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Colour Palette Generation using Machine learning algorithms

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Abstract – Colors have a power of lift our mood, thoughts and emotions. Color Palette is used by designers and artist to make their website or drawing beautiful and attractive to clients. Our project is about color palette Generation using various Machine learning algorithms such as K-means clustering and Median cut algorithm. They are unsupervised machine learning algorithm and there is no labelled data for these types of clustering. In computer graphics, there is a table called color lookup table also known as CLUT. CLUT is a table in which colors are selected using an index number, hence by referencing that number we can describe the actual color without using much memory. Our project will also be using less memory by using CLUT. A color palette in digital world is much more useful and a full range of colors can be displayed on a user interface and a screen. User-interface designers have a challenging task of selecting colors in their interface which will successfully communicate the brands name and meaning. Hence, we can help designers to generate colors from an existing image using different algorithms.

Key Words: Clustering, UI, colours, K-means, CLUT

1. INTRODUCTION

Image segmentation is a crucial step in image process, and it appears everyplace if we wish to research what's within the image. for instance, if we tend to obtain to search out if there's a chair or person within an inside image, we tend to may have image segmentation to separate objects and analyze every object one by one to ascertain what it's. Image segmentation sometimes is the pre-processing before pattern recognition, feature extraction, and compression of the image.

Image segmentation is that the classification of a picture into totally different teams. several varieties of analysis are drained the world of image segmentation mistreatment clump. Image segmentation is that the method of partitioning a digital image into multiple distinct regions containing every component (sets of pixels, conjointly called super pixels) with similar attributes.

The goal of Image segmentation is to alter the illustration of a picture into one thing that's additional important and easier to research. Image segmentation is usually accustomed find objects and limits (lines, curves, etc.) in pictures. additional exactly, Image Segmentation is that the method of distribution a label to each component in a picture such pixels with identical label share bound characteristics. Image Segmentation involves changing a picture into a set of regions of pixels that are painted by a mask or a labeled image. By dividing a picture into segments, you'll be able to method solely the vital segments of the image rather than process the whole image.

2. NEED OF THE PROJECT

This project aims to take care of the difficulty that happens by not getting the ideal colors and shades from a picture. Shading is vital in marking and showcasing in light of the fact that it is the place where initial feelings of clients are based. Additionally, shading is the mystery in creating a decent character for an organization. Shadings are something beyond a visual guide since colors pass on feelings, sentiments and encounters. There are implications behind different tones and for organizations, it will help in the event that they are side by side with this on the grounds that picking a shading plan can influence their business – it might either represent the moment of truth for them. Our project will produce some colors from existing image and create coloring range from a given picture which will be helpful to extricate colors.

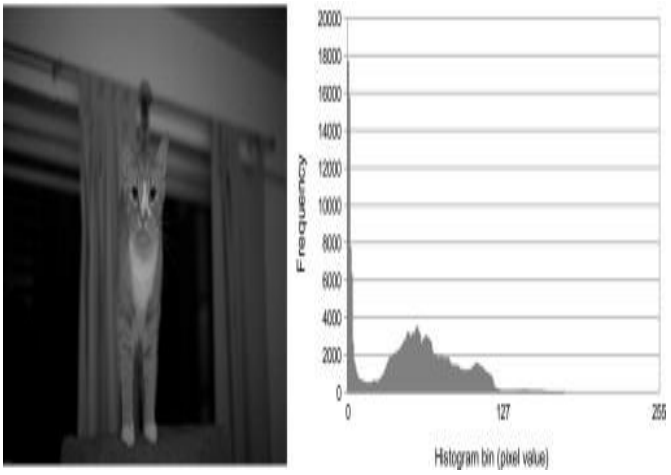

Fig. 1: Color graph generation

3. PROJECT OBJECTIVES

1. To provide efficiency in the color extracting process.
2. To reduce the overall time spent in generating colors.
3. Increase in-design quality.
4. Provide better algorithms.
5. Provide solution at minimal cost.
6. Satisfying developers and designers demands.

4. PROJECT FEATURES

1. Load balancing: Since the system can generate colors using an image, many clients can use it at a same time and hence load on server will be limited to time period of admin access.
2. Easy accessibility: Colors can be easily generated.
3. User friendly: The website will be giving a very user-friendly approach for all user.
4. Efficient and reliable: Maintaining the all graphs and data on the server which will be accessible according the user requirement without any maintenance cost will be a very efficient as compared to storing all the customer data on the spreadsheet or in physically in the record books.
5. Easy maintenance: Higher education access prediction using data mining and color extraction is design as easy way. So maintenance is also easy.

5. SYSTEM ARCHITECTURE

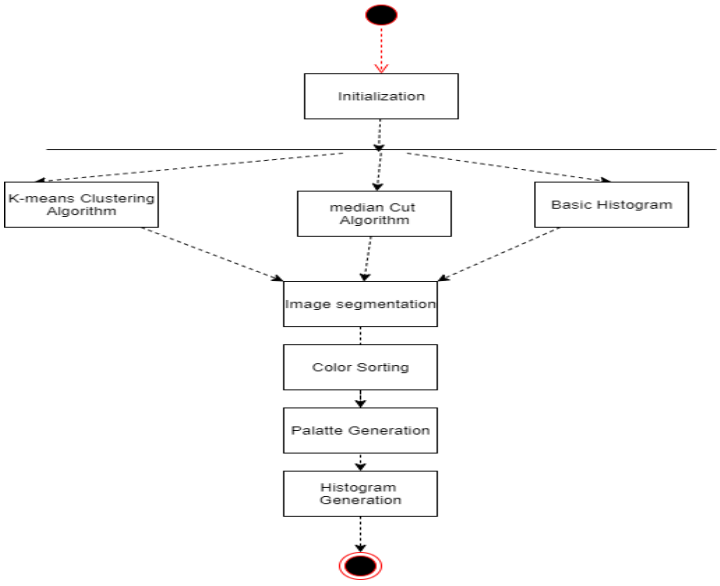

Fig. 2 -Activity Diagram

6. System Architecture

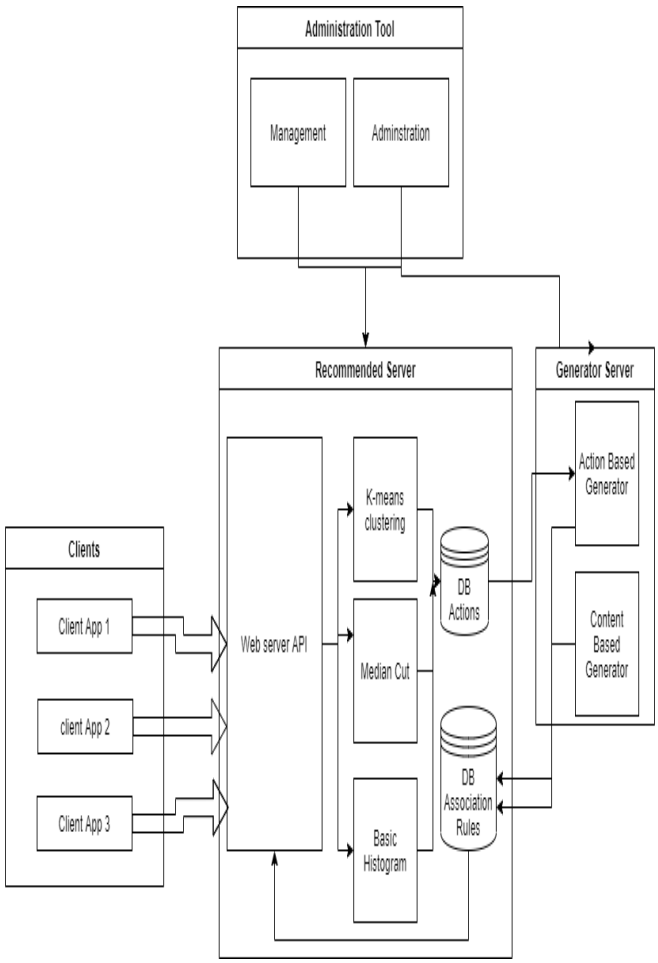

Fig 3. System Architecture

Our project is a application which will generate a color palette from an image or can generate random colors if no image is provided. User can generate any number of colors in color palette and can generate contrast, hue, saturated color based on the algorithm and quality of image. Algorithms working is written in short below:

- **Median cut:** Median cut additionally segments the space, however it does to in a non-uniform manner. The pixel range is processed for each shading measurement (red, green, and blue). At that point, the measurement with the biggest reach is chosen, and the middle worth is processed. The space is then parted into equal parts - one over the middle, and one beneath. This interaction proceeds recursively. Every emphasis, just the subspace with most prominent pixel range is parted.

- **K-means:** K-Means endeavors to group the pixels into k particular bunches. The client offers a k value as information. Since k-means is famous for stalling

out in nearby minima, the calculation is re-run multiple times and the outcome with most reduced error is chosen

- **Histogram binning**: The histogram binning approach partitions the red, green, blue space into a MxMxM matrix where M is a client offered some benefit. The beneath picture shows a model when M=3. Here, the space is divided into 27 similarly estimated cells. The pixels that fall inside every cell are counted, and their normal shading esteem is figured. Normal colors from the most populated 10 cells are chosen and shown as the shading range

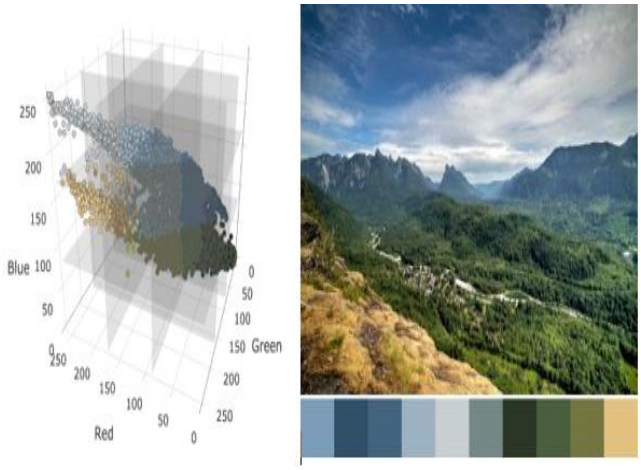

Fig-4 Simple histogram module Output

7. RESULTS

We attribute most of our data to two web development and design communities online. We reasonably conclude that these findings are representative of the palettes most useful individuals of these professions. The value in a tool is that it defines a set of colors that can be used with a base color. Oftentimes designers work with clients that designate the use of a color or colors that are unique to their brand. Our data can offer guidance for successful use of those colors. For example, if a mandated color is a dark color, our data suggests incorporating brighter colors. Alternatively, if the mandated color is highly saturated, it might be safer to use a hue template rather than eye-balling it with an unrelated color.

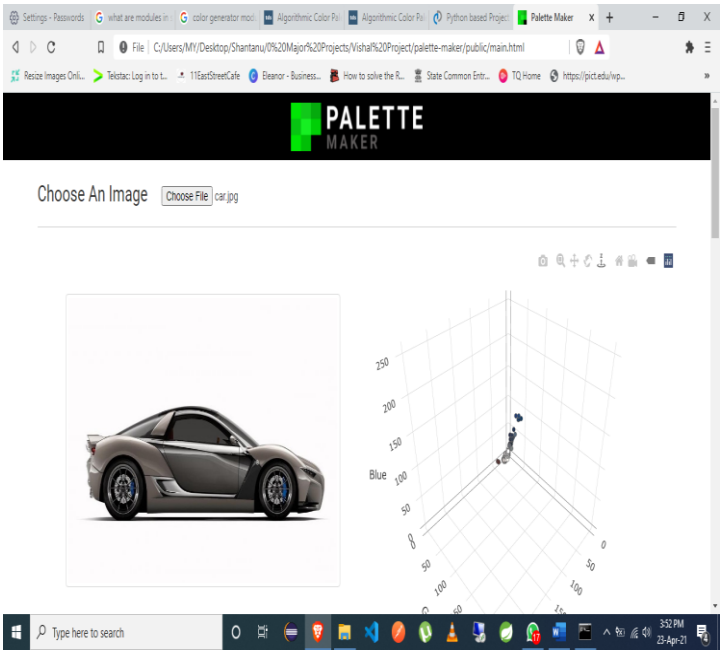

Fig -5: Sample image

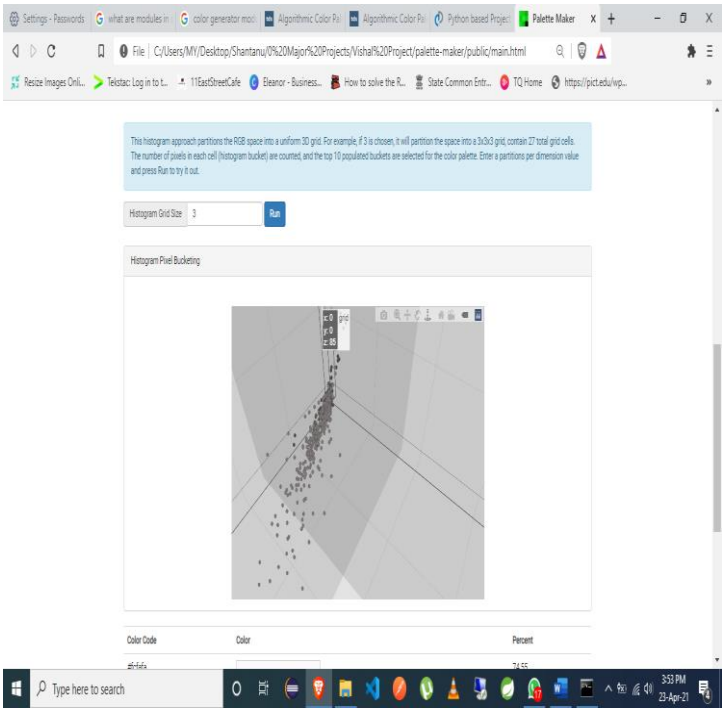

Fig. 6. Color Palette generator Page

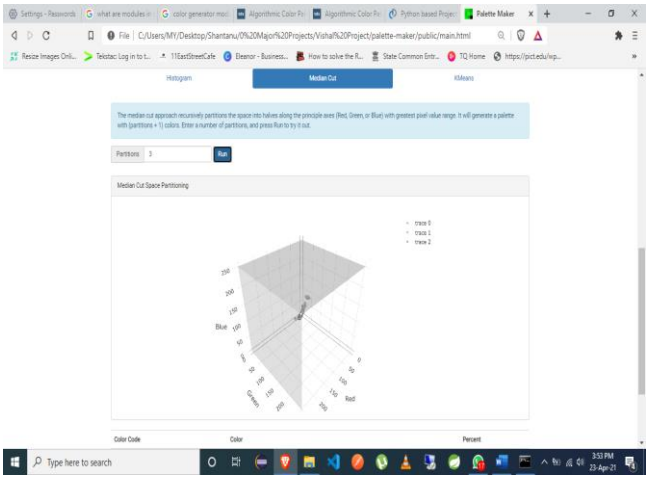

Fig. 7. Color Palette generator Page

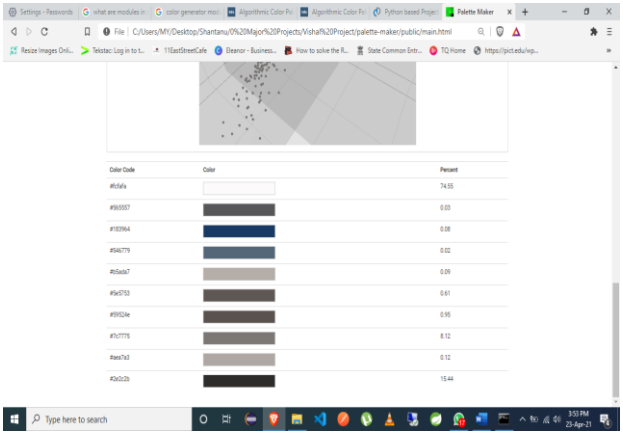

Fig. 8. Color Palette generator Page

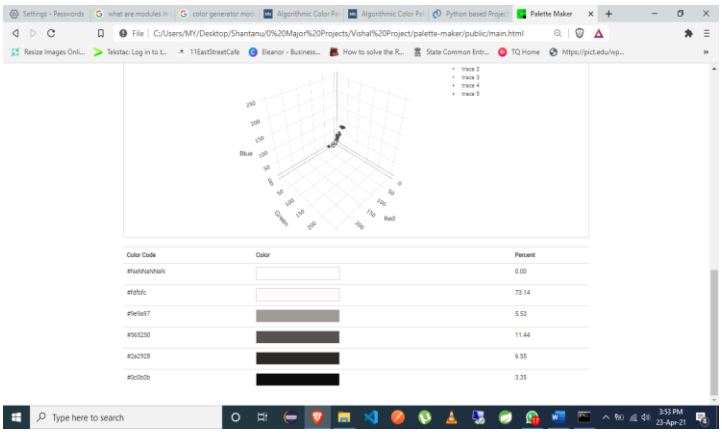

Fig. 9. Color Palette generator Page

8. FUTURE SCOPE

There are several ways in which Website and algorithm can be improved. Website can be made much more responsive and animated if possible. More features such as generating color form HEX, RGBA code and many more can be added in project.

9. CONCLUSIONS

There are many ways to achieve a set of colors that are compatible with each other. Color experts from a wide variety of businesses have each solved this problem. We wanted each technique to measure the most successful conditions.

Our work provides a starting point for the future exploration of this subject. With a better understanding of advanced hieroglyphics and how humans perceive color, these algorithms can be improved and expanded so that they can be applied beyond the field of graphic design.

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