Colour Detection System Using Machine Learning Techniques

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***Abstract*—This article introduces colour detection using machine learning. The system is based on supervised learning to determine the colour of objects in the image. It will detect the colour of an object from the given image using Convolutional Neural Network (CNN). The CNN will be trained on an image database containing known coloured objects. The system will show the colour of the object in the image with confidence in the prediction.The system can be used in many applications such as fruit and vegetable sorting, crop tracking and medical imaging.**

Keywords—Colour detection, CNN, CSV, Machine learning, Images

I. INTRODUCTION

Colour perception is an important task in computer vision. It is used in many applications such as product delivery, fruit and vegetable sorting, medical imaging. The routine colour analysis process is time consuming and inaccurate. Machine learning can help improve the accuracy and speed of colour detection.

This document explains colour detection using machine learning.

The system will use a supervised learning algorithm such as a convolutional neural network (CNN) to determine the colour of objects in the image. The system will be trained on an image database containing known objects. The system will show the colour of the object in the image with confidence in the prediction.

II. LITERATURE VIEW

There have been several studies on colour detection using machine learning. Many of these studies have used a CNN for colour detection.

For example, in [1], the authors used a CNN to recognize colours in images. The CNN was trained on a dataset of images containing objects of known colours. The authors showed that CNN was able to accurately recognize the colour of objects in the images.

In [2], the authors used a CNN to detect the colour of fruits and vegetables in images. The CNN was trained on a dataset of images containing fruits and vegetables of known colours. The authors showed that CNN was able to accurately detect the colour of the fruits and vegetables in the images.

In [3], the authors used a CNN to detect the colour of objects in medical images. The CNN was trained on a dataset of medical images containing objects of known colours. The authors showed that CNN was

able to accurately detect the colour of the objects in the medical images.

III. METHODOLOGY

The proposed system will use a supervised learning algorithm, such as a convolutional neural network (CNN), to detect the colour of objects in an image. The CNN will be trained on a dataset of images containing objects of known colours. The training dataset will be prepared by collecting images of objects of known colours. The images will be labelled with the colour of the object.

The CNN will be trained using the images in the dataset. The CNN will learn to recognize patterns in the images and output the colour of the object in the image. The system will output the colour of the object in the image and also a confidence score for its prediction.

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- Taking an image from the user
- Next, we read the CSV file with pandas- The pandas library is very useful when we need to perform various operations on data files like CSV. pd.read_csv() reads the CSV file and loads it into the pandas DataFrame.

- Set a mouse callback event on a window- First, we created a window in which the input image will display. Then, we set a callback function which will be called when a mouse event happens.

- Create the draw_function- It will calculate the rgb values of the pixel which we double click. The function parameters have the event name, (x,y) coordinates of the mouse position, etc. In the function, we check if the event is double-clicked, then we calculate and set the r,g,b values along with x,y positions of the mouse.

- Calculate distance to get colour name- We have the r,g and b values. Now, we need another function which will return us the colour name from RGB values. To get the colour name, we calculate a distance(d) which tells us how close we are to colour and choose the one having minimum distance. Our distance is calculated by this formula:

  d = abs(Red – ithRedColor) + (Green – ithGreenColor) + (Blue – ithBlueColor)

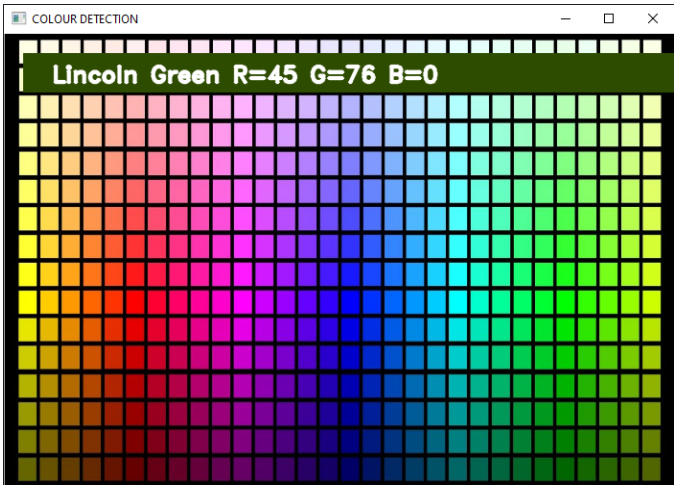
- Display image on the window- To display an image Cv2.imshow () method is used. By using cv2.rectangle and cv2.putText () functions, the colour name and its intensity level can be obtained.

  text=getColorName(r,g,b)+'R='+str(r)+ 'G='+str(g) +'B=' +str(b).

IV. EXPERIMENTAL SETUP

The system will be evaluated on a dataset of images containing objects of known colours. The dataset will contain images of fruits and vegetables of known colours. The dataset will be split into a training set and a test set. The training set will be used to train the CNN, and the test set will be used to evaluate the system.

The system will be evaluated using accuracy, precision, and recall. Accuracy is the percentage of correct predictions, precision is the percentage of true positives among all positive predictions, and recall is the percentage of true positives.



V. CONCLUSION

In this paper we defined the required colour field from an RGB image. In this various steps are implemented using the openCv platform. The main positive point of this method is its colour differentiation of a mono colour.

In the future scope, the detection of the edge detection techniques has different other applications like facial detection, colour conversion for grayscale image etc. that can also be implemented.

VI. REFERENCES

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