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APPLE FRUIT DISEASE DETECTION USING IMAGE PROCESSING AND SUPPORT VECTOR MACHINE

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Abstract: This project presents a method for identifying apple disease and an approach for careful detection of diseases. The goal of proposed work is to diagnose the disease of fruit using image processing and (SVM) Support Vector Machine. The diseases on the fruit are critical issue which makes the sharp decrease in the production of fruit. The study of interest is the fruit rather than whole apple fruit fruit because about 85-95 % of diseases occurred on the fruit like, the methodology to detect fruit disease in this work includes K mean's clustering algorithm for segmentation and Support Vector Machine. The proposed detection model based very effective in recognizing fruit diseases.

Keywords: Image Processing,Support Vector Machine,K means Clustering

I. INTRODUCTION

Cloud is an emerging technology and cloud based storage is the newly adopted idea that facilitates users not only to upload data to the web but also allows instant accessibility to available resources and share data with anyone at any point of time. But Cloud is a technology that creates a challenge for the person who is investigating and finding out the forensic evidences that may help in the forensic analysis as data stored on cloud can be accessed from anywhere and from any system and very little amount of traces are left behind.

Overview Of The Project :

There are many reasons for estimating or measuring disease on fruits. Knowledge of the fruit disease is important to decision making in crop situations and disease management decisions. Identifying fruit disease is attempted in this work. In India 60% of the people spend their lives in agriculture. Improving the cultivation will enhance the economy of the nation since it is considering as one of the major category. The objectives of this work includes identifying the diseases of fruit using Image processing techniques such as

- ✓ DIGITIZING THE COLOR IMAGE OF DISEASE FRUIT
- ✓ SEGMENTATION OF THESE IMAGES
- ✓ EXTRACTING THE TEXTURE, SHAPE AND COLOR FEATURES OF COLOR IMAGE OF DISEASE SPOT ON FRUIT
- ✓ CLASSIFY AND TO DISCRIMINATE BETWEEN THE TYPES OF DISEASES. .

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II. SYSTEM REQUIREMENTS

SOFTWARE REQUIREMENTS

- ✓ Operating System : Windows 10
- ✓ Front end : MATLAB
- ✓ Language used : JAVA

HARDWARE REQUIREMENTS

- ✓ Processor Type : Pentium i3
- ✓ Speed : 3.40 GHZ
- ✓ RAM : : 4 GB DD2 RAM
- ✓ Hard disk : 500 GB
- ✓ Keyboard : 101/102 Standard Keys
- ✓ Mouse : Optical Mouse

III.SYSTEM STUDY

A. PROPOSED METHOD

The proposed system consist of two parts: digital image assessment and feature extraction of sample maizefruit, to implement the back propagation the goal of proposed work is to diagnose the disease of apple using image processing and (SVM) Support Vector Machine. The diseases on the fruit are critical issue which makes the sharp decrease in the production of fruit the collection of inter-connected neurons. There are set of neuron arranged in a row, each neuron consists of the value from, where the darkest pixel is lightest pixel. The proposed system was able to identify the quality of maize keeping relative error at minimum. SVM is developed to work according to can learn pattern and give priorities to the results and distinguish between patterns accordingly.

BLOCK DIAGRAM:

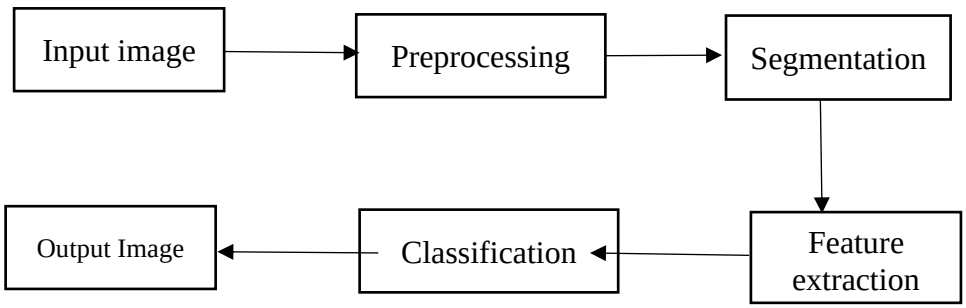

Figure: Proposed System Flow Diagram

BLOCK DIAGRAM EXPLANATION

Maizefruit is important crop as it directly related to economy of farmer and country. But diseases on maizefruit are main disturbance that decreases the productivity. Maizefruit is which requires .So it is the time for sowing to harvesting during maintained of fruit is taken for good production The maizefruit can be subjected for attack of pest and disease having reason such as climate change and many more.it is significant to diagnosis the disease .Thus it helps to selecting the right chemical and fertilizer. As fruit can effect by disease have many sources but fruit is the main source is fruitfruit. Nearly 80 to 90 % disease on maizefruit is effect to fruit. Thus main researcher have study of interest is fruit instant of whole maizefruit or other part such as roots, stems.

ADVANTAGES OF PROPOSED METHOD

- ✓ To detect diseased fruit, stem.

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- ✓ To quantify affected area by disease.
- ✓ To find shape of affected area.
- ✓ To determine color of affected area

IV. MODULE DESCRIPTION

A. PREPROCESSING:

Image pre-processing is the name for operations on images at the lowest level of abstraction whose aim is an improvement of the image data that suppress undesired distortions or enhances some image features important for further processing and analysis task. It does not increase image information content. Its methods use the considerable redundancy in images. Neighboring pixels corresponding to one real object have the same or similar brightness value. If a distorted pixel can be picked out from the image, it can be restored as an average value of neighboring pixels .In the proposed approach image pre-processing methods are applied to the captured image which are stored in image database.

INPUT IMAGE:

Various bacterial and fungal affected image samples on maizefruits such as foliar fruit spot, applefruitspot, for detection. The fruits used for processing are randomly selected from the maize field and captured at uncontrolled lighting condition. Before segmentation, image preprocessing is done in which image is resized into 256 x 256 dimensions.

B. SEGMENTATION:

Image segmentation is used to determine components of an image into which are more significant and easier to examine. Image segmentation is done using k-means clustering algorithm which is easy to analyze images. Image segmentation is to be done for dividing and extracting image objects even from blur boundary. Clustering needs various image objects which are easily separable from each other to form number of clusters. Hence we are transforming color image into space. color space is used because it is made up of luminosity layer in component and two chromaticity layers in components is more organized because all color elements are exists. To measure the difference between two colors Euclidean distance matrix‟ is used. K-means classifies the two colors between spaces. For every pixel in image k-mean determines cluster value.

C. K-MEAN CLUSTERING:

To study and understand images segmentation is done by using k-means clustering. A cluster is a group of same items and dissimilar to items which are not same to any other cluster. Clustering is the sorting of items into various groups so that the data in every subset show some common part according to some defined distance measure. An image can be grouped using shapes, textures or any other information that can be taken from the image itself. In K-means, data parts are divided into predefined number of clusters Firstly the centroids of defined clusters are set randomly. The next step is to take every point belonging to a given data set and link it to the closest centroid. Each pixel is assigned to the cluster based on the closeness of the pixel which is determined by the Euclidian distance measure.

D. FEATURE EXTRACTION:

Feature Extraction this stage is an important stage that uses algorithms and techniques to detect and isolate various desired portions or shapes of a given image. When the input data to an algorithm is too large to be processed and it is suspected to be notoriously redundant, then the input data will be transformed into a reduced representation set of features. The basic characters of feature are area, perimeter and eccentricity. These are measured in scalar. These features are defined as follows:

ENERGY: The energy is the extent of consistency between the pixels extend = [0, 1]. The consistency of the pixel has communicated

$$= \sum_{,=0}^{-1} (\quad , \quad)^2 \ldots (1)$$

Energy is a feature that measures the smoothness of the image. Less smooth the region is, the more uniformly distributed Pij and the lower will be the value of the angular second moment. Where Pij is the entry of the normalized co-occurrence matrix, N is the number of thermal images

CONTRAST:

Contrast is the measure of the distinction in luminance to make value discernable. Range = [0, 1].

$$= \sum_{,=0}^{-1} , (\quad - \quad)^2 \ldots (2)$$

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Where N-1 denotes the dimension and a total number of pixels in the image, Pij denotes the color value.

STANDARD DEVIATION:

It is a most generally utilized measure of changeability or decent variety utilized as a part of insights. As far as picture preparing, it demonstrates how much variety or "scattering" exists from the normal (mean, or expected value).

$$= \sqrt{| - |} \ldots (3)$$

Where Σ means "sum of the function",x is a value in the images, is the mean of the image and N is the number of data points in the image

VARIANCE:

The variance (σ^2) is an image of variance, that is the squares of the standard deviations, in the values of the input or output images..

$$\equiv$$

$$\bar{\sum} = (\quad - \quad) \ldots (\quad)$$

Where the image is vector and $\bar{}$ is the mean given by: 1/N ∑

E. CLASSIFICATION

Support vector machines are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Yes, you read it right… it can also be used for regression problems. We will look at the power of svms for classification in this method we used svm algorithm and used to classify the images and the performance measures of them are calculated. A Support vector machine is a powerful tool for binary classification, capable of generating very fast classifier function following a training period. There are several approaches to adopting SVMs to classification problems with three or more classes. In machine learning, support vector machines are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. SVM are inherently two class classifiers. The traditional way to do multiclass classification with SVMs is use one of the methods. The classifier evaluation consist the output value higher than the threshold area recorded as "true" and any SVM output value lower than the threshold are recorded ad "false". The SVM classifier consist the binary classification of images.

V. CONCLUSION

The world is moving more towards technology dependent era. Every day we keep hearing owes of farmers that even after using costly fertilizers the fruits were eaten away by various diseases. The expertise in this field is rarely available. Since the opinion of an expert can vary from that of a novice, for the benefit of all it is advisory to make the most use of the technology available to infer or conclude for treatments. It was concluded that the accuracy of disease detection is increased as the number of training samples increases and that the change in SVM settings also affects accuracy. A method for detection and classification of fruitdiseases is implemented. The segmentation of the diseased part is done using K-Means segmentation. Then, GLCM texture features are extracted and classification is done using SVM. The method is tested for detection of diseases in citrus fruits.

Future Work:

Future work is to be carried out for classification of diseases in different apple fruit and to improve the classification accuracy.The machine learning methods bring this aspect to reality, by observing the database and helping the botanists in the diagnosis of diseases where a lot of precision is required. And one of the k- means algorithm, SVM-algorithm is used in this project for classification of fruit diseases. The accuracy results in an available range from mid-90 to top90%. This can be bettered by increasing the database. However, the results obtained from real life images are very encouraging.

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