

# A SURVEY OF DIGITAL CLASSIFICATION OF AGRICULTURE DATA USING SVM

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**Abstract:**In our Indian Culture, most of the peoples are dependent on the agriculture sector. So that agriculture has become much more than simply a means to feed an ever-growing population. Nowadays Taking care of our agriculture products for example like leaves, fruits, vegetables, seed are more important. Because as in today's polluted atmosphere harm to these agriculture products. Plant disease causes a major problem in human life which is directly or indirectly. So it is necessary to identify the disease in fruits. Identification of the fruit disease is the key to preventing the losses in the yield and quantity of the agriculture products. But the traditional methods were inaccurate and not much effective. So many researchers in this field lead to include digital image processing for accurate plant diseases detection of using fruits. Disease detection in image processing involves various steps for example – Image acquisition, Image pre-processing, Image segmentation, feature extraction, and classification.

**Keywords - Image Acquisition, Image Segmentation, Image Classification, Feature Extraction, SVM**

## I. INTRODUCTION

Fruit Propagation is the main backbone of any country. Basically, the quality of fruit is decided based on two main important factors i.e. weight and nutrients and another one is detection of disease. With the help of proper management approaches for example pesticide, fungicide and chemical applications one can simplifies control of diseases which confines improve quality.

In normal ways, experts can easily identify the disease or may be based on lab diagnostic tests. Most of the currently followed practices for fruit disease detection system in India are naked eye observation by domain expert. The consultation charges of professional experts are high and it is also not possible to get it on time at remote location. Hence, there is a need of automatic fruit disease detection system in the early stage of the disease.[1] This is traditionally diagnosed by experts or pathogenic identification, which is time-consuming and delays the optimal treatment time. Computer vision can conduct real-time diagnosis for diseases rarely, rapidly and effectively.[4]

We have selected pomegranate fruit to detect various disease occurs in it. The production of this fruit is taken in the low rain region and which gives more profit to the farmers. The range of temperature between 20-35 degree Celsius with humidity greater than 50%, rains and winds are favorable for rapid disease development. [1] This fruit is mainly affected now days by some disease attacks. And those diseases are Alternaria Fruit Spot, Anthracnose, Bacterial Blight, Cercospora Fruit Spot, Cercospora Leaf Spot, and Wilt of Pomegranate. Fig. 1 shows the disease affected pomegranate with their disease name respectively.



Alternaria Fruit Spot



Anthracnose



Bacterial Blight



Cercospora Fruit Spot

Fig.1 Disease in Pomegranate [8]

## II. LITERATURE REVIEW:

### 2.1 Pomegranate Disease Detection Using Image Processing.

- In [1] Manisha Bhangea, H.A.Hingoliwalab detects the disease in pomegranate fruit with the Support Vector Machine Image processing technique. The proposed system is suitable for more practical cases in which bacterial black disease is detect in pomegranate fruits. In this paper methods are used for detection of disease - color, morphology and CCV are used for feature extraction; K-means clustering techniques are used for partitioning the training dataset according to their features. And SVM algorithm is used for training and classification.

## 2.2 Fruit Disease Detection Using Color, Texture Analysis And ANN.

• In [2] Ashwini Awate, Damini Deshmankar, Gayatri Amrutkar, Utkarsha Bagul presents the disease detection in Grapes, Apple, and Pomegranate Fruits. For Grape -Black Rot, Powdery Mildew, Downy Mildew; For Apple -Apple Scab, Apple Rot, Apple Blotch; For Pomegranate -Bacterial Blight, Aspergillums Fruit Rot, Gray Mold diseases are detected and classified. Here, Blob Analysis and Pattern Matching algorithms are used for detection disease in fruits. In this paper for disease detection number of methods are using as Image acquisition, Image segmentation used for detect exact affected area, Blob Analysis used for detecting scope of interest surrounded by digital image and Pattern Matching used for identify disease.

## 2.3 Image Processing For Smart Farming : Detection Of Disease And Fruit Grading

• In [3] Monika Jhuria, Ashwani Kumar gives the ideas of disease detection in fruit Grapes and Apple using ANN. For Grapes – Black Rot, and Powdery Mildew; and for Apple – Apple Scab and Rot are detected in this system. They have combine ANN and Back Propagation methods for disease detection in Apple and Grapes. Here, Color, Morphology and texture three features vectors are used for feature extraction of learning database images. After feature extraction, learning database are classified by using Artificial neural networks (ANN). Back Propagation methods used for any query images which are not already learning database. In this Paper weight of fruit is also calculated.

## 2.4 Apple Fruit Disease Detection Using Image Segmentation Algorithm.

• In [4] Mr. Abhijeet V. Jamdar, Prof. A. P. Patil gives the disease detection in Apple using Image Segmentation Algorithm. For Apple – Apple Scab, Apple Rot, and Apple Blotch are kind of disease detected. Here, Image Pre-Processing includes contrast enhancement which proceed for making image more clearly optimal. K-means Clustering techniques used for the Image Segmentation for segmenting disease part of apple with three clusters.

## 2.5 Disease Detection In Crop Using Remote Sensing Images.

• In [5] Leninisha Shanmugam, Agasta Adline A. L, Aishwarya N, Krithika G has developed simple disease detection method which is more suitable for available disease in Rice Plant and wheat Plant. They have used for disease detection, CANNY's Edge Detection Methods. Once the database is acquired of healthy and infected images of samples the threshold is extracted. It is then compared with the images obtained by remote sensing that are taken periodically. Then RGB values are extracted and then compared with threshold image. If the threshold is greater or lesser than the given value histogram analysis and canny edge detection techniques are used to identify particular plant disease and intimate with an alert message to farmer using Message Transferring Technology in MATLAB.

## 2.6 Expert System for Diagnosis Mango Disease Using Leaf Symptoms Analysis

• In [6] Chutinan Trogtorkid, Part Pramokchon, gives Expert system diagnosis mango disease using leaf Symptom analysis. The system consists of Expert System in the form of Decision Tree. There are two kinds of disease are detected here i.e. - Anthracnose, and Algal Spot. Decision Tree is for diagnoses a disease and finds the correct answer for User. The knowledge-based obtained by data mining technique used decision tree model. The dataset consist of 129 leaf image attributes which categorized into 3 answer classes (Normal leaf, Anthracnose, Algal Spot). After implementation of J48 algorithm on Weka 3.8, the decision tree model shows 6 of important features to uses for classify leaf symptom.

## 2.7 Pomegranate Disease Detection and Classification

• In [7] Rashmi Pawar, Ambaji Jadhav introduced system for detecting disease in Pomegranate fruits for disease Alternaria alternata, Anthracnose, Bacterial blight, and Cercospora fruit spot. Methodology of this paper is divided into four parts. Image Acquisition is used for captured RGB Images. Image Pre-Processing is considered various techniques for example Noise Removal, Image Cropping, Image Smoothing and then turn RGB images into Grey Images. Image Segmentation is used for partitioning of Image and identifies boundary and spot. K- Means clustering Algorithm is used for classification of objects based on a set of features into K number of Classes. And for identifying disease Artificial Neural Network and Back Propagation Methods are used.

## III. COMPARATIVE TABLE:

Table -1:Comparative Table

Detection Method	Accuracy	Time Efficiency	Advantages	Limitations
Artificial Neural Networks	Moderate	Moderate	<ul style="list-style-type: none"> <li>It is a non-parametric classifier.</li> <li>It is an universal functional approximate with arbitrary accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>It is semantically poor.</li> <li>The training of ANN is time taking</li> <li>Problem of over fitting</li> </ul>
Decision Tree	Moderate	High	<ul style="list-style-type: none"> <li>Can Handle non-parametric training</li> </ul>	<ul style="list-style-type: none"> <li>The usage of hyper plane decision boundaries parallel</li> </ul>

			<ul style="list-style-type: none"> <li>data</li> <li>Does not require an extensive design and training</li> <li>Simple and Computational efficiency is good.</li> </ul>	to the feature axes may restrict their use in which classes are clearly distinguishable.
Support Vector Machine	High	Low to moderate	<ul style="list-style-type: none"> <li>It gains Flexibility in the choice of the form of the threshold.</li> <li>Contains a non-linear transformation.</li> <li>It provides a good generalization.</li> <li>Reduction in computational complexity</li> </ul>	<ul style="list-style-type: none"> <li>It Result Transparency is low</li> <li>Training is time consuming</li> <li>Structure of algorithm is difficult to understand without moving object</li> </ul>
Fuzzy Measures	Moderate	Moderate	Efficiently handles uncertainty.	Without prior-knowledge output is not good.

#### IV. SYSTEM FLOW DIAGRAM:

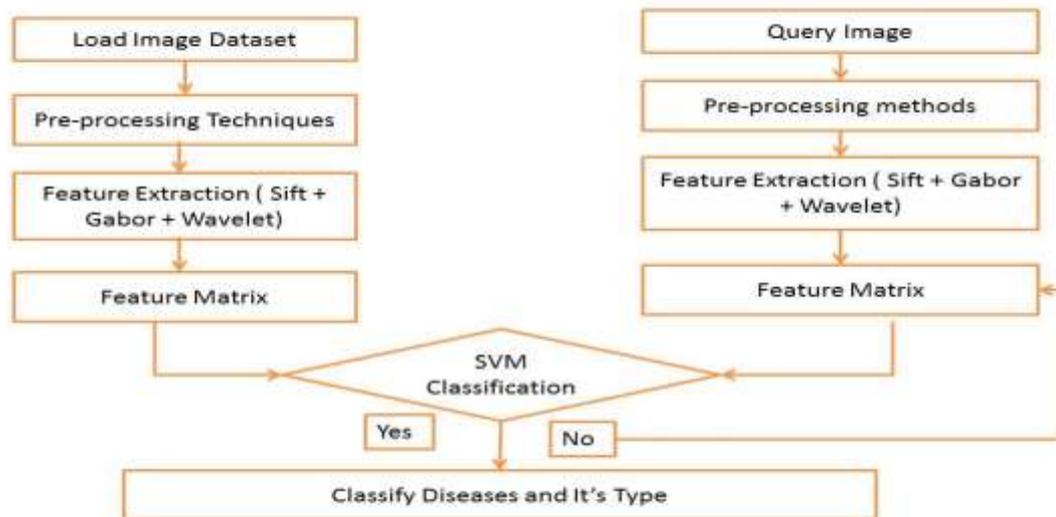


Fig. 2 System Flow Diagram

#### IV. CONCLUSION:

In this research paper, research in the field of Digital Image Processing had completed to identify the basic problem regarding to classify the pomegranate fruit disease detection with the help of Digital Image Processing. Make sure in the various image classifications provides the details which methods to be used and which algorithm is beneficial to that provides the maximum accuracy which totally depends on selected dataset.

In this paper majorly disease are identify on the Pomegranate fruit. In this paper, we have total focused on feature extraction based concept of detecting disease on various kinds of Pomegranates. After analyzing various research papers we indemnify that SVM (Support Vector Machine) algorithm gives much better output as compared to other. The main purpose of this paper to survey about the various research papers and identified the better techniques for detecting Fruit disease with high accuracy and minimum time complexity.

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