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Pest Detection and Identification by Applying Color Histogram and Contour Detectionby Svm Model

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ABSTRACT--- Insect Pest take a heavy toll on agricultural crops causing severe loss to the farmers and farming community.. Crops were damaged by attack of disease, insect, nematodes and weeds.. Our crops are under threat from the day they are seeded till they are harvested causing significant damage to the crop affecting adversely to the farmer's economy. Many factors influence disease development and growth of insect that includes genetics of variety, plant growth stage, weather, soil and nutrients of plants form leaves and fruits etc. Developing a mobile app having a complete knowledge base of insect pest in the farmer's field based on the damaged system or by the image of the insects through Image Processing technique. With this technique we introduce the SVM in Machine Learning for image classification and Color histogram and Contour Detection for feature extraction, K-fold and Bootstrapping algorithm for validation.

Keywords—Machine Learning, SVM, Color Histogram , Contour Detection, Open CV

I. INTRODUCTION

Early exasperation ID and disease discovery will limit the loss of making[1]. Unaided eye recognition is a common however dreary technique to perceive the aggravation. We in this way recommend a programmed plan for distinguishing pests utilizing picture preparing techniques [1,2]. We are planned in building up a product model framework for early vermin identification on the tainted harvests in . Pictures tainted leaf are caught by a camera with container tilt and zoom and afterward prepared utilizing image processing methods to identify nearness of pests[2 [2]. proposes image processing for pest location and control yet the foundations of pictures are fluctuating contrasted and indoor conditions, the visual commotion of indigenous habitats is progressively convoluted and wild. So as to decrease the effect of visual clamor on acknowledgment exactness, we have utilized some image segmentation calculations were utilized to catch the ideal articles from jumbled foundations. In any case, there are as

yet flimsy factors that influence the exhibition of these approaches[3]. In the proposed application tests are gathered by utilizing the inbuilt gadget camera with zoom. When the picture is gained the following stage is to image processing procedure so as to get the data about pest[4].detection of nuisances utilizing k implies calculation ,yet K-means can just deal with numerical information and k-implies accept that we manage round groups and that each bunch has generally equivalent quantities of perceptions There are a few additional drawbacks of the grouping which influences the outcomes [5]. In this we extricate the picture of the creepy crawly by utilizing the edge identification and corner recognition and histogram based thresholding with shading histogram. In this watchful edge recognition is an edge identification administrator that uses a multi-organize calculation to identify a wide scope of edges in pictures . At that point we have corner identification strategy which is a methodology utilized inside PC vision frameworks to remove specific sorts of highlights and construe the substance of a picture. Corner detection is often utilized in motion detection, image registration, video trailing, image mosaicing, panorama sewing, 3D modeling and beholding. Then bar graph based mostly color feature extraction technique that is modified from the (Red-Green-Blue) house to the (Hue-Saturation-Value) house before bar graph construction. To limit the impact of enlightenment varieties, simply the hue and saturation elements area unit underneath thought [6] and Color Histogram which is a portrayal of the circulation of hues in a picture. For advanced pictures, a shading histogram speaks to the quantity of pixels that have hues in every one of a fixed rundown of shading ranges, that length the picture's shading space, the arrangement of every conceivable shading. The shading histogram can be worked for any sort of shading space, in spite of the fact that the term is all the more frequently utilized for 3D spaces like RGB or HSV. We have another significant discovery technique for picture division a brought together way to deal with form location and picture division. Commitments include: a superior form locator which consolidating nearby and a worldwide picture data, and a strategy to change any shape signal into its progression of districts while safeguarding shape quality,[7] . broad quantitative assessment and the arrival of another commented on informational collection.

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So as to give the great interpretation between the farmer and system we need an interpreter that gives the territorial language where the farmer has a place and cause him to comprehend the methodology and measures plainly with no slip-ups. With the goal that we acquaint the Google content with discourse include in the application which makes the interpreter method. Google's Text-to-discourse (TTS) is an availability highlight that is for some time been a piece of Android [7].

II. RELATED WORK

Presently a days there are a few endeavors made to construct programmed bother recognizable proof framework dependent on picture preparing. Various techniques are utilized by various analysts in programmed bother distinguishing proof framework. Gaurav Kandalkar[8] proposed choice emotionally supportive network comprises of picture division, include extraction, preparing and testing neural system. Thresholding methods are utilized for division. The component extraction is performed after division. The fragmented information are arranged utilizing RBF. Vincent Martin et.al[9] built up a framework named DIVINE for early vermin identification. In this framework bother discovery is performed utilizing video investigation. The discovery of items in video successions is normally founded on back view subtraction scheme [20]. This framework receive psychological vision approach. Psychological vision approach joins picture preparing, learning and information based methods [19. Algorithm divided into three such as wrappers, filters, and embedded .Wrapper is rule for learning and additionally for analysis of options, whereas filter evaluating the attributes heuristically supported the common individualism of the information [11] and embedded technique, that performs coaching method.

III. PROPOSED WORK

The study presented in this paper overcomes the drawback retained in the existing work. As the existing system depends on detecting the pest using the image processing and extracting the features using different algorithms without any validation algorithms and also not that helpful for the farmers so we introduced the feature extraction of image captured by using the color histogram with the HSV using the canny edge detector and corner detection method and then we use SVM for image classification and k fold cross validation algorithms to boost up the process and we use the Google text to speech feature to convert the text given in terms of voice with regional language that has been well understand by the farmer and proceed with what are all the safety measures the voice gave following according to that and safeguard the crops.

A. System Architecture

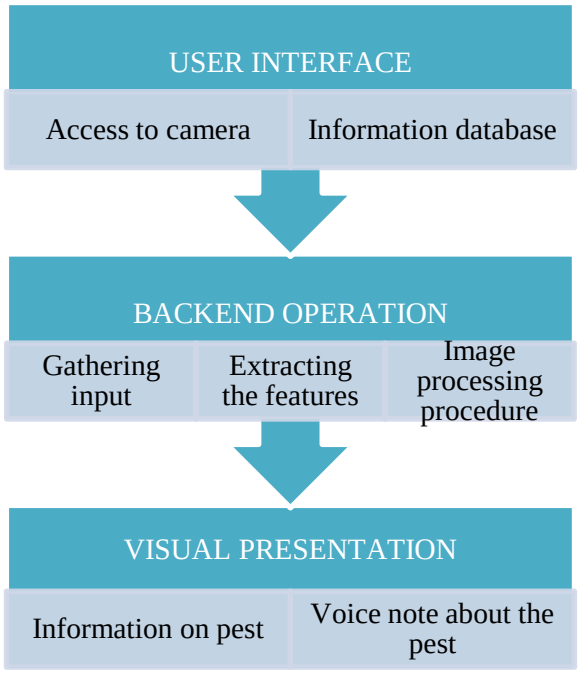

Fig 1: SYSTEM ARCHITECTURE

In this we used four modules has been used like User Interface , Image Processing ,feature extraction and image classification with Google text to speech feature that has been added.

Fig 1 explains the various function that has been done while developing the software and that can provide the various output in each section. The first one is the user interface which is the main interaction where the farmer gonna provide his input and get an output in this interface there is Access to the camera through which farmer can take an image of the insect or scan the insect which is in their crop field and then the process happens where the feature extracted and classification happens and provide the information which also available in the user interface that has been displayed to the farmer. Then the second section which has been the backend operation that has been the major part of the software where the input which has been given by the farmer has been taken and processed by the system and then the image of the insect which is the input has been extracted by the features using the edge detection and corner detection with using the color histogram and then classifying the image based on the image in the histogram structure and label which is given in the classification part has been matched with the feature extracted and check which label has been matching the shape and produce the output according to it and then the image has been processing based on its feature and provide the related information [14]. Next is the visual presentation where the result going to be displayed for the given input which is given [16]. In that the information of the given image of the pest and then the voice over input of the pest information has been provided as the output to the farmer so that he can process the information and make it useful.

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B. User Interface:

In this system we have improved the In this proposed system our main aim is to improve the pest control by detecting the bad one from the crop and manage them by providing the measures needed to destroy the bad one instead of killing good one which help us in support against bad one and made the crop nutrient and also so that the farmer will get helped with the application on his own language provided as a feature to understand by all the people, for that first the image of the pest has been captured in the photographic feature provided in the application after capturing the image and the image has been processed whether it is a good one or bad one in the classification provided in the label that has been provided in the database of application and provide the result about the pest details with their image and harmfulness of that pest and how to manage them to destroy without affecting the crop has been provided.

OpenCV[13] is Computer Vision Library, free for all extensive library which consist of more than 2000+ algorithms and parameters categorization used to carry out computer vision and machine learning related projects. The OpenCV formulation involves Scenery Recognition, Face Recognition, Camera Movement Tracking, and Object Identification [10].Here we have been used it for detecting the image using camera and identify the image by extracting the features of it. In this the Image the captured image has been taken for extracting the features using the extraction algorithms and methods for detecting the insects.

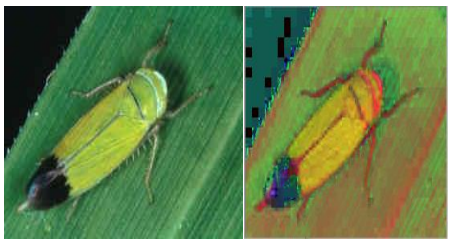

Fig 2:The Original Vs after HSV image

The first procedure to convert image of RGB to HSV image through an OPENCV method which has set of formula that has been taken into consideration and used to convert the image into HSV image format. The conversion consists of set of program lines which can be used for the conversion.This is the HSV color image of the insect that has been converted from the RGB to the HSBV format. After converting it will be easier for detecting the edge of the insect every knook and corner of the insect and with that a clear decision has been made for the farmers.

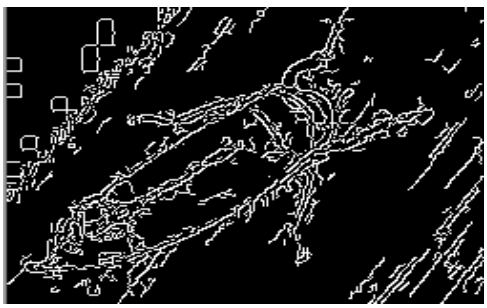

Fig 3:Image after edge detection applies

In this the feature extraction has been done by Edge Detection method using the CANNY EDGE DETECTOR. A versatile Canny edge-discovery strategy is proposed which Based on Canny hypothesis. Embrace the 3*3 neighborhood rather than vigilant calculation in 2*2 neighborhood to figure the estimation slope. At that point, the most extreme between-class difference (Otsu) strategy is utilized to get the high and low thresholds[11].and this will identify the edge with layer of the insert and after that the CORNER DETECTION which is utilized to distinguish the edge of the insert

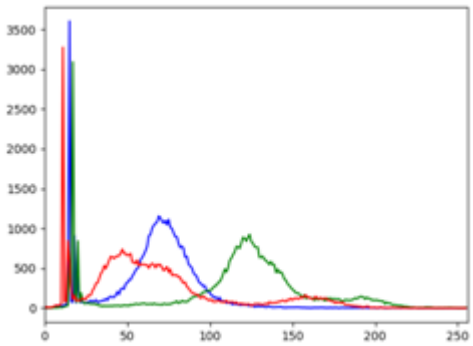

Fig 4:Image histogram plot

Then we use COLOR HISTOGRAM we will represent the feature in terms of graph based by using the RGB color of the insect and edge detection of the image which is therefore useful for the thing to classify the insect based on its features where the x axis values which always depends the y axis so the range of y is much higher than the range of x axis based on its plot in the graph the image has extracted with its features and process for the next process.

C. Support Vector Machine:

There comes the accompanying module system called Image Classification which is done by SVM in Machine Learning [18]. Reinforce Vector Machine is a regulated knowledge system is used to gathering and backslide exercises. SVM are beneficial strategy for course of action when appeared differently in relation to RBF and neural framework. If the amount of estimations is more vital than the amount of tests, then Support Vector Machine works efficiently [12]. This system uses a subset of getting ready centers called bolster vectors in the decision limit. The basic thought of SVM is the usage of hyper planes as far as possible disengaging the data centers into different classes. SVMs can manage both fundamental similarly as progressively complex course of action endeavors (immediate and nonlinear, request issues). Both unmistakable and non separate data things are managed by SVMs in both direct and non straight case [12].and this comprise of set of code and equations to order the picture. Most of surface arrangement issues include multiple surfaces. Therefore, expanded SVMs are required for application to different surfaces, and the ideal plan of multiclass SVM classifiers is as yet a zone of dynamic research.

One as often as possible utilized technique is one-against-others deterioration, which works by building a SVM for every class r that initially isolates that class from the various classes and after that uses a specialist F to parley between each SVM yield so as to deliver a ultimate conclusion. In a maximum selector, the yield class is dictated by picking the limit of all the SVM yields. Be that as it may, the yields of the remaining Support Vector Machines, except the victor, likewise convey certain data [14]. 10-crease, 5-overlap and 3-overlay cross approval are utilized to isolate the datasets into two classes train and test. The advantage of utilizing k-crease cross approval is trying the whole dataset. In the wake of making a preparation set in every k-overlay a model is produced, which testing set will be tried dependent on that model. To test the datasets neural system, SVM with direct portion, SVM with MLP part, SVM with RBF piece, Decision tree, and Naïve Bayes are utilized. The reason of utilizing a few techniques is to analyze the last outcome and increment the precision and discover the effect of k in k-overlay cross approval.

The other primary component which has been utilized in the framework is the approval calculation so as to help the procedure of the SVM by the presentation of K-overlay cross approval algorithm. There is an issue in accomplishing higher precise outcomes in restricted measure of information, which can be enhanced by utilizing K-crease cross approval. Subsequently, this paper endeavors to discover the effect of K in KCV procedure to accomplish better outcome in characterization of medicinal dataset . with the goal that the procedure can done piece faster and give the yield in clear manner there are numerous approval calculation accessible however this cross approval has been conveyed other than Bootstrapping and Random Sub inspecting. A Cross validation and bootstrap make an increasingly productive utilization in dataset by re-testing it a great deal of period when all is said in done, preferable execution over hold out.[18]

D. Text to Speech:

With that it has been checked whether the given insect is belong to this label and get the information given for that label and provide the result as text with the information about the insect with the image and how to manage to destroy with the techniques and also provide the voice over input in order to convey the information in terms of the voice in regional language that the farmer can able to understand the language so that they can process the management process clearly for that we use the Google text to speech software which has been given in Google android facility so that it has provided with our software as a important feature which is the highlight when compare with other application that has been developed previously and so it will be useful to the farmers.[19].

IV. IMPLEMENTATION RESULT

There has been label which is classified the pest which provide the information about the pest like Green Leaf Hopper, Grasshopper, Swarming Caterpillar, Leaf Holder etc. In this grass hopper we extract the features of the capturing image and based on its HSV conversion the edge has been detected and the histogram representation of the image has been taken as a result to the classification.

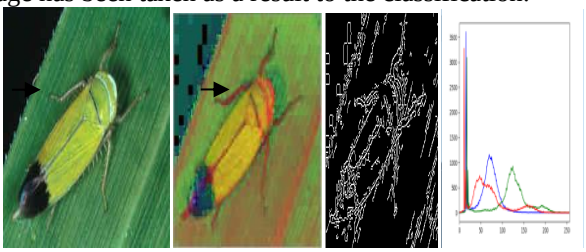

Figure 5. Flow Diagram

1. Capturing the image of pest
2. Get the RGB color intensity of image
3. Convert RGB to HSV color
4. Detect the edge and corner
5. Extract the detected image of the pest
6. Draw the histogram using the RGB image to extract
7. Then classify images using SVM
8. Get the required label based on the classification
9. Produce the output as a text and also as a speech using Google TTS.

Like this the dataset has been collected for each of the insect represented in different angles where it can recognize the insect pest and extract the feature from the image using various algorithm provided in the software which has been done has backend process of the work.

The process has been taken from the first step of capturing the image from the field by the farmer till the classification of the image using the extraction of the image using the feature provided to extract has been process as backend where theresult which is the one everyone want to provide while is the recognizing the insect and provide the information about the pest which has been captured and then steps to carry for the management of the controlling the pest and destroys it by the process which has been provided by the system, in other terms the voice over input which provide the information in the regional language of the farmer so that he can hear it clearly and process according is used here which provide text information as voice to the farmer.

V. CHALLENGES

The challenges which going to occur when this process going is time consumption is little higher when the image capture is of high resolution like hd, so this is one of the challenge to face. Next is the algorithm which has to occur correctly and work correctly and SVM which has to classify the pest has to work in all aspects of the process. The training of the dataset in the classification model has to be happen correctly without any error and collaboration.

VI. CONCLUSION

In this conclusion, pest detection and pest identification system introduced by applying the color histogram and contour detection technique with image processing by SVM model . Different images were tested.

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The pests can be identified using this method by extracting the feature of the insect and get out layer of the insect for the detection with the histogram based graph. This developed system helps to save the cost and environment for the farmer in order to protect the crop. Time and accuracy were considered as important. By using the validation algorithm the process going to work so efficiently to boost up the process and provide the effective outcome and clear one.

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