

## AUTOMATIC MARKER BASED MORPHOLOGICAL IMAGE SEGMENTATION, CLASSIFICATION AND DISEASE DETECTION USING SVM CLASSIFIER IN DISEASED TOMATO PLANTS

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### Abstract

The process of identifying parts of plants and its diseases with modern electronic devices is called biometric Image processing. Many algorithms are proposed and implemented to discover finite outcomes in agriculture. But one of the efficient approaches to be used is Morphological Watershed. Markers of type internal and external are used for foreground and background region based Segmentation. This approach can be done with or without any preprocessing steps. The goal of this approach is to develop a descriptive algorithm for fully automated segmentation, classification and identification of diseased tomato leaf image modalities. There are 2D as well 3D Automatic Markers Controllers developed and implemented in Segmentation. Automatic identification can be done using Support Vector Machine (SVM) along with feature extraction. Many methods are used and reviewed for Segmentation as well as detection and Classification of tomato Plant Diseases in Image processing.

**Keywords** – Agriculture, Image Processing, Leaf diseases, Tomato, Automation Algorithms

### 1. INTRODUCTION

Agriculture is the basic occupation for 70% of Indian population. So a standard approach helps to improve agriculture. Early detection of diseases in plants fortify yield. Detection of diseases through automatic technique is highly beneficial and helps to reduce large amount of manual monitoring in agricultural fields [1]. Automation method is highly computational and cost effective. These methods are more attractive to do accurate, forceful and speedy analysis. Morphological based watershed segmentation gives outstanding results [2]. Illustration of the marker-based watershed transform is done by transforming original image into the gradient image with boundaries of stridently changing intensity levels. Compared with user-depended interactive segmentation, this approach shows a hopeful accuracy. Segmenting a 2D or 3D mandible is typically done ‘interactively’ in computer software [3].

### 2. MATERIALS AND METHODS

#### 2.1. DATASET DESCRIPTION

Plants that affected with disease caused by any living organism are known as biotic plant disease. This can be further classified as Fungal disease, Bacterial disease, Viral[4].A variety of diseases affect on Tomato plants .Diseases may cause problems during growing season and may damage a crop, leading to reduced or poor-quality of yields. Tomato disease pathogens may be fungal, bacterial or even viral. The following table shows example of one fungal, bacterial and viral disease respectively with its optimum temperature condition. Image database consists of healthy and diseased Tomato images. All images are captured by using a high resolution digital camera with 16 mega pixel resolution to get the better image and in jpeg format. An image database of total 100 images, include 25 images of healthy, and 75 images of diseased Tomato affected by various diseases namely Tomato Early Blight, Bacterial spot, yellow Curled Virus

Disease	Causal organism	Optimum temperature
<b>Tomato Early Blight</b>	Alternaria tomatophila and Alternaria solani(Fungal)	28°C -30°C
<b>Tomato Bacterial spot</b>	Xanthomonas vesicatoria, Xanthomonas euvesicatoria, Xanthomonas gardneri, and Xanthomonas perforans(bacterial)	24°C- 30°C