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IMAGE BASED SEARCH ENGINE USING PYTHON

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ABSTRACT

We utilize search engines conventionally. When we have queries, we can utilize the search engine like Google to retrieve the most pertinent answer. Most of the queries format is text-predicated. But not most of the time, the text is quite utilizable to find germane answers. The quandary for utilizing descriptions is that you will get wide varieties of products. And what exacerbates it, they will not be kindred with the product that you opt to probe, so you require a better way to retrieve them. To overcome this we utilize the image of the required item, extract its features, and utilize those similarities to retrieve kindred products. We named the concept as the Image Predicated Search Engine (IBSE). In this project we put forward a model for a search engine where an image can be uploaded from the local database of the utilizer to retrieve information about it from the cyber world. In this a utilizer can probe for cognate images on the browser predicated on sample images and the browser will show homogeneous results on the screen. This is great work for probing for information.

Keywords: Image Search, Dataset, Query, Search Engine.

I. INTRODUCTION

Image primarily based computer programme (IBSE) systems change to search out kindred pictures to a question image among a picture dataset. The foremost noted CBIR system is the search per image feature of Google search. There square measure 2 [image retrieval] frameworks: text-predicated and content-predicated. The text-predicated approach may be copied back to the Seventies. In such systems, the photographs square measure manually annotated by text descriptors, that square measure then used by a direction system to perform image retrieval. Image based search could be a system for finding similar images supporting a query image.

The implementation can begin by extracting options on all pictures, whether or not it's the question or the image information by employing a feature extraction formula. Then, the system can calculate similarities between the questions with all pictures on the information. Finally, the system can retrieve all the photographs that have a good similarity with the question.

[1] Krizhevsky et al. trained a deep CNN to classify ImageNet dataset consisting of one 2 Million pictures into a thousand completely different categories. The authors worked on a network containing eight layers, wherever initial 5 were convolutional layers, and last 3 were totally connected layers. Since one GTS 580 CPU with 4GB memory is the largest network size for coaching, that's why this network has been trained on 2 GTS 580 4GB CPUs. The authors used the options extracted from the seventh layer to fetch similar photos and achieved the top-1 error rate of thirty seven 5% and top-5 error rates of seventeen 0%.

[2] Babenko et al. suggested compressing the features using the dimensionality reduction method and attained a good performance. However, because of the high dimensionality of CNN features and inefficiency of similarity computation between two 4096-dimensional vectors.

[3] Deep models are used for hash learning. Xia et al. proposed a supervised hashing methodology to check binary hash codes to retrieve pictures exploitation deep learning and disclosed the revolutionary performance of retrieval on datasets that are publicly offered.

[4] Lin et al. projected a simple and economical supervised learning model for a quick image retrieval system using hashing-based strategies that project the high-dimensional options to low-dimensional feature areas and produce the binary hash codes.

[5] Szegedy et al. presented a deep CNN architecture, Inception that achieved the state-of-the-art performance for query description and image detection tasks in the ImageNet dataset. The primary indicator of this model is the effective use of computing resources in the network.

II. METHODOLOGY

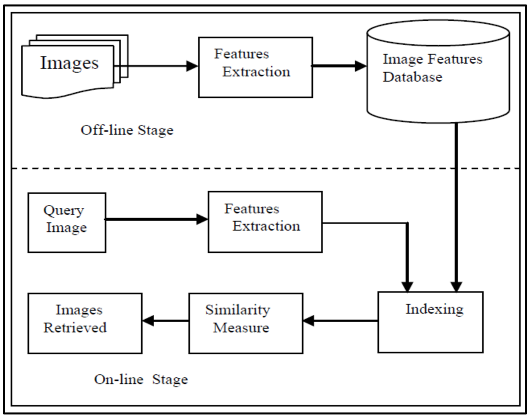

Fig. 1 System Architecture

We utilize the Google search engine for our circadian queries like probing for study material, location, shopping, incipient, etc. Google is an astronomically immense search engine utilized by everyone today. But sometimes we couldn't find the exact result we are probing for because we don't know precisely what to probe and for that particular result. We waste a plethora of time scrolling for the impeccable result for our query. To surmount this issue we decided to work on this proposed system so that if a utilizer has any picture cognate to the query they can simply upload it to our search engine and he will get the exact result of that query within a minute. This image-predicated search engine will avail people to find their queries easily with less time consumption.

In this project, we are implementing a search engine with image-predicated retrieval. The project is made prosperously utilizing python programming and its libraries. Feature extraction is done here to extract the exact image from the dataset. Dataset used in this project is self-made and can be transmuted as per requisite and it has so much data to be retrieved. The modules used are as follows:

- PIL (Python Imaging Library)
- Feature Extractor
- Numpy
- Pathlib
- Flask
- DateTime

PIL:

The most important class in the Python Imaging Library is the image class, defined in the module with the same name. We can create instances of this class in several ways; either by loading images from files, processing other images, or creating images from scratch.

Feature Extractor:

Feature extraction is a type of dimensionality abbreviation where a sizably voluminous number of pixels of the image are efficiently represented in such a way that intriguing components of the image are captured efficiently.

Numpy:

NumPy is a Python library that provides a simple yet puissant data structure: the n-dimensional array. This is the substratum on which virtually all the potency of Python's data science toolkit is built.

Pathlib:

The pathlib is a Python module which provides an object API for working with files and directories. The pathlib is a standard module. Path is the core object to work with files.

Flask:

Flask is a popular Python web framework, betokening it is a third-party Python library utilized for developing web applications.

DateTime:

The datetime module supplies classes for manipulating dates and times. While date and time arithmetic is supported, the focus of the implementation is on efficient attribute extraction for output formatting and manipulation.

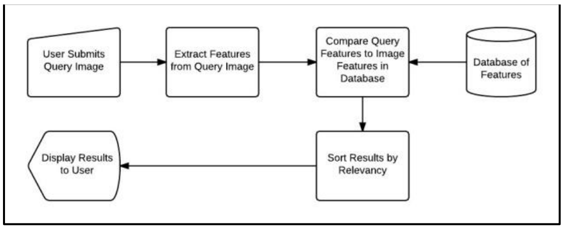
User Submits Query Image
Extract Features from Query Image
Compare Query Features to Image Features in Database
Database of Features
Sort Results by Relevancy
Display Results to User

Fig. 2 Feature extraction process

III. MODELING AND ANALYSIS

1. Colour Feature:

Color is taken into account united of the vital low-level visual options because the human eye will differentiate between visuals on the idea of color. The photographs of the real-world objects that area unit taken at intervals the vary of the human visual spectrum may be distinguished on the idea of variations in color. The colour feature is steady and hardly gets laid low with the image translation, scale, and rotation. Through the utilization of a dominant color descriptor (DCD), the color info of the image may be replaced by atiny low quantity of representing colours. DCD is taken from the MPEG-7 color descriptors and uses a good, compact, and intuitive format to narrate the indicative color distribution and have. Shao et al. bestowed a completely unique approach for CBIR that supported the MPEG-7 descriptor. Eight dominant colours from every image area unit selected, options area unit measured by the bar graph intersection algorithmic rule, and similarity computation complexity is simplified by this.

2. Shape features extraction:

This is because the median filter only acts on a single color frequency. The Craig's formula for the conversion of RGB color image to gray scale image is shown below:

$$I_{gs} = \begin{bmatrix} I_r & I_g & I_b \end{bmatrix} * \begin{bmatrix} 0.2989 \\ 0.587 \\ 0.114 \end{bmatrix}$$

Where Igs denotes the combined 2D matrix while Ir.Ig.Ib entails the colour components that generate the coloured image whereas Igs is symbolized as the grey level combined image. Meanwhile, salt and pepper noise and speckle noise are reduced using the median filter.

3. Feature Extraction:

It is the process where features such as shape, texture, colour, etc. are used to describe the content of the image. The features further can be classified as low-level and high-level features. In this stage visual information is extracted from the image and saves them as features vectors in a features database .For each pixel, the image description is found in the form of feature value (or a set of value called a feature vector) by using the feature extraction.

4. Similarity Matching:

It is a process that entails the information about each image is stored in its feature vectors for computation process and these feature vectors are matched with the feature vectors of query image (the image to be search in the image database whether the same image is present or not or how many are similar kind images are exist or not) which helps in measuring the similarity. This step involves the matching of the above stated features to yield a result that is visually similar with the use of a similarity measure method called the Distance method. There are various distance methods available such as Euclidean distance, City Block Distance, and Canberra Distance.

5. Image pre-processing :

It is the process of improving the image in ways that increases the chances for success of the other processes. The image is first processed to extract the features, observe its contents. The processing involves filtering, normalization, segmentation, and object identification. Image segmentation is the process of dividing an image into multiple parts. The output of this stage is a set of significant regions and objects. Feature Extraction it is the process where features such as shape, texture, color, etc. are used to describe the content of the image. For each pixel, the image description is found in the form of feature value by using the feature extraction.

IV. RESULTS AND DISCUSSION

We have developed a system kindred to a google search engine and it is thoroughly predicated on image-predicated retrieval utilizing self-made datasets.

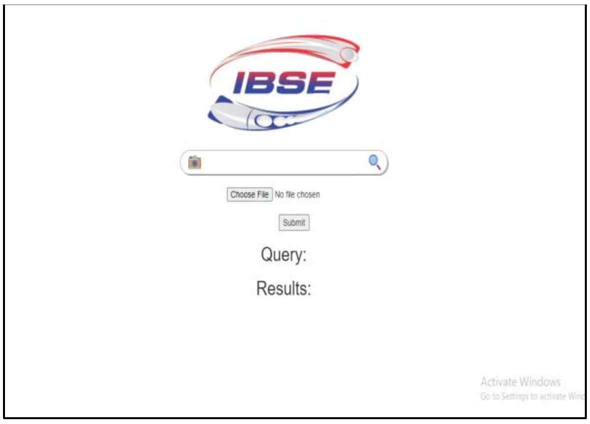
IBSE
Choose File No file chosen
Submit
Query:
Results:
Activate Windows
Go to Settings to activate Windows

Fig. 3 Main Web screen

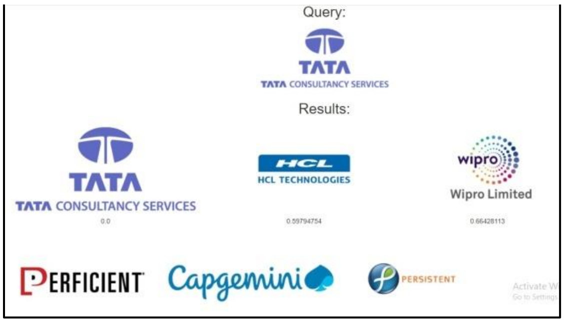

Fig. 4 Search query results

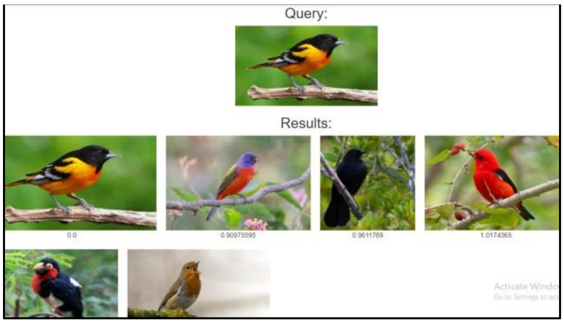

Fig. 5 Result Images

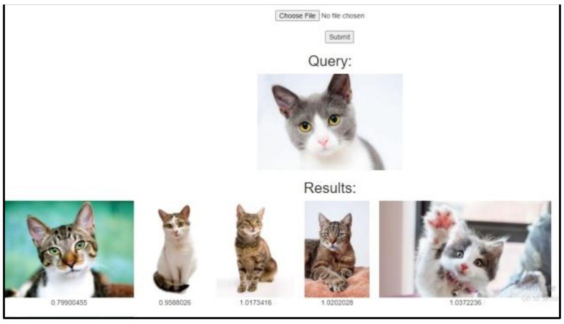

Fig. 6 Result Images

V. CONCLUSION

Successfully implemented and tested this method of image content extraction and results obtained are quite satisfactory. Using this type of a search engine where the image about which no information is available to the user is given as a query and corresponding information related to it is obtained, will definitely be helpful in taking us to the next level of advanced computing. A self-made dataset is used here to maintain the accuracy as there is no algorithm used in this project. The project is purely working on a self-made dataset and showing results using feature extraction. In the future we can expand this project by adding a 100% dataset with 100% accuracy of finding the similar images as with query images. The project is working on a local server provided by python coding. Furthermore, a global server to make this project live for everyone.

VI. REFERENCES

[1] "Sobel Image Edge Detection," Proceedings of Information Science & IT Education by O. Vincent, and O.F. in Conference 2019.

[2] "Refreshing Images in Web App," by D. R. V., Deepika K., Proceedings for International Conference on Control, Robotics and Cybernetics, October 2018.

[3] Daniella Stan. eID: A system for Exploration of Image Databases, phD thesis, Oakland University, 2020.

[4] "Pathfinder Networks for Content Based Image Retrieval Based on Automated Shape Feature discovery", 2012 by Aiyesha, Rishi, and I. Sethi.

[5] "WebSeer: An Image Search Engine for the WWW," by Michael J. Swain, Charles Frankel, Vassilis Athitsos at Technical Report TR96 -14, University of Chicago, July 2018.