Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Special Issue [1]2022 : 596-602

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

Logistic Regression technique to identify the Leafy & non-Leafy Vegetables

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ABSTRACT

Analyzing the edibility of food devoured by the human body is extremely urgent to recognize the healthy benefits consumed. Absence of the perfect measure of supplements can prompt different medical problems like food contamination, low invulnerability and nourishing illnesses. Consequently, distinguishing such issues at the phase of utilization can help in forestalling a few Foodborne illnesses and further develop wellbeing. In any case, this perspective is given pretty much nothing significance in our nation, because of the hefty costs included also, the infeasibility of huge scope organization of existing strategies, which are principally synthetic examinations. Along these lines, the fundamental objective of this work is to give an easier, financially savvy answer for address the given issue. Green verdant vegetables, specifically non- leafy plants are considered for this exploration as they are profoundly nutritious with extremely low life span. Given the typical stockpiling conditions, the time span of usability of non- leafy leaves can be reached out to a limit. Over the span of this exploration, we dissect the edibility of non- leafy leaves utilizing Picture Preparing strategies and Artificial intelligent to give more straightforward arrangements that can supplant the current techniques. An informational index was made to catch the falling apart phases of the non- leafy leaves at standard time frames for ten days. Picture Preparing strategies were utilized to extricate the chlorophyll and nitrogen content of the leaves. By utilizing AI, these qualities were associated with the age of the leaf. After the preparation interaction, testing was performed to distinguish the execution of the proposed framework. The proposed calculation is executed with an illustration of leafy images product evaluating resulted in Logistic regression accuracy-91.00% and KNN accuracy is about 88.00% respectively.

Keywords: Leafy Vegetables, Non-Leafy Vegetables, Logistic Regression, KNN, PNN

Received 11.03.2022 Revised 21.03.2022 Accepted 12.04.2022

Introduction

Perceiving various types of vegetables and organic products is an intermittent undertaking in grocery stores, where the clerk should have the option to call attention to not just the types of a specific natural product (i.e., Beans, Fenugreek, Capsicum, Mint, Potato) yet additionally its assortment (i.e., Brilliant Delectable, Fuji), which will decide it's cost. The utilization of scanner tags has for the most part finished this issue for bundled items however given that buyers need to pick their produce, they cannot be bundled, and hence should be weighted. A typical answer for this issue is giving codes for every sort of organic product/vegetable; which has issues given that the retention is hard, prompting mistakes in estimating. As a guide to the clerk, numerous general stores issue a little book with pictures and codes; the issue with this arrangement is that flipping throughout the booklet is tedious. This paper audits a few picture descriptors in the writing and acquaints a framework with take care of the issue by adjusting a camera to the general store scale that distinguishes foods grown from the ground dependent on shading, surface, and appearance signals. Eventually, given a picture of organic products or vegetables of frequently, one requirement to manage complex order issues. In such situations, utilizing only one component descriptor to catch the classes' distinctness probably won't be sufficient and feature combination might become fundamental. Albeit ordinary component combination is very powerful for certain issues, it can yield unforeseen arrangement results when the various elements are not appropriately standardized and pre-processed. The various classifiers [1,2,10] are used in the classification process of different techniques. Other than it has the downside of expanding the dimensionality of the information which may require additional preparation models. Also, the requirement of agricultural advisory service is described in [7]. Manuel Díaz-Pérez, Ángel Carreño-Orteget.al suggested thatStraightforward and different parallel logistic regression models were applied in which the reliant variable was the leafy items of attractiveness and the autonomous factors were the

times of capacity, cultivars, organic product weight reduction, and long periods of assessment. The outcomes showed that beans, capsicum, potato etc. Cultivars with a more extended time span of usability can be chosen by a straightforward and different double logistic regression analysis [3].
Aiswarya B, Anushka Sharmaet reveals that Green Leafy vegetables, explicitly Leafy plants are considered for this exploration as they are profoundly nutritious with extremely low life span. Given the typical stockpiling conditions, the time span of usability of leaves can be reached out to a limit of 5-7 days. Throughout this examination, we dissect the edibility of non- leafy leaves utilizing Picture Preparing strategies and AI to give more straightforward arrangements that can supplant the current techniques. [4]. Yongmei Fang, Shouhua Yu, Liwen Ling explain about Logistic Regression model dependent on cabbage hazard is created through a progression of information mining steps, like information input, information understanding, information arrangement, and cleaning. The model is trustworthy by hazard appraisal. Then, at that point it is doable to utilize the model to anticipate future danger and break down the danger pattern by existing information. It tends to be drawn from the analysis Calculated regression model is applied to mining helpful data from the restricted unique test information of vegetable and anticipating the danger pattern of pesticide buildup of vegetable in the further [8]. Manuel Díaz-Pérez, Ángel Carreño-Orteganarrated that Basic regression is an intriguing technique to examine the impact of capacity time on the attractiveness of person pepper aggregates. All basic logistic models showed profoundly critical relationship between the likelihood of attractiveness of pepper leafy foods time [5]. Shivram Dubey, Anand Singh Jalal, in this method, an answer for the identification and classification of vegetables organic product infections is proposed and tentatively approved. The picture handling based proposed approach is made out of the accompanying primary strides; in the first step K-Means grouping procedure is utilized for the picture division, in the subsequent advance some cutting edge highlights are extricated from the fragmented picture, lastly pictures are arranged into one of the classes by utilizing a multi-class support Vector Machine [9]. Rocha and Hauagge suggested that Contemporary Vision and Example Acknowledgment issues, for example, face acknowledgment, fingerprinting distinguishing proof, picture order, and DNA sequencing frequently have a discretionarily enormous number of classes and properties to consider. To manage such complex issues utilizing only one component descriptor is a troublesome errand and element combination might become required. Albeit ordinary element combination is very powerful for certain issues, it can yield sudden characterization results when the various elements are not appropriately standardized and preprocessed [11]. Neetu and S. S. Ray revealed that examination was done not exclusively to investigate the AI calculations however to upgrade the abilities of high-goal information, Sentinel-2 utilizing Well. In future, the examination might be broadened utilizing the numerous dates of satellite information alongside microwave information [6].

MATERIAL AND METHODS

The graphical representation of proposed method is described in Figure 1.

Feature Extraction

A good feature set can recognize one object from other objects. It must be as robust as possible in order to prevent generating different feature values for the objects in the same class. The selected set of features should be a small set whose values efficiently distinguish among patterns of different class types, but are almost similar for patterns within the same class type. Following features are extracted

Geometrical features:

Area: number of pixels in the ROI.
Perimeter: number of pixel on border of ROI.
Major Axis Length: Returns a scalar that specifies the length (in pixels) of the major axis of the ellipse around ROI.
Minor Axis Length: Returns a scalar that specifies the length (in pixels) of the minor axis of the ellipse around ROI.

Color Features:

Red mean : sum of all red pixel values / (row x column)
Green mean : sum of all green pixel values / (row x column)
Blue mean : sum of all blue pixel values / (row x column)

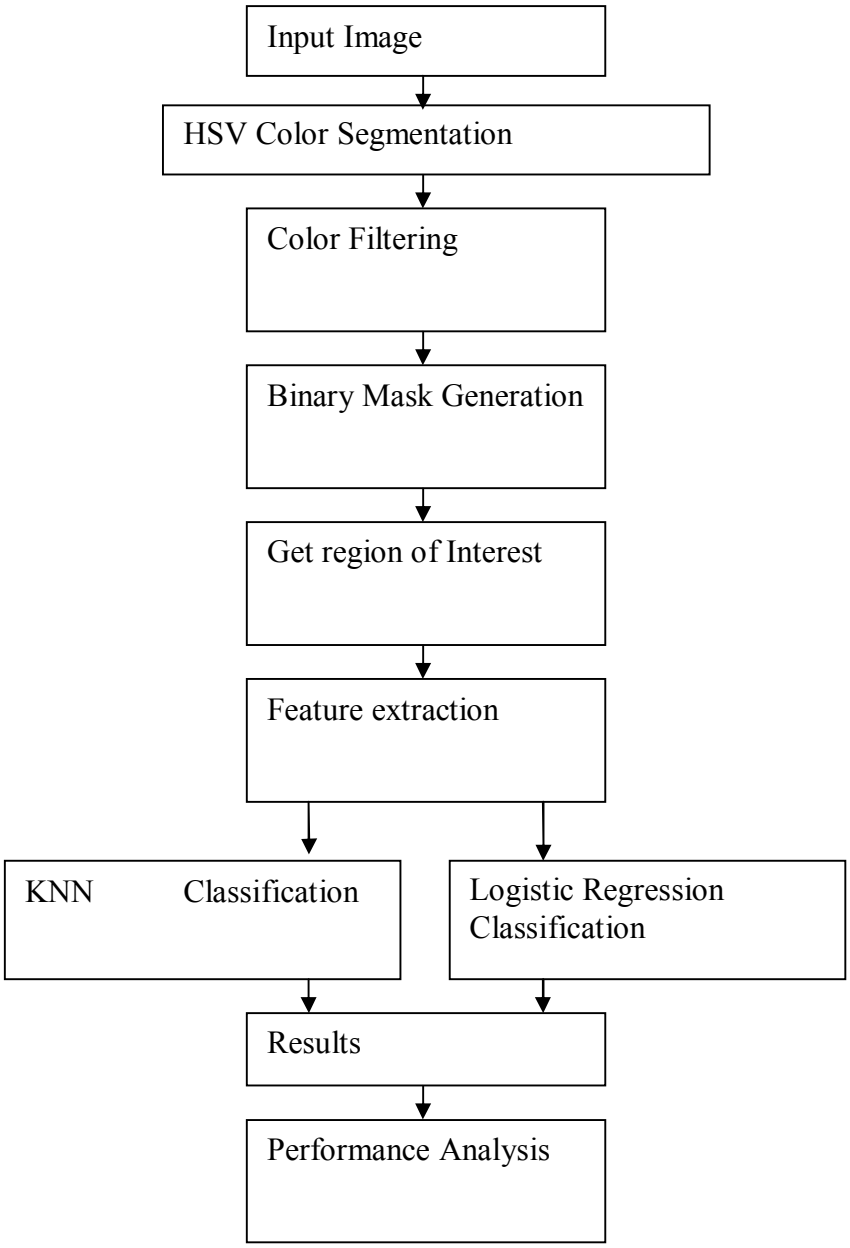


Figure 1. Proposed Method

KNN Classification:

K-Nearest Neighbor is utilized for both order and logistic issues. KNN has a place with directed learning. This calculation is straightforward. KNN model is altogether in light of the preparation dataset. Here at whatever point we require expectation for concealed information, this calculation will look for K most comparable occasions. K-nearest neighbor classifier is amazing on the grounds that, to perform order it will measure the distance between two occurrences to discover the comparability. Then, at that point dependent on the comparability, it will arrange the approaching information.

The K-Nearest-Neighbors (KNN) is a nonparametric arrangement calculation, for example it doesn't make any assumptions on the rudimentary dataset. It is known for its straightforwardness and viability. It is an administered learning calculation. A named preparing dataset is given where the information focuses are classified into different classes, with the goal that the class of the unlabeled information can be anticipated.

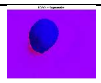
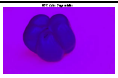
Logistic Regression Classification

Logistic Regression is a measurable strategy for dataset investigation in which, there is at least one autonomous factor that decide the output. The principle objective of Logistic regression is, it is a way used to divide the information to get an exact expectation of the class which utilizes the present data.

RESULT AND DISCUSSION

The results of the proposed system are represented in Table 1. The comparative analysis of KNN and Logistic Regression classifier result is described in Table 2. Finally, the pictorial representation of accuracy comparison is represented in Figure 8.

Table 1. Original Image, HSV color segmentation and Segmented image

Original Image	HSV Color Segmentation	Segmented Image
Potato 		
 Beans		
 Mint		
 Capsicum		
 Fenugreek		

Logistic Regression Performance Analysis

The Logistic Regression technique confusion matrix is represented in Figure 2. Then the classwise and all class result is represented in Figure 3 and Figure 4.

Accuracy = 91.00 %
Sensitivity = 91.92 %
Specificity = 99.01 %
Precision = 98.91 %

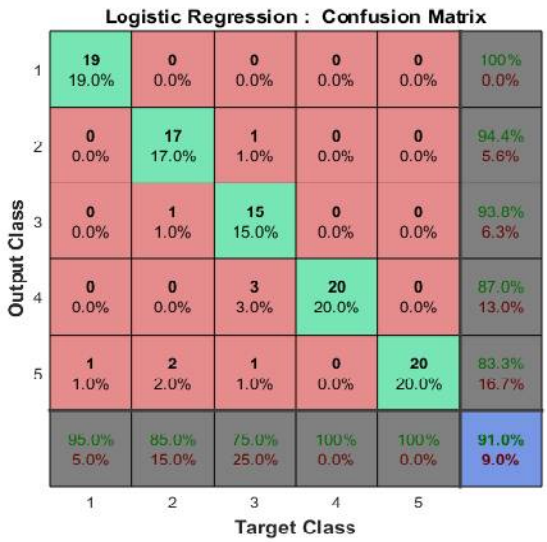


Figure 2.Logistic Regression Confusion Matrix

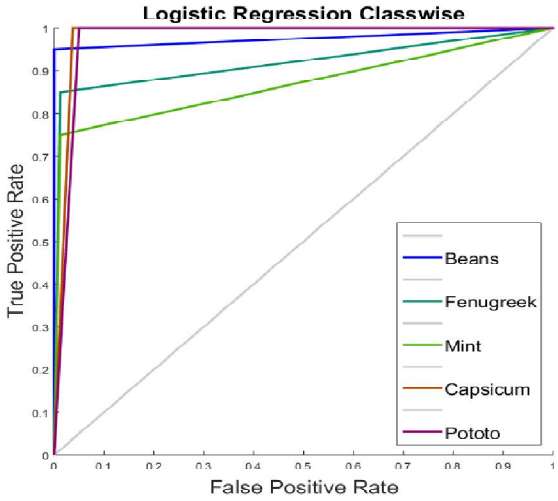


Figure 3. Logistic Regression Class wise

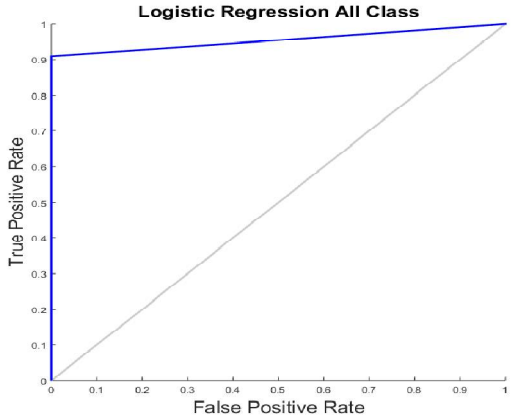


Figure 4. Logistic Regression All Class

KNN performance analysis

The KNN classifier confusion matrix is described in Figure 5 alsothe KNN class wise and all class result is described in Figure 6 and Figure 7.

Accuracy = 88.00 %
Sensitivity = 93.62 %
Specificity = 94.34 %
Precision = 93.62 %

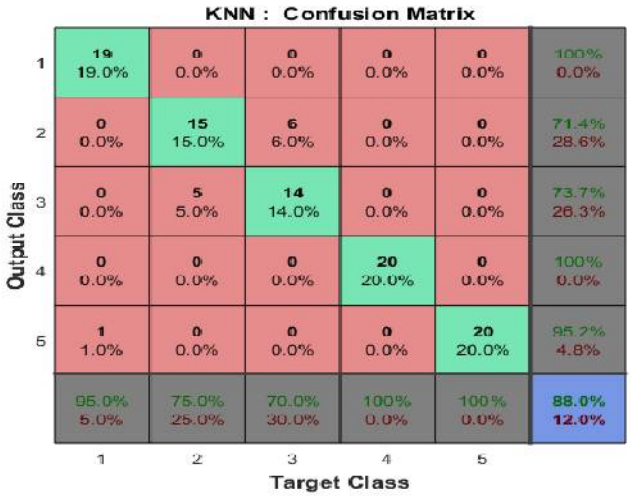


Figure 5. KNN Confusion Matrix

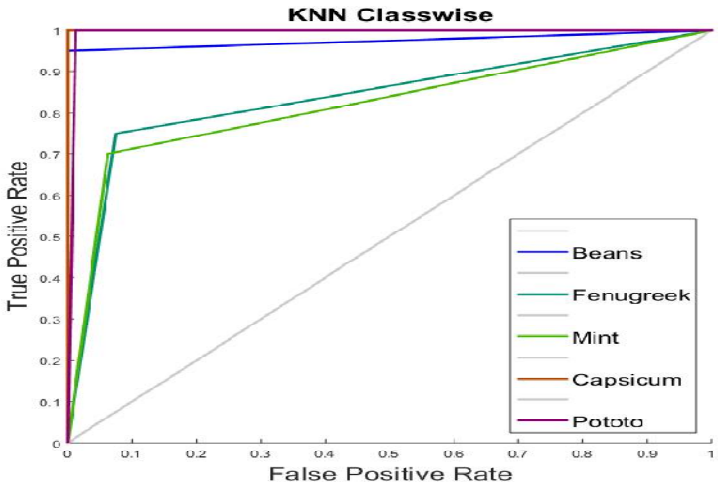


Figure 6. KNN Class wise

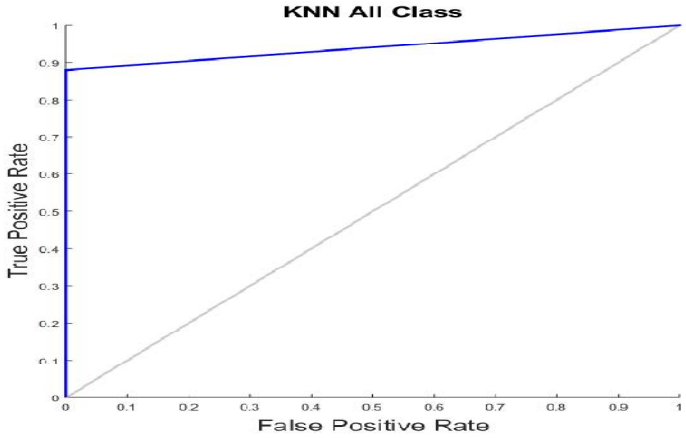


Figure 7. KNN All Class

Table 2. KNN Vs Logistic regression Comparison

	Logistic Regression	KNN
Accuracy	91.00 %	88.00 %
Sensitivity	91.92 %	93.62 %
Specificity	99.01 %	94.34 %
Precision	98.91 %	93.62 %

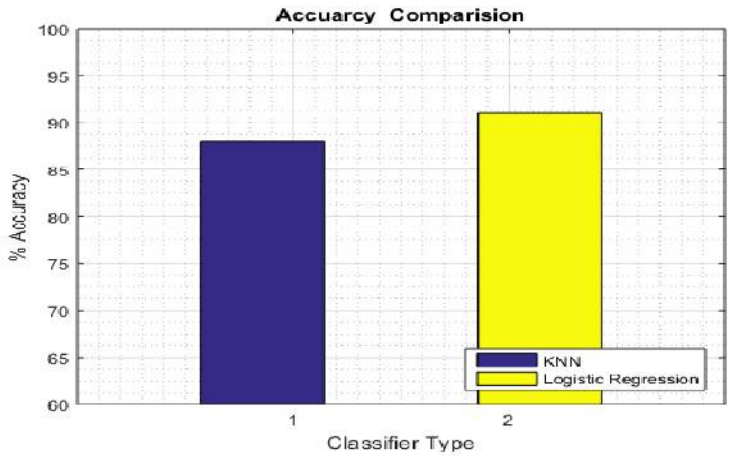


Figure 8. Accuracy Comparison

CONCLUSION

A picture preparing based arrangement is proposed and assessed in this paper for the discovery and order of vegetable and natural product illnesses. The proposed approach is made out of basically three stages. In the initial step picture division is performed utilizing K-Means bunching strategy. In the subsequent advance components are removed. In the third step preparing and arrangement are performed on a Multiclass SVM [1]. Our trial results express that the proposed arrangement can altogether uphold exact identification and programmed grouping of vegetable's organic product. Our experimental results outcomes show that the proposed arrangement can fundamentally uphold programmed identification and order of non-vegetables natural product infections. In light of our analyses, we have tracked down that ordinary non-vegetables are effectively discernable with the sick non-vegetables and CLBP highlight shows more precise outcome for the order of non-vegetables natural product sicknesses and accomplished arrangement exactness. Further work incorporates thought of combination of more than one element to work on the yield of the proposed technique.

REFERENCES

1. Dayanand G. Savakar and Ravi Hosur, (2020). "The 3D Emotion Recognition Using SVM and HoG Features", International Journal of Image and Graphics, Vol. 20, No. 03, PP 2050019-1 to 2050019-13, https://doi.org/10.1142/S0219467820500199.
2. Swalp kumar, Biduyt Bavan Choudary, (2019). "Fused squeeze and excitation network for spectral-spatial hyperspectral image classification", IET image processing IET, The Inst of Engg & Technology, pp:1-9,2020.
3. Manuel Díaz-Pérez(2009)., "Application of Logistic Regression Models for the Marketability of Cucumber Cultivars", Agronomy, 9, 17.
4. Aishwarya B, Anusha Sharma, (2019). "Image Processing Based Edibility Analysis of spinach leaves using machine learning Approach ", IJRTEISSN:2277-3878,Vol-7,Issue-6, pp:2097-2101.
5. Manuel.Dia2-Piere, Angel-Jesus- Calereg, (2000). "Logistic Regression to evaluate the marketability of Pepper cultivars", Agronomy,125, pp:1-13.
6. Neetu and S S Ray,(2018). "Exploring machine learning classification algorithms for crop classification sentinel 2 data", The International Archives Photogrammetry, Remote sensing and spatial information sciences vol XL11-31 w6, w191 pp 573-578
7. Hossein Mahmoudip and Andrea Knierimp,(2015). "Risk Communication for Farmers' Adaptation to Climate Change: A New Task for Agricultural Advisory Services", International Journal of Performability Engineering, Vol. 11, No. 6, pp. 533-547.
8. Yong mei Fang, Shoubgya, (2012)."Research on the Trend of Vegetable safety based on the Logistic Regression Model", CISME, Vol1,ISS5,- pp:10-43.
9. Shivaram Dubey, Anand Singh Jalal, (2012). "Detection and classification of Non-Vegetables fruit diseases using complete local binary patterns",DOI 10.1109/ICCT 2012.76
10. A S Jalal and S Dubey, (2012)."Robust Approach for fruit and vegetables classification ", 187758 @ 2012, doi:10.1016/jproeny.2012.06.398 pp 3450-3453.
11. C Anderson, Rocha, Jacques wainer, (2010). "Automatic fruit and vegetables classification from images", presented Elsevier, computer and electronics in agriculture, pp:1-10.

CITATION OF THIS ARTICLE

Dayanand G Savakar, ArunK Talawar. Logistic Regression technique to identify the Leafy & non-Leafy Vegetables. Bull. Env.Pharmacol. Life Sci., Spl Issue [1] 2022 : 596-602