pass that image to Convolutional neural network. Generally the Convolutional Neural Network is used for classification. Total 128 feature we were extracted from single image. After bird classification if the bird is belonging to harmful category suddenly the model will play repellent frequency. We are achieved the 97.30% accuracy at 50 epochs.

Keywords-- Convolutional Neural Network, Image Processing, Deep Learning, Bird Repelling System

I. INTRODUCTION

Most plantations are found outside to meet the natural and space prerequisites for the endurance of organic product trees. Birds living around plantations normally rush to plantations wealthy in food. Thus, plantations experience the ill effects of the hurtful bird around them consistently. Natural products are harmed by around 30% of their complete yearly creation. Repulsing destructive birds since people started cultivating is a significant examination theme. The different bird repeller investigates for safeguarding ranches by unsafe birds have been examined from the conventional strategies (scarecrow, kite, expand) to the advanced techniques (sound firearm, sonic repeller, sound repeller). Not with standing, hurtful birds are as yet harming the plantations. We think the main motivation is the transformation of the birds. Most techniques for repulsing birds work in the beginning phases, yet they become less successful over the long run. Birds in the beginning phases of attack take off in light of the fact that they feel abnormal to any danger. Be that

as it may, they over and over re-attack plantations with the end goal of bountiful food. These monotonous attack encounters permit them to learn and adjust to the danger. Specifically, birds have natural qualities that adjust quicker than different species. Birds of the past have voyaged significant distances in their lives to track down their natural surroundings through their wings. So they frequently confronted weird and new conditions, and subsequently developed to rapidly adjust to the climate to make due. Disregarding the variation, Forestalling the re-attack of hurtful birds in the standard way is troublesome.

1.1 Motivation

Over the last two decades, the application of Machine learning approach is increased due to various reasons like availability of large amount of data and the necessity of handling them in an efficient way. The main purpose of the proposed work is to create a suitable model for classifying various kinds of birds data along with suitable frequency as well.

II. LITERATURE SURVEY

Suleyman A. Al-Showarah et al. [1] stated that, this study targets examining the utilization of profound learning for birds' recognizable proof utilizing convolutional brain network for extricating highlights from pictures. The examination was performed on data set contained 4340 pictures. The author investigate the accuracy by Artificial neural networks, K-Nearest Neighbor, Random Forest, Naïve Bayes and Decision Tree. Whereas, the metrics used in each classifier are: accuracy, precision, recall, and F-Measure.

Piyush Bidwai, Vaibhav Mahalle et al. [2] stated that anybody can catch the bird's picture. By utilizing Convolutional brain organizations (CNN) calculation that picture is changed over into a dark scale configuration to produce signature by utilizing Pytorch model, where the numerous hubs of examination are produced. These unique hubs are contrasted and the testing dataset and score sheet is gotten from it. In the wake of examining the score sheet It can anticipate the expected bird species

Bhavana. C et al. [3] stated that in this paper the biology relies upon untamed life to keep up with the regular equilibrium of the climate. The number of inhabitants in all natural life species has been recuperated since the untamed life preservation regulation was passed and placed into impact, effectively safeguarding untamed life assets. Various instances of conflicts among individuals and creatures might be found all through China, like the dangers of monkeys in populated areas, the attack of wild pigs, and so on. Creatures who are gone after briefly lose their fastidiously created presence, making it unquestionably trying for them to get back to business as usual. The creation and lifestyle of people have been fundamentally affected by harm to crops and rural hardware. Section discovery is a sort of designated movement checking innovation in the climate. It will alarm and remind qualified representatives during the mediation.

Petr Marco et al. [4] proposed that this paper portrayed the security of organic product crops from striking rushes of birds is a significant issue for natural product farmers and winegrowers. Perhaps of the most conspicuous bug in this regard is the European starling (*Sturnus vulgaris*), whose massive groups benefiting from natural product in enormous plantations and grape plantations are very much adequate at demolishing the whole reap. Various measures are being taken to keep this wonderful passerine from going after natural product fields and wine-developing regions, with the pertinent endeavors and material methods generally considered or intended to be actually innocuous to the bird. The startling techniques include mechanical, optical, and acoustic methodologies, as well as using regular adversaries.

Jenitha et al. [5] stated that this paper the Aircraft structure ceaselessly fly going with the gamble of hit with force unimportant items, for example, flying creature, frozen water, runway waste, flexible, and extra FOD. Episodes of bird influence exist not uncommon and make critical flight security from hurt dangers in the air plane. Numerous framework for achieving something are utilized to misjudge flying creature strikes in front of departure and harbor, via air terminals committed in flying creature people running an association and control. Author happen proposing a plan by using a fast hypothesis. Model of Ultrasonic Bird Repulsed exist a plan to limit flying creature influence event, this has numerous likely need for what's to come. The

monotony range picked is a high level speedy sound motor changing over energy that is equipped going with a few facial qualities to further develop charm viability and charm expertise to help both next and getting through bird control. Hence, it exist an ideal plan for a Ultrasonic Bird Repulsed that exist competent to frighten.

Dr P. P. Priya G Pavankalyan et al. [6] stated that this paper, Rice is a yield which is broadly filled in a large number of the horticultural nations across globe like south east Asian nations. In those districts of nations Farmers are normally prepared to confront many difficulties to safeguard crops and its items delivered before reap. This is typically brought about by bothers like monkeys and birds .let us examine Birds are one illustration of irritations which cause harms to farmers. Birds would generally observed to be in enormous gatherings and needed to go after horticulture land in same manner like gatherings ,the assault will ascend to ruin and harm the farming items at whatever point the rice begins to contain. This bird assault is exceptionally damaging and truly hurt a few farmers on the grounds that the birds went after in bunches which are among huge numbers. A portion of the endeavors were made by farmers to get freed off the bug like birds by making scarecrows like perilous unfortunate sculptures and others methods, yet that large number of impacts are not sufficient.

III PROPOSED METHOD AND ALGORITHM

3.1 Proposed Methodology

With a small collection of trained data, we are proposing an experiment on bird repellent frequency for specific bird type. The System architecture of the proposed model is shown in fig.

1. A significant number of training samples are needed for the convolutional neural network used for image classification.

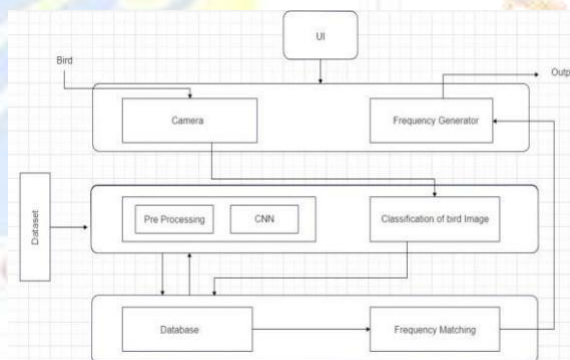


Fig1. Proposed Architecture

i. Dataset

In this project we are collecting the data from kaggle as well as google platform. Total 510 images we have collected. Out of them 460 images for training and 50 images for testing.

ii. Pze-processing

After gathering of data we are resized image into 224*224 size.

iii. Data Augmentation

The data augmentation we increases the size of training dataset. Rotate the image, Zoom and change the brightness of image.

3.2 Algorithms

A. CNN

In this proposed research paper Convolution Brain Organization will be utilized for highlight extraction. CNN can get accurate elements from the picture information, as opposed to taking the highlights individually. Created loads are extricated from the various layers of CNN, for example, convolution layers, pooling layers, initiation layer and completely associated layers. Convolution layer is the vital job of this organization, which does the extraction of the elements from the preparation picture information

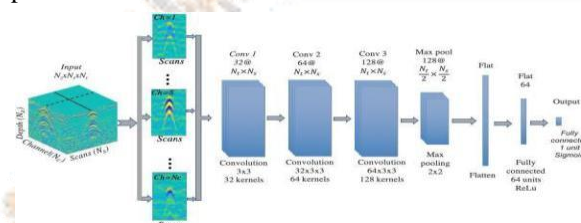


Fig2. CNN Architecture

(i) Convolution

The guideline use of the Convolution movement in the event that there ought to be an event of a CNN is to perceive fitting features from the image which goes probably as a commitment to the essential layer. Convolution keeps up the spatial interrelation of the pixels This is done by satisfaction of picture features using miniscule squares of the image. Convolution condition. Each image is viewed as an organization of pixels, each having its own value. Pixel is the tiniest unit in this image network. Permit us to take a 5 by 5(5*5) system whose characteristics are simply in twofold (for instance 0 or 1), for better understanding. It is to be seen that photos are all around RGB with potential gains of the pixels going from 0 - 255 i.e 256 pixels.

(ii). ReLU

ReLU circles back to a simple level. All things considered, it is an action which is applied per pixel and supersedes all of the non-positive potential gains of each and every pixel in the part map by nothing.

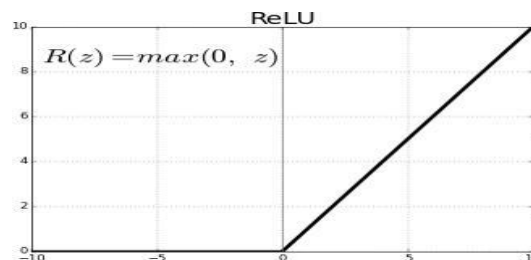


Fig3. Relu Activation Function

(iii). Pooling or sub-sampling

Spatial Pooling which is similarly called sub-examining or down testing assists in reducing the components of every component with planning yet even simultaneously, holds the most significant information of the aide. Ensuing to pooling is finished, over the long haul our 3D component map is changed over to one layered part vector.

B. YOLO

This is particularly valid for profound learning spaces like PC vision. Not every person has the computational assets to construct a DL model without any preparation. That is where predefined structures and pre-trained models prove to be useful. What's more, in this article, we will take a gander at one such structure for object recognition - Consequences be damned. It's an especially quick and exact structure, as we'll see soon. The R-CNN group of strategies we found to some degree 1 fundamentally use districts to confine the articles inside the picture. The organization doesn't take a gander at the whole picture, just at the pieces of the pictures which have a higher possibility containing an item. The Just go for it structure (You Just Look Once) then again, manages object discovery another way. It takes the whole picture in a solitary example and predicts the jumping box organizes and class probabilities for these crates. The greatest benefit of utilizing Just go for it is its wonderful speed - it's unquestionably quick and can deal with 45 casings each second. Consequences be damned likewise grasps summed up object portrayal.

IV. RESULTS & DISCUSSION

In our experimental setup, as shown in table 2, the total numbers of 510 of trained images for five birds such as crow, parrot, pigeon, owl and sparrow 50 new images were tested. These images go through CNN framework by following feature extraction using our image processing module. Then our trained model of classification of birds get classifies the image into specifies bird category. We get the accuracy 97.30% at 50 epochs. In this paper we also use yolo model for bird detection from webcam and it forward to CNN for bird category. After classification we are playing the bird repellent frequency for harmful bird.

Table1. CLASSIFICATION OF DATA

Sr. No.	Category	Number of Images
1	Training	460
2	Testing	50

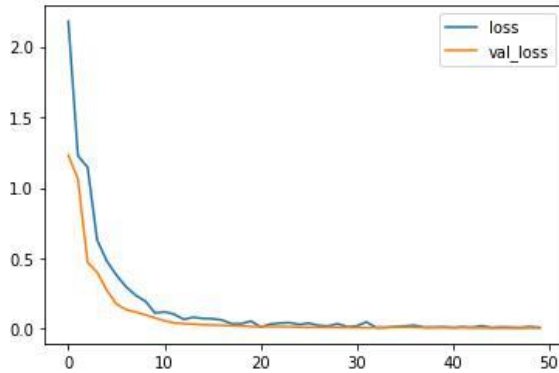


Figure4. Loss of CNN

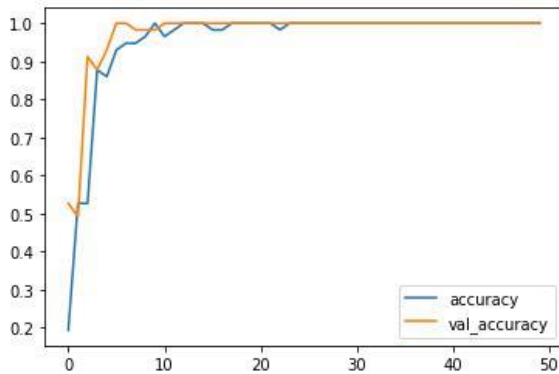


Figure5. Accuracy of CNN

V. CONCLUSION

A model is proposed for predicting bird category and providing suitable frequency of bird. In this paper, we are going to propose a CNN model

improved from traditional CNN model and developed from ConvNet. We are using CNN model for bird classification. We get 97.30% accuracy for 50 epochs. After detecting the bird category we are playing the bird repellent frequency. In future scope we will try to improve the performance of model as well as increases the category.

REFERENCES

[1] Piyush Bidwai, Vaibhav Mahalle, Eshan Gandhi, Sharda Dhavale “Bird Classification using Deep Learning” International Research Journal of Engineering and Technology (IRJET).

[2] Suleyman A. Al-Showarah1 , Sohyb T. Alqbailat “Birds Identification System using Deep Learning” (IJACSA) International Journal of Advanced Computer Science and Applications Vol. 12, No. 4, 2021.

[3] Artificial Intelligence Based Birds and Animal Detection and Alert System (2022). Bhavana. C1, Yashaswini.M2. IJCRT.

[4] A System Using Artificial Intelligence to Detect and Scare Bird Flocks in the Protection of Ripening Fruit (2021). Petr Marco'n * , Ji'ri Janoušek , Josef Pokorný, Josef Novotný, Eliška Vlachová Hutová, Anna Šir ō'ucková, Martin Ācáp, Jana Lázni'cková, Radim Kadlec, Petr Raichl, P'remysl Dohnal, Miloslav Steinbauer and Eva Gescheidtová. MDPI.

[5] Design and Development of Ultrasonic Bird Repellent in Aviation using Arduino (2021).1V.Jenitha, 2V.Niranjanadevi, 3R.Rajashree, 4S. Jeevitha. Nat. Volatiles & Essent.

[6] Design Of Birds Detector And Repellent Using Frequency Based Repeller By Machine Learning Algorithm (2020). Dr P. P. Priya G Pavankalyan , P Siva Swapnic guptha , Sk Juber Ahamed. IJSTR.