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Color Detection Using Machine Learning

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ABSTRACT: Color Recognition plays an important role in ft image processing techniques for applications based on color, such as object recognition, facial expressions, skin color knowledge etc. The total accurate of color recognition plays an important role in many applications. In this paper a K-Proximity Colored Classification algorithm and R, G, B Color Neighbor histogram is used to train the KNN algorithms. It can identify eight different colors, namely Yellow, Voilet, Orange, White, Green, Red, Blue, and Black.

KEYWORDS: Feature extraction, K-nearest Neighbor Classifier, Color histogram.

I. INTRODUCTION

Introduction Acknowledging color plays an important role in everyday human life. Color plays an important role in how we perceive and resolve things within ourselves. From the first colors (Red, Green, Blue), many examples of color have been established according to the size of the color. Quantitative color measurement is one key component in color knowledge, background analysis, exposure and tracking. The RGB and HSV color model are one of the simplest coloration patterns that are widely used today in detection and tracking. There are many important real world applications in which color detection can be applied, such as skin color exposure, traffic light detection, vehicle color identification, image segmentation, biometric identification, video surveillance, and so on.

II. LITERATURE REVIEW

I]In 2020, Batur Alp Hakul et al. [1] Color revision using the color histogram extraction and the proposed K-nearest neighbor classifier. Classifying KNN distinguishes twelve colors. These colors are blue, black, brown, green, gilt, navy green, forest green, red, pink, violet, white and yellow. Black and red have the best accuracy (90%) with k-5. From the results, it can be seen that information and k values are very important in classification accuracy, and accuracy is increased when correct training and correct values are selected.

II] In 2018, M. Mary Deepa et al. proposed a method to use threshold colors for the identification of images using 2-D model of RGB Color to detect colors. The colors detected here are blue, red, green, magenta, blue. The 3-D image data is converted into a gray image, then 2 images are taken and a 2 dimensional black and white image is obtained, and the undesirable noise is removed from the image by Image Filtering. Detecting when attached to the Digital Images component in the linking area and using the metric marking area for every included box and its properties. The shadow of each image element is detected by dividing the RGB value of each pixel.is the analysis of the RGB value of each pixel.

III] In 2016, you can see 6 color face recognition using K-NN classification algorithm and PCA. KNN is used for the classification of face color images. K-NN was initially used to perform the Classifying classification. Afterwards, principal component analysis (PCA) and K-NN classification are used together to extract facial color images and to simplify a given image. Applications for different spatial coloration pattern and K values have been tested. Color space examples are HSV, RGB and YIQ. Finally the results are compared. From the above-mentioned 2 tables, the accuracy of classification accuracy of K-NN and PCA and K-NN classification accuracy decreases with increasing k-value accuracy. Moreover, the change in the value of k does not affect the accuracy of classification in some situations.

IV] In 2015, SK Niranjan et al.19] presented the Raw Arecanut classification method. The classification of attributes is based on colors. Color dates and color histogram. along with the KNN algorithm used for the classification of raw arecanut. This classifying model uses 4 spatial measures to examine the impact. The result was 98% obtained using the

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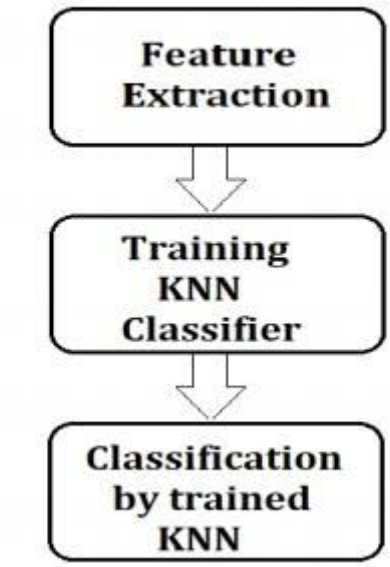
nearest neighbor K value having K value 3 and the Euclidean distance measurement color of the known histogram. In the theoretical approach, accuracy runs around 20%.

V] In 2013, Mihir Narayan Mohanty et al. Proposed Statistical Approach to Color Recognition. It arises from the image of the possession and the limit detected by the object, which is distinct from the object. This means that the values of different binary rows are obtained using the iterative method. The pixel wise Region Interest Process (ROI) was used. A statistical method is used to determine the threshold that helps the color of the exposure object

III. METHODOLOGY

3.1 system framework

Color classification is done by using the K-NN classifying algorithm. The classified K-NN is formed by the image R, G, B Color of the value of the histogram. The work-flow process is given below. The General Color Recognition system includes feature extraction, training KNN classification, and classification from trained KNN.



3.2 IMPLEMENTATION:

The aim of creating a machine learning model is to learn about different colors, namely Green, Black, White, Blue, Orange, and so on. Feature extraction is to be performed as R, G. B Histogram values of the training images Necessary feature extraction methods should be used to extract several lines from the images. KNN algorithm is performed using R, G, and B Color characteristics of the histograms. By using the machine learning algorithm KNN classifies, the color of the image input data is detected and the model is unavailable.

FEATURE EXTRACTION

Color Histogram is a presentation of the distribution of colors present in an image. For images exhibit no histogram. from the elements that have colors in a particular color index of the area, which color the space of the image, so that the colors can be drawn. We can get RGB color images. For example, construct an RGB color histogram of a red given image. Bin no. Using the peak value that R, G and B will have as a feature pixel count, we can create a feature vector to create the dominant function R, G, and R value.

Training K-NN classifier

The K-NN algorithm is the most commonly used and is the simplest algorithm to investigate various models in regression and classification problems. It is unsupervised and this isan algorithm is called lazy learning algorithm. Operation K-NN begins first by calculating the distance of one experimental observation from all the known

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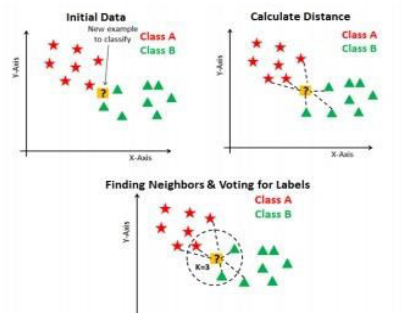
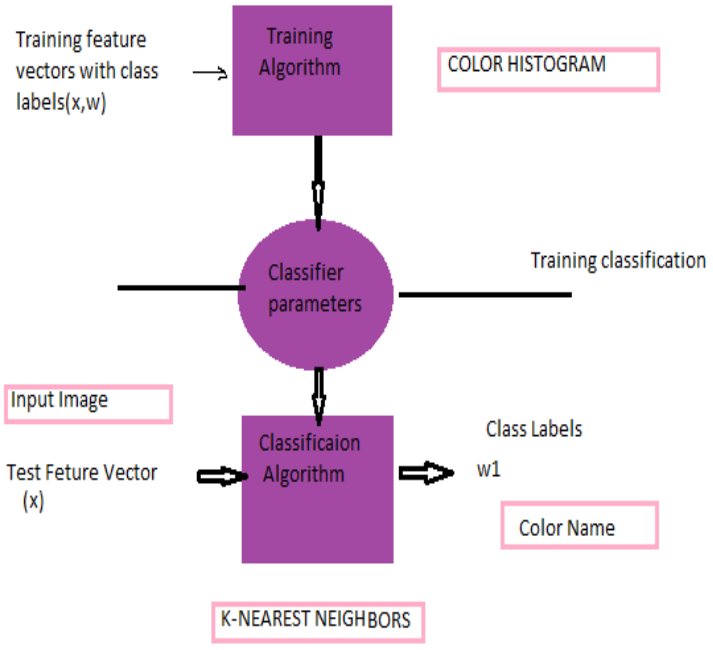
observations of the training dataset and then finding the 'K' nearest to its nearest neighbor. The aforesaid step is carried out during each experiment observed, and in this way the images are found in the data. In order to create the best working algorithms in a dataset, we choose the most appropriate space metric. There are a lot of different reasons that require the space to be computed: the Euclidean space was chosen in this performance. The default Euclidean distance function is used in learning SK-K-NN classifying in python. The measurement of a straight-line is between 2 points of distance present in the Euclid space.

$$d(x, y) = \sqrt{\sum_{i=1}^{n}(y_i - x_i)^2}$$

Classification by trained KNN:



The algorithm that is used to implement the classification is called as Classifier. The name "classifier" refers to a mathematical function that is introduced by an algorithm that devises a given classification into a given category. K-NN is an algorithm that stores everything available. case and also classifies new cases based on the similar measures (Evg. space functions).



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IV. RESULT

Report	precision	recall	f1-score	sup
black	0.93	1.00	0.96	13
blue	1.00	1.00	1.00	7
green	1.00	0.89	0.94	9
orange	0.89	1.00	0.94	8
red	1.00	1.00	1.00	7
violet	1.00	1.00	1.00	8
white	1.00	1.00	1.00	6
yellow	1.00	0.80	0.89	5
accuracy			0.97	63
macro avg	0.98	0.96	0.97	63
weighted avg	0.97	0.97	0.97	63

Precision, Recall, f1-Score, Support

V. CONCLUSIONS

Color recognition is important in most image processing applications. Color detection has received significant interest in many computer vision due to a wide range of applications including video limitation, face indexing and so on. In this project, we perform a color recognition method using KNN to classify the RGB color histogram carried out. Data training has an important role in precision. This pattern can match Green, Orange, Red, Blue, Yellow, Black, and Violet. To digest several colors and to improve accuracy, we have to consider a large training dataset.

The Future of Color identification in real-time includes a list of colors, but we want to expand the data with which our KNN classifieds are ready to give more detailed results. In our design only 8 basic colors can be detected, we can improve the model to indicate multiple colors and improve accuracy, and to detect the desired color by the user. It can be improved to detect different shades of color and not just the basic colors. In an existing project only one color can be detected from a data input image, it can be corrected to detect multi-colors in a single image input, color detection can be further developed from the image and using the feature used in photo editing; video editing or it can be used for color choosing and mixing software or for face detection. Real-timecolor identification can be used on auto parts, robotic vehicles can be applied to many and many otherstechnical applications

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