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Disease Classification and Grading of Orange Using Machine Learning and Fuzzy Logic

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Abstract



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Abstract:

This paper suggests a computer vision based system which have ability to identify deformity in the orange fruits and also organize the flaw type appeared on the surface of orange fruit. The symptoms of flaw mark imply the seriousness of the disease and recommend the optimal approach to deal with the disease. It's conjointly required to diagnose the disease properly with prior to great damage by providing proper treatment. Further, estimation of severity of disease is required for applying proper amount of pesticides to avoid the environmental pollution and economic burden. Here we use multi class SVM with K-means clustering for classification of diseases with 90% of accuracy and Fuzzy logic to compute the degree of disease severity.

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I. Introduction

Mandarin Orange (*Citrus Reticulate*) is most common among citrus fruit grown in India with 0.62million hectore area and 4.72 million tonnes production. Citrus industry in India is the third largest fruit industry of the country [1]–[2]. The production cost mainly depend on application of fertilizers, plant protection chemicals and post-harvest packaging & handling. The growth and productivity of plant hamper due to diseases, which leads ecological and economical losses. For this reason, the proper diagnosis of disease is needed with its severity measurement to avoid great losses. The orange fruits mainly affected by four diseases Reading danker (b) brown rot (c) stub burn (d) Melanose. The detection of orange disease can be done manually by the help of an expert person or, automatically based on computer vision image processing. But the manual system is lengthy, costly and may lead to error due to fatigue. So automatic system based on computer vision image processing is the best one which consumes less time, more accuracy with affordable cost [3]. In this paper, we introduce an approach to classify mostly appear four type of orange disease and measure the severity of the disease.

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