RAJEEV INSTITUTE OF TECHNOLOGY

(Approved by AICTE, New Delhi & affiliated to VTU, Belagavi)

PROJECT SYNOPSIS ON

"Tobacco Leaves Grading System using Image Processing"

Submitted in partial fulfilment for the award of degree of

Bachelor of Engineering

In

Computer Science and Engineering

Under the Guidance of **Sangeetha mam**

Submitted by

Likith Gowda H	4RA16CS037
Rajath S Koushik	4RA16CS072
Rakesh Gowda R	4RA16CS073
Uzair Ahmed	4RA16CS102

Abstract

Most of classification, quality evaluation or grading of the flue-cured tobacco leaves are manually operated, which relies on the judgmental experience of experts, and inevitably limited by personal, physical and environmental factors. The classification and the quality evaluation are therefore subjective and experimentally based. A grading system based on image processing techniques was developed for automatically inspecting and grading flue-cured tobacco leaves.

Determination of the current tobacco grade classification performed by the grader with a variety of human frailties. Therefore it is necessary to develop classification automation tools. Classification is done on two major classes namely class-1, class-2 for obtaining global efficiency on the test set consisting about images of each cluster. The decision on grades was made based on nearest neighbor method. A comparative study is performed on the results from the proposed model with existing models, state of the art models on tobacco leaf classification.

Introduction

Tobacco is one of the most successful commercial crops cultivated on this planet. China, India, Brazil and USA are the major producers of tobacco worldwide and these four nations alone contribute around 86 percent of the global production. India is the top two contributors to the global tobacco production and its estimated that around 750 Mkgs of tobacco is being produced in the area around 0.45 M hectares.

Tobacco is cultivated in many parts of the world because of its high economic value. Quality inspection of tobacco leaves plays a crucial role in quality assurance of tobacco productions. After curing, the tobacco leaves are inspected and graded according to their color intensity, maturity, leaf structure, body, oil, length, appearance, waste and other characteristics.

At present, the grading process is performed manually throughout the world. The grading process is extremely labor-intensive and millions of man-days are required to grade each years crop. A high level of skill is required to the graders, but still many mistakes are made by them because the process is highly subjective. So graders are eager for equipment that can help them grade tobacco leaves. If we can use machine vision technology and design algorithms to grade tobacco leaves automatically, it will be very useful for improving the level and efficiency of tobacco grading, arbitrating the dispute of the quality of tobacco leaves between buyer and seller. Because of the diversity and complexity of tobacco leaves New technology and equipment are needed to automate the quality inspection process of tobacco leaves.

Fig: Good quality

Fig: Mid quality

Fig: Low Quality

Problem statement:

At present, the grading process is performed manually throughout the world. The grading process is extremely labor-intensive and millions of man-days are required to grade each years crop. A high level of skill is required to the graders, but still many mistakes are made by them because the process is highly subjective. So graders are eager for equipment that can help them grade tobacco leaves. If we can use machine vision technology and design algorithms to grade tobacco leaves automatically, it will be very useful for improving the level and efficiency of tobacco grading, arbitrating the dispute of the quality of tobacco leaves between buyer and seller.

Literature survey:

Image preprocessing include the detection and restoration of bad lines, geometric rectification or image registration, radiometric calibration and atmospheric correction, and topographic correction. If different ancillary data are used, data conversion among different sources or formats and quality evaluation of these data are also necessary before they can be incorporated into a classification procedure. Accurate geometric rectification or image registration of remotely sensed data is a prerequisite for a combination of different source data in a classification process. System which finds size of different fruits and accordingly different fruits can be sorted using fuzzy logic, here author proposed matlab for the features extraction. Computer vision based system for automatic grading and sorting of agricultural products like Mango based on maturity level. The application of machine vision based system, aimed to replace manual based technique for grading and sorting of fruit.Some work in this direction has already been undertaken.

A grading system based on image processing techniques is developed for automatic inspection and grading of tobacco leaves. The system used machine vision in extraction and analysis of color, size, shape, surface texture and vein. A two-dimensional feature space is proposed to express feature distribution of tobacco leaves. The space is found to be well confined in an elliptic region. A database is constructed to record the feature distribution of standard contrast tobacco leaves prepared by experts through visual evaluation. The decision on grades is made based on the so-called nearest-neighbor method for which the overall difference among features between the measured tobacco leaves and the standard contrast samples were used as a target parameter for judgment. This system can be easily trained by users with the knowledge of the feature distribution information of different tobacco leaves.

An image processing system of tobacco leaves grading is Actually, the lighted cabinet is the same one as Zhang has used , but all other equipments, such as computer and camera has been updated. The image processing system is consisted of a color camera. In the similar way we are grading the flue-cured tobacco leaves based on the digital image processing and the fuzzy sets theory in this project.

Methodology:

- Machine learning tasks are typically classifed into several broad categories:

• Python features a dynamic type system and automatic memory management. It supports multiple programming paradigms, including object-oriented, imperative, functional and procedural, and has a large and comprehensive standard library.

- K Nearest Neighbor (KNN from now on) is one of those algorithms that are very simple to understand but works incredibly well in practice.This is why it is called the K Nearest Neighbours algorithm.

- Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Image processing is one of the rapidly growing technologies. It forms core research area within engineering and computer science disciplines too

- Importing the image via image acquisition tools.

- Analysing and manipulating the image.

• Output in which result can be altered image or report that is based on image analysis.

- Feature Extraction : Features are the information that are extracted from an image. These are realvalued numbers (integers, float or binary). There are a wider range of feature extraction algorithms in Computer Vision. When deciding about the features that could quantify leaves, we could possibly think of Color, Texture and Shape as the primary ones. This is an obvious choice to globally quantify and represent the leaves. 1.5.1 Global Feature Descriptors

- Color - Color Channel Statistics (Mean, Standard Deviation) and Color Histogram.

- Shape - Hu Moments, Zernike Moments. • Texture - Haralick Texture, Local Binary Patterns (LBP)

- Decision Tree Algorithm Pseudocode

Place the best attribute of the dataset at the root of the tree.
Split the training set into subsets. Subsets should be made in such a way that each subset contains data with the same value for an attribute.
Repeat step 1 and step 2 on each subset until you find leaf nodes in all the branches of the tree.

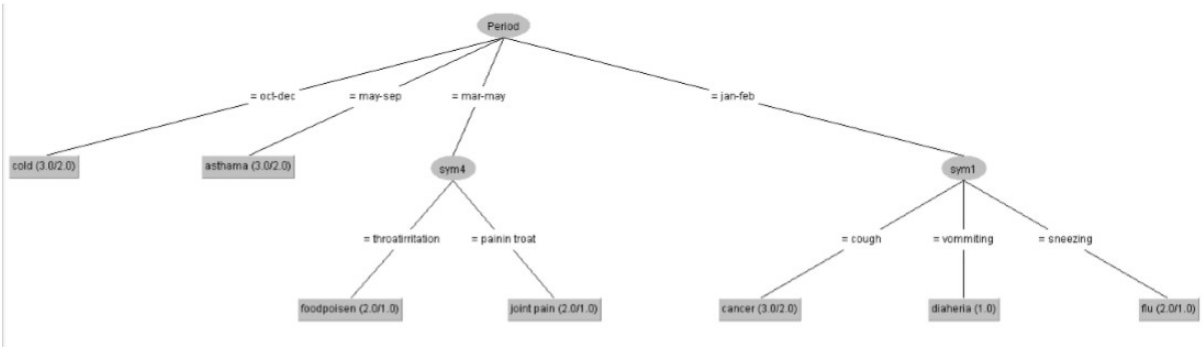

figure 5: Decision tree flowchart

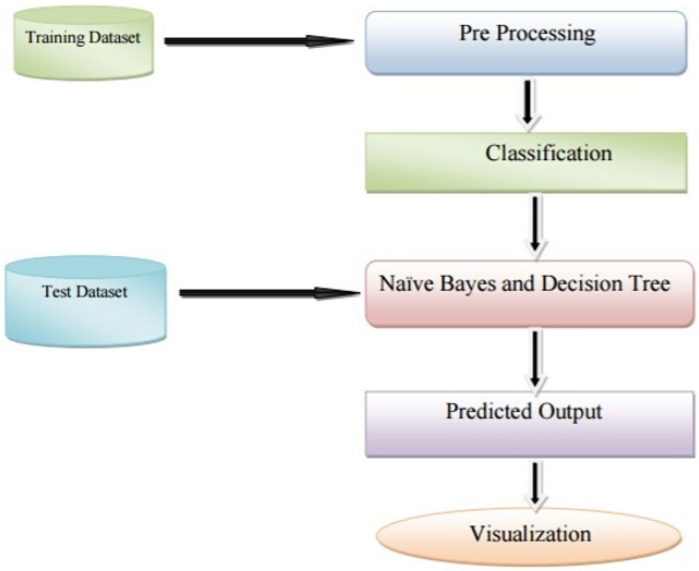

figure 6: flowchart

Objectives:

Human eyes may fail to recognize the minute diferences in colour, shape or texture of the leaf. But the system is developed to recognize quality of leaves more accurately. The separation of cured Tobacco leaves manually consumes more time and also it requires human resource. If it is done by the system, then the accuracy will be improved and without any manual intervention the quality of the leaves may be detected.

The system classifies the leaves as Quality 1, Quality 2 based on shape, colour and texture. As the quality of the leaf will be known prior, one can have idea about further processes and curing leaves.

As the leaves are classified by the system, Time taken by the system will be very less. System may minimize the errors which could be common in manual method of classification. This system reduces human eforts and manual intervention. Based on this result, one can decide how much temperature is given to a particular leaf.

Requirements:

Hardware requirements:

- Processor : Pentium or above
- Processor Speed : 1.6Ghz and above
- RAM : 4GB and above
- Storage Space : Approx. 5 GB

Software requirements:

- Operating System : Windows7 & above or Linux
- Language : Python
- Libraries : Python Libraries
- IDE : Anaconda / Spyder

User Requirements:

- Throughout knowledge of the compiling python programs.
- Knowledge of converting train data into dataset

References:

1.https://scholar.google.com
2.https://stackoverflow.com
3.https://github.com

Base Papers :

[1] Leaf Disease Grading by Machine Vision and Fuzzy Logic

[2] Factors Influencing Tobacco Leaf Quality an Investigation of the Literature

[3] Zhang, J.; Sokhansanj, S.; Wu, S.; Fang, R.; Yang, W.; Winter, P. A trainable grading system for tobacco leaves. Comput. Electron. Agric.1997, 16, 231244.

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