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NEIGHBOURHOOD TEXTILE STORE RECOMMENDATION USING FABRIC PATTERN RECOGNITION

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ABSTRACT

It takes time and effort to locate the necessary fabric at a neighborhood textile shop. Our website makes it possible for consumers to locate the needed fabric at their convenience without having to struggle through exploring multiple stores. This feature is useful for consumers who are short on time. By making it accessible online, retailers may increase their sales. The available database also allows the merchants to locate specific fabrics in the textile store. This automation enables the merchants to serve more consumers in a shorter amount of time.

Pattern recognition would be a challenging task and it is the factor that makes this application worthy. Here comes, Computer Vision and Digital Image Processing tools which plays a crucial role in applications to recognize patterns in images as well as machine learning enabling us to provide the best possible match of required fabric and patterns. In addition to this, a questionnaire regarding the fabric also plays an important role to provide the best possible recommendations. Finally, this application enables us to find the required fabric for the customers and recommend a nearby textile store with the availability.

I INTRODUCTION

Nowadays there are many textile stores present in our location. We need to search for many stores to get a required pattern that makes us satisfied. Customers need to spend large amounts of time searching for fabric or wait for days to get a purchase in online stores. This makes the customer's job tough. On the contrary, shopkeepers also should give many advertisements for increasing their sales. All these shops should recruit many workers to provide services to customers. Textile store recommendation using fabric pattern recognition makes customers' and shopkeepers' work convenient. Customers can easily locate the neighborhood textile store for the required fabric within minutes by simply sitting at home. Moreover, shopkeepers can easily increase their sales without any additional advertisements. The number of salespersons is also limited as our website provides information about the exact place where the fabric is located. By logging into this website, customers can shop for their required fabric without any hurdles, which in turn reduces (or) save time. All these can be achieved using OpenCV and Digital Image Processing tools. This application is more worthy by not only matching the exact patterns but also by providing more related searches if the exact pattern is not matched.

Keywords:

CBIR, Flask, OpenCV-python, Feature extraction, Feature matching, colour histograms, KNN algorithm, Chi-square distances, Feature database, Product database.

II PROBLEM STATEMENT

Nowadays there are many textile stores located in our places. But when a customer needs to purchase a fabric, he/she needs to go manually and search all the stores until the required fabric is matched. It makes customers spend their precious time. To solve this problem, we came up with many online stores. Due to these online shopping stores, we can get the required fabric easily without searching. But this method of purchasing fabric also consumes a lot of time for delivery. To provide a solution to these problems, our neighborhood textile store recommends using fabric pattern matching to make customers shop for their required fabric easily by knowing whether the fabric is present or not. If present in which nearest store it is located?

Shopkeepers are also facing many problems in running fabric stores. They need to assign a lot of staff to provide quick service to the customers. They need to give many advertisements to increase their shop sales. By using this application shopkeepers will get many customers and there is no need of giving additional advertisements. Our website also provides information about the exact place where the fabric is located in the shop. With this information shopkeeper, itself can provide quick service without any sales persons.

III LITERATURE SURVEY

[1] TITLE: New Development of the Image Matching Algorithm
AUTHOR: Xiaoqiang Zhang, Zhao Feng
The above paper explains the image-matching process and also the image-matching algorithm based on many parameters like grey value, feature, frequency domain analysis, neural network, and semantic representation.

[2] TITLE: Feature detection and matching with OpenCV-Python
AUTHOR: sanjaydev0901
The above article explains which is better among many existing feature detection algorithms. It has an analysis to say the ORB is very effective among all others.

[3] TITLE: Content-based image retrieval: A review of recent trends
AUTHOR: Ibtihaal M. Hameed, Sadiq H. Abdulhussain, Basheera M. Mahmood.
The above paper gives a skeleton of CBIR frameworks and low-level features of recent. It also gives a view of machine learning algorithms and similarity measures.

[4] TITLE: Overview of Image Matching Based on ORB Algorithm
AUTHOR: Chuan Luo, Wei Yang, Panling Huang, Jun Zhou
The above paper describes the traditional ORB algorithm and also says about improved versions of the ORB algorithm. It includes a part about the performance index and feature points.

EXISTING SYSTEM:
If a user needs a particular fabric and if he/she is running late of time, then he/she will go and search for that particular fabric in multiple stores and it might take a lot of time. A user might also go with the option of online shopping. In online shopping, only a few applications and websites serve customers with fabric. It means fabric is not provided by every online shopping application website. He/she is not able to check the quality of the product and it takes 2-3 days for our order to get delivered. Here, in this case, customers who are in hurry for the fabric won't be satisfied. The customer might or might not get to search for the fabric he/she needs. Finding the exact fabric that the user needs might not be possible and then finally the customer won't be satisfied and happy. When customers go to a textile store, merchants of textile stores have to find the fabric asked for by the customer. In case the store is multistoried and has many different varieties of fabric, then the merchant will take more time to find the location of the fabric.

Image processing techniques are used in many other different systems based on different types of algorithms. There are many web applications for shopping for different products but there is no specific and exclusive web application for finding fabric from a nearby textile store.

IV PROPOSED SYSTEM

When a user needs a fabric and running out of time then this system would be the best alternative to get suggestions and stores having that particular fabric, then the user can go and buy that and he can save time and get his work done on time. This proposed system will help users to get his/her required fabric and make the user happy. If the user is not able to get his/her fabric at least he would be given the nearest matching pattern recommendations. Merchants can find fabric more easily as they will have data about the location of fabric in their stores.

Image Processing Techniques: In the case of feature extraction, the ORB feature extraction algorithm for greyscale images and 3D color histogram in the HSV color space image descriptor for color images are used.

Coming to pattern matching, the KNN algorithm for greyscale images and the Chi-square distribution algorithm for color images are used.

Image retrieval is integrated with this web application. This proposed system would be the first exclusive web application for fabric recommendation from neighborhood textile stores. Here, shopkeepers will register and upload products along with their complete descriptions and customers can upload needed fabric images, can start getting recommendations for required fabric, can go and buy fabric and save time.

Important libraries:

- flask
- OpenCV-python
- NumPy
- flask-sqlalchemy

V IMPLEMENTATION:

ADMIN'S PERSPECTIVE:

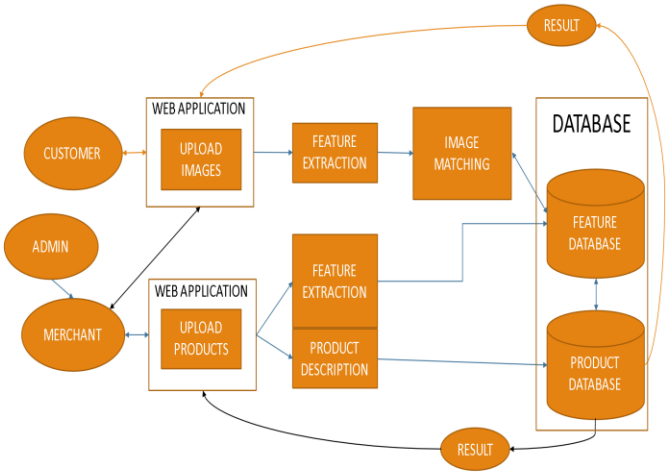
Admin has charge and supervision of overall web application. It includes the admin's registration, login, and logout to get into the web application. Has authority to remove merchants in case of their misuse of the web application.

MERCHANT'S PERSPECTIVE:

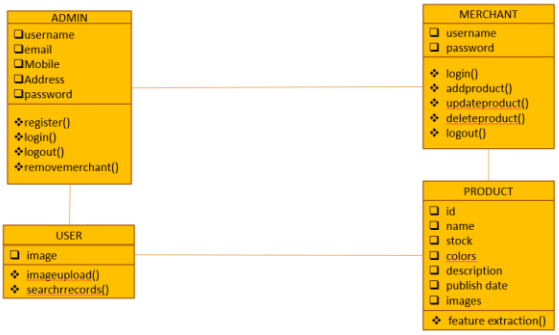
Merchants should register into the web application to create an account. They upload images of fabrics that are available within their shops along with product descriptions that are to be stored in a separate database. They need to update their product database every time. This process will result in a hike in sales without any additional advertisements.

CUSTOMER'S PERSPECTIVE:

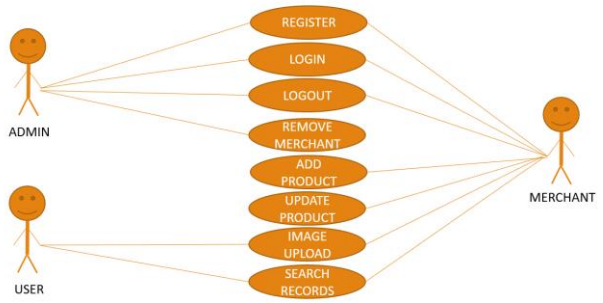
Customers upload the fabric image of their requirement. After image processing techniques are done, they get the results based on fabric availability. If the required fabric is not available, some recommendations will be shown. Then the happy customers will go and shop for their fabrics with ease.



CLASS DIAGRAM



USECASE DIAGRAMS



PRODUCT:

Product Description is a list of attributes of a product that makes user search easier. Product Description includes id, name, stock availability, colors, and type of fabric.

FEATURE EXTRACTION &PATTERN MATCHING:

For color images:

A 3D color histogram in the HSV color space image descriptor is used for feature extraction. It includes the usage of HSV color space (Hue, Saturation, Value) for mapping pixel intensities into a cylinder. for the density of pixel intensities, histograms with bins are used. Here the complication is the number of bins utilized i.e., with very few bins histogram won't be able to disambiguate between images with different color distribution, and with many bins used histogram lose the ability to generalize between

images with similar perceptual content, this leads to the use of iterative approach depending on the size of the dataset and an alternative.

The Chi-square distance algorithm is used for pattern matching. It takes two histograms which are to be compared. In the first case, if the similarity is zero then we can say they are identical. the second case is, if the similarity value increases, then we can say they are less similar.

For greyscale images

Firstly, the conversion of a color image to a greyscale image takes place. This algorithm takes less time to detect very important features. The feature includes edges, ridges, blocks, and corners.

KNN algorithm used for pattern matching.

KNN would be the best approach, here as we are going to compare only a few features. In KNN the distance is measured between features and determines the nearest neighbor.

So, it defines similarities between features depending on their distance.

Results:

Uploading query image for searching

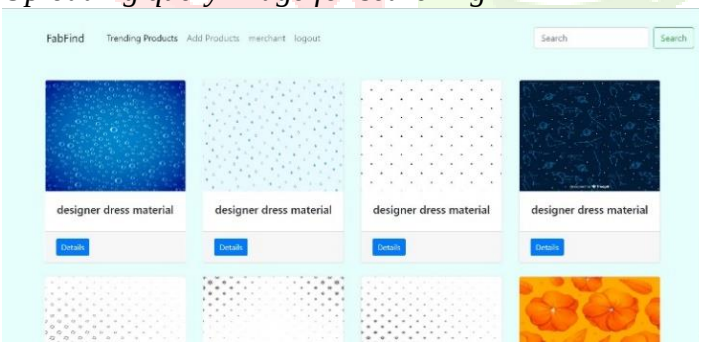


Image matching Colour description and Chi-square distance

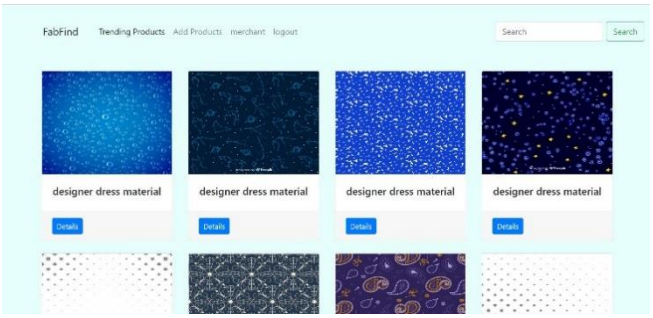
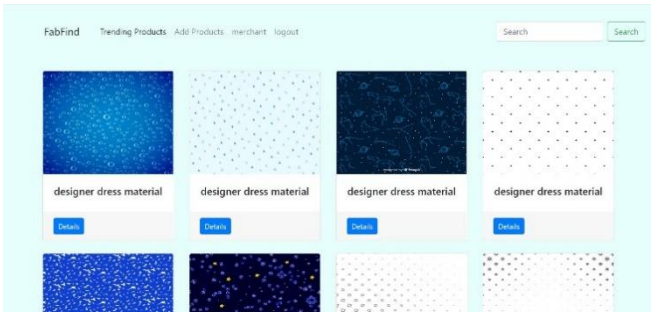


Image matching ORB description and KNN-based matching algorithm



Merging the above two results.

VI CONCLUSION:

This proposed web application would be user-friendly to customers and merchants. It provides suggestions and recommendations of neighborhood textile stores having customer-required fabric leading to saving time and satisfaction of customers. As well merchant also will be benefited from the fast search for fabric in his shop and also increase his sales. This would be the best option with social feasibility and Economic feasibility.

VII REFERENCES:

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[2]sanjaydev0901,https://www.geeksforgeeks.org/feature-detection-and-matching-with-opencv-python/

[3] Ibtihaal M. Hameed, Sadiq H. Abdulhussain, Basheera M. Mahmood. Article: 1927469 | Received 18 Jan 2021, Accepted 29 Apr 2021, Published online: 02 Jun 2021

[4] Chuan Luo, Wei Yang, Panling Huang, Jun Zhou. Published under licence by IOP Publishing Ltd Journal of Physics: Conference Series, Volume 1237, Issue 3**Citation** Chuan Luo *et al* 2019 *J. Phys.: Conf. Ser.* **1237** 032020