Ilkogretim Online - Elementary Education Online, 2020; Vol 19 (Issue 3): pp. 4576-4581
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2020.03.735610

Quality Assessment Of Rice Using Open Cv

#Dr Pachhaiammal Alias Priya M[1] ; J.Jeyaganesan[2] ; A.Sathiya[3] ; S.Keerthana[4]

[1]M.Tech.,Ph.D.,Assoc professor and Head Department of Artificial Intelligence and Data Science, Sri Sai Ram Institute of Technology, Chennai

[2]Asst professor Department of AI&DS, Sri Sai Ram Institute of Technology, Chennai

[3]Asst professor Department of AI&DS, Sri Sai Ram Institute of Technology, Chennai

[4]Asst professor Department of AI&DS, Sri Sai Ram Institute of Technology, Chennai

Abstract— Automated quality assessment of crops is the problem of assessing the quality of the crops so that required necessary actions can take place timely to minimize the loss to crops and also create a transparency while selling the crops to the end user. In the existing, there is no machine learning or automated system to access the quality of crops. Right now, the crop quality is accessed manually. In this study, an OpenCV based automated quality assessment method will be exploited for assessing the quality of the crops in the Indian context. For Computer Vision and Machine Learning process, PyCharm tool is used for analysing the input images and extract the feature values according to the grade of the crops. The values are stored in a path which would be accessed by Java to showcase the pricing, connecting nearby farmers with the end user's using data mining algorithms.

Keywords—PyCharm

Introduction:

India is an agricultural country. International comparisons reveal that the average yield in India is generally 30%-50% of the highest average yield in the world. Agriculture has comprised of 16.5% GDP by sector (2016 est.) with approximately 50% labour force (2014 est.) and 10% total export. The budget 2017-18 pitched for more reforms in agriculture sector and increased funds for almost all areas of agriculture.

Due to advancement in vision-based computing capabilities and since algorithms can understand images, systems can be trained now which understands what we are looking at and what's the quality of the agriculture product which we are looking onto. The basic steps of the automatic image-based agriculture product grading are: rice image recognition, classification, and finally grading by quality estimation.

In current scenario, there is much confusion when we procure food products like organic, inorganic, addition of preservative, buying low-grade crops in higher pricing, quality certified crops, vegetables etc. Thus, we got motivated to automate or develop a machine learning based technique for crop quality assessment and develop an e-agriculture platform for the farmers to sell their products directly to the end users using image processing techniques and data mining algorithms.

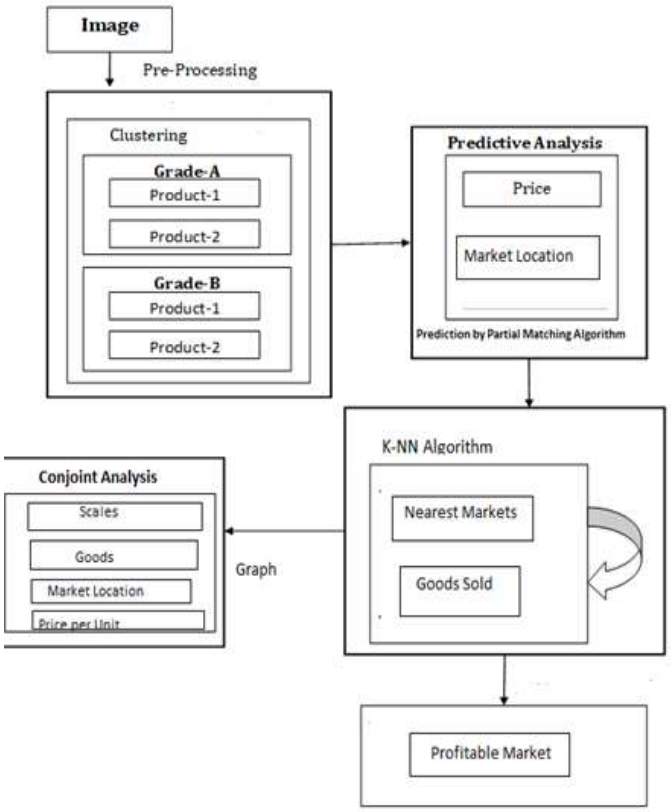
Image classification is a preferred method for agricultural production. Many published papers have adopted image classification techniques for identifying rice seed varieties. In our proposed system, we use Python and Java. In Python we use, principal component analysis for feature extraction and OpenCv for classification.

In order to predict the price, we use an algorithm called prediction by partial matching (PPM). Prediction by Partial Matching is a method to predict the next symbol depending on n previous. This method is else called prediction by Markov Model of order n. Once the price of the product is finalised the best market is to be chosen. This is done by using K-nearest neighbour algorithm (KNN) which is used to find the shortest distance.

Scope of the project:

The scope of inventing or integrating technology in agriculture field has a huge demand and recognition. Agriculture is a big industry, and most of the careers are related to science and/or business. The agriculture industry plays a major role in the Indian economy by contributing approximately 15-20% of the GDP.

ARCHITECTURE:



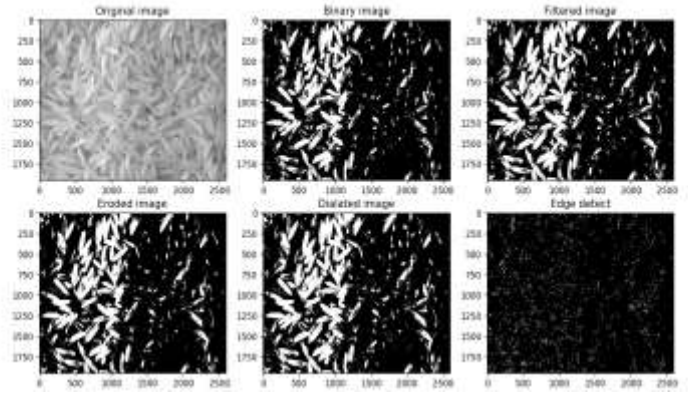
Modules:

1.Image Classification:
Feature Extraction-Principal component analysis

2. Prediction by partial matching.
3. K-Nearest neighbour algorithm.

I-Principal Component Analysis (PCA)

PCA (Rafael and Woods, 2002) is a well-known and one of the most successful techniques used in image recognition and compression for extracting feature and representing data.



It is a technique widely used in the area of pattern recognition, computer vision and signal processing. The purpose of PCA is to reduce the large dimensionality of the data space (observed variables) to the smaller intrinsic dimensionality of feature space (independent variables), which are needed to describe the data economically.

PCA are some of the techniques used for feature extraction, among them PCA is powerful method in image formation, Data patterns, similarities and differences between them are identified efficiently. The other main advantage of PCA is dimension will be reduced by avoiding redundant information, without much loss. Better understanding of principal component analysis is through statistics and some of the mathematical techniques which are Eigen values, Eigen vectors. PCA is a useful statistical and common technique that has found application in fields such as image recognition and compression. Principal Component Analysis (PCA) is a mathematical procedure that uses linear Transformations to map data from high dimensional space to low dimensional space. The low dimensional space can be determined by Eigen vectors of the covariance matrix.

The steps involved in PCA include:

- The mean valve S of the given data set" S" is found
- Subtract the mean value say from S. from these valves a new matrix is obtained. Let say "A"
- Covariance is obtained from the matrix

• Finally, Eigen vectors are calculated for covariance matrix C.

• Any vector S or SS − can be written as linear combination of Eigen vectors shown in Eq. 5

• Because covariance matrix is symmetric it forms basis V1, V2, V3, V4, …, VN SS − = b1u1+b2u2+b3u3+…+bNuN.

• Only Largest Eigen values are kept to form lower dimension data set, OpenCV (Open Source Computer Vision) is a library that can be imported in almost all computers.

II-Prediction by Partial Matching:

Predictions are usually reduced to symbol rankings. Each symbol (a letter, bit or any other amount of data) is ranked before it is compressed and, the ranking system determines the corresponding code word (and therefore the compression rate).

Prediction by partial matching (PPM) is an adaptive statistical data compression technique based on context modelling and prediction. PPM models use a set of previous symbols in the uncompressed symbol stream to predict the next symbol in the stream. PPM algorithms can also be used to cluster data into predicted groupings in cluster analysis. We use this algorithm to allocate the price of these produce. There are a few attributes that play an important role such as current market price, profit percentage, quality, to which state the produce is to be transported etc. Based on these input values the price will be predicted.

III - KNN ALGORITHM:

There are several ways to select the initial 'k' points that represent the clusters. The heart of the algorithm is the for-loop, in which we consider each point other than the 'k' selected points and assign it to the closest cluster, where "closest" means closest to the centroid of the cluster. Note that the centroid of a cluster can migrate as points are assigned to it. However, since only points near the cluster are likely to be assigned, the centroid tends not to move too much.

```
Initially choose 'k' points that are likely to be in different clusters;
Make these points the centroids of their clusters
for
  Each remaining point p
do
  Find the centroid to which p is closest;
Add P
   To the cluster of that centroid;
   Adjust the centroid of cluster to account for p;
end;
```

An optional step at the end is to fix the centroids of the clusters and to reassign each point, including the 'k' initial points, to the 'k' clusters. Usually, a point 'p' will be assigned to the same cluster in which it was placed on the first pass. However, there are cases where the centroid of p's original

cluster moved quite far from 'p' after 'p' was placed there, and 'p' is assigned to a different cluster on the second passes. In fact, even some of the original 'k' points could wind up being reassigned.

Initializing Clusters for K-Means:

We want to pick points that have a good chance of lying in different clusters. There are two approaches.

1. Pick points that are as far away from one another as possible.
2. Cluster a sample of the data, perhaps hierarchically, so there are k clusters.
   Pick a point from each cluster, perhaps that point closest to the centroid of the cluster.

The second approach requires little elaboration. For the first approach, there are variations. One good choice is:

Pick the first point at random;
while
t there is fewer than k points
do
Add the point whose minimum distance from the selected points is as large as possible;
end;

Conclusion:

In this paper we have explored the use of image processing to enhance quality assessment of rice. Experimental results show the improved tracking of rice in various cities and make them available to all end users in a reasonable price. External properties of agriculture products like colour, size, shape, texture and different defects are very important attributes of agriculture products for classification and grading. Now a days due to advancement in machine vision and data mining algorithms availability of software, manual work of agriculture products classification and grading has been replaced with automated machine vision systems. In this proposed system, we combined image processing technique using PyCharm and data mining-based recommendation system using Java framework.

References:

Agriculture in India: Information about Indian Agriculture & Its Importance. [online] https://www.ibef.org/industry/agriculture-india.aspx. Date: 18.06.2017.
Agriculture in India [online] https://en.m.wikipedia.org/wiki/Agriculture_in_India. Date: 18.06.2017.
Google I/O https://events.google.com/io/. Date: 18.06.2017.
Gomes et al., "Applications of computer vision techniques in the agriculture and food industry: a review", Eur. Food Res. Technol., 235 (6), 989–1000. 2012.
Zhang et al., "Application of computer vision technology in agricultural field", Applied Mechanics and Materials, vol. 462. Trans Tech Publ, pp. 72–76, 2014.

Vibhute et al., "Applications of image processing in agriculture: a survey", Int. J. Compute. Appl., 52 (2), 34– 40, 2012.
Diego Sebastián Pérez et al., “Image classification for detection of winter grapevine buds in natural conditions using scale-invariant features transform, bag of features and support vector machines”, Computers and Electronics in Agriculture 135, 81–95, January 2017.
A. Vyas et al, “Colour Feature Extraction Techniques of Fruits: A Survey”, International Journal of Computer Applications (0975 – 8887) Volume 83 – No 15, December 2013.
S. Naik et al, “Shape, size and maturity features extraction with fuzzy classifier for non-destructive mango (Mangifera Indica L., cv. Kesar) grading”, TIAR (978-1-4799-7758-1),
5-11, July 2015.
Rashmi Pandey et al.,” Image Processing and Machine Learning for Automated Fruit Grading System: A Technical Review”, International Journal of Computer Applications (0975 – 8887) Volume 81 – No 16, November 2013.