International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 12 Dec 2021, pp: 1456-1462 www.ijaem.net ISSN: 2395-5252

An Implementation of Content Based Image Retrieval and Feature Extraction using Deep Learning

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Date of Submission: 15-12-2021 Revised: 27-12-2021 Date of Acceptance: 30-12-2021

ABSTRACT

Many applications related to digital data and digital media comprises of Multimedia content and its analysis is of that much important. During few years its complexity increase with images and increases exponentially since many digital platforms increase the use of social media platform to upload various types of images. And to search those content became a challenging task and open the way of exploration in this area. Many search engines make the use of retrieval of images from the traditional text based method which depends on the metadata. Whereas content based image retrieval system and its research analysis was continuously increases. In CBIR and image classification based models, high-level image visuals are represented in the form of feature vectors that consists of numerical values. And to fulfill this significant gap many research now focus on image retrieval with new ideas and concepts. So in this paper we try to implement the new method of image retrieval through classification of some features. To do so low level feature extraction models was used by using various machine learning and deep learning techniques

Keyword – Applications platforms image retrieval

I. INTRODUCTION

The use of digital cameras and image click from mobile phones increases and those images are also shared on large volume over internet and to search the relevant images from that database become the process of continuous improvement. The visual semantic relationship in terms of its feature became an important aspect for the parameter of search inserted by user through query. Many researchers make the use of text based search into their concept and required the need of caption in it. Sometime the text which was inserted by user may fails to match the feature of the image required. The main reason is the caption which was generated during the process of search makes it impossible to relate with the search. Automatic image annotations make the labeling of the images and classify the feature for the search. The main intension is to extract the feature related to detecting color, edges, texture and various shape in the image. To classify all those feature it become very essential to distinguish the image search with the related features.

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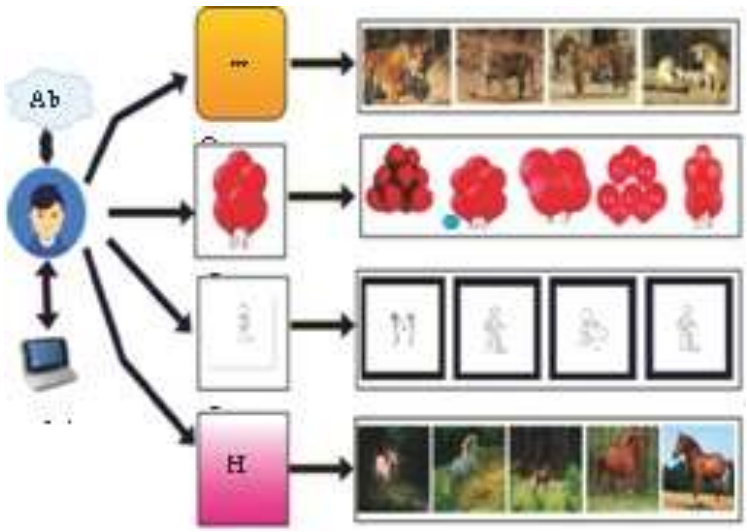

Fig 1: Pictorial representation of diff erent concepts of image retrieval

And the method of feature dimension had getting higher computational cost. But when the low level features are extracted then it become very easy to classify the image in terms of shape, size and texture.

II. LITERATURE SURVEY

Zhang et al. [27] presented a new approach to derive a complete set of pseudo-Zernike moment invariants. The link between pseudo-Zernike moments of the original image and the same shape but distinct orientation and scale images is formed first. An absolute set of scale and rotation invariants is obtained from this relationship. And this proposed technique proved to be better in performance in recognizing pattern over other techniques [27].

Guo et al. [28] proposed a new approach for indexing images based on the features extracted from the error dif- fusion block truncation coding (EDBTC). To originate image feature descriptor, two color quantizers and a bitmap image using vector quantization (VQ) are processed which are produced by EDBTC. For assessing the resemblance between the query image and the image in the database, two features Color Histogram Feature (CHF) and Bit Pattern Histogram Feature (BHF) are introduced. The CHF and BHF are calculated from the VQ-indexed color quantizer and VQ-indexed bitmap image, respectively. The distance evaluated from CHF and BHF can be used to assess the likeliness between the two images. Results obtained from the experiments show that the proposed scheme performs better than former BTC-based image indexing and other existing image retrieval schemes. The EDBTC has good ability for image compression as well as indexing images for CBIR [28].

Liu et al. [29] proposed a novel method for region-based image learning which utilizes a decision tree named DT-ST. Image segmentation and machine learning techniques are the base of this proposed technique. DT-ST controls the feature discretization problem which frequently occurs in contemporary decision tree learning algorithms by constructing semantic templates from low-level features for annotating the regions of an image. It presents a hybrid tree which is good for handling the noise and tree fragmentation problems and reduced the chances of misclassification. In semantic-based image retrieval, the user can query image through both labels and regions of images. Results obtained from the experiments conducted to check the eff ectiveness of the proposed technique reveal that this technique provides higher retrieval accuracy than the traditional CBIR techniques and the semantic gap between low- and high-level features is reduced to a significant level. The proposed technique performs well than the two eff ectively set decision tree induction algorithms ID3 and C4.5 in image semantic learning [29]. Islam et al. [30] presented a supreme color- based vector quantization algorithm that can automatically categorize the image components. The new algorithm effi- ciently holds the variable feature vector like the dominant color descriptors than the traditional vector quantization algorithm. This algorithm is accompanied by the novel splitting and stopping criterion. The number of clusters can be learned, and unnecessary overfragmentation of region clusters can be avoided

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by the algorithm through these criteria.

Jiexian et al. [31] presented a multiscale distance co- herence vector (MDCV) for CBIR. The purpose behind this is that diff erent shapes may have the same descriptor and distance coherence vector algorithm may not completely eliminate the noise. The proposed technique first uses the Gaussian function to develop the image contour curve. The proposed technique is invariant to diff erent operations like translation, rotation, and scaling transformation.

Papakostas et al. [32] performed their experiments on four datasets, namely, COIL, ORL, JAFFE, and TRIESCH I in order to show the discrimination power of the wavelet moments. These datasets are divided into 10, 40, 7, and 10 classes. For the evaluation of the proposed model (WMs), two diff erent configurations of wavelets WMS-1 and WMs-2 are used where the former uses cubic B-spline and the other uses the Mexican hat mother wavelets. By keeping only eff ective characteristics in feature selection approach greatly improves the classification capabilities of the wavelet moments. The performance of the proposed model is compared with Zernike, pseudo-Zernike, Fourier–Mellin, and Legen- dre and with two others by using 25, 50, 75, and 100 percent of the entire datasets, and each moment family behaves diff erently in each dataset. Classification performance of the moment descriptors shows the better results of the proposed model (wavelet Moments and moment invariants). For the evaluation of the proposed model (MSD) for image retrieval, Liu et al. [33] perform experiments on Corel datasets as there are no specific datasets for content-based image retrieval (CBIR). Corel-5000 and Corel-10000 are used with 15000 images, and HSV, RGB, and Lab color space are used to evaluate the retrieval performance.

III. ANALYSIS OF PROBLEM

In supervised learning of machine learning concept the labeling of data become implemented when the set of images are less in number. But when the images increases it become very difficult to do the process of labeling and by that way the proposed system classify the feature in terms of shape, texture and color pattern. The method to implement consisting of dataset which helps to categorized the image in terms of shape, texture and color and a process of model creation was done which then help to compare the query with the set of trained images and provide the result in an efficient way. CNN is used to create the model which makes it possible to create the relationship between the features of the image.

PROPOSED WORK

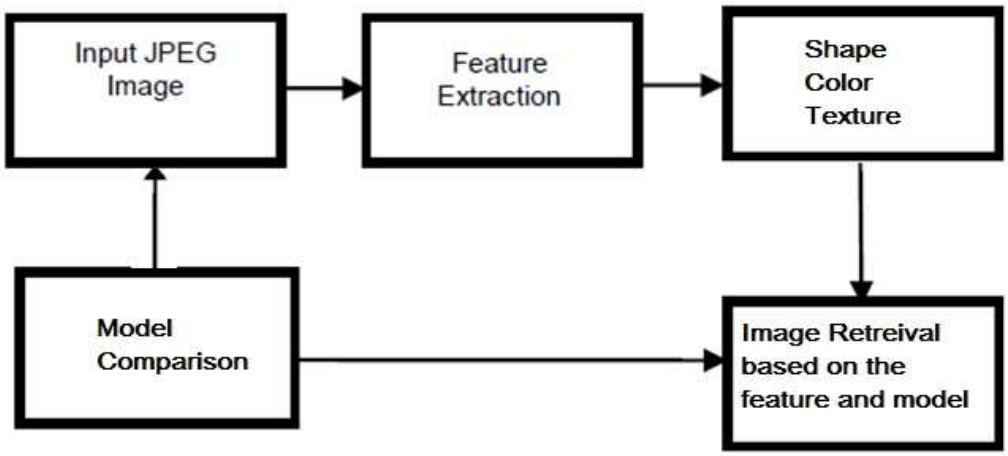

Fig.2 Feature Extraction from JPEG compressed image

From the above diagram it can be stated the process of the image retrieval using following steps

Step 1:
An image query was inserted into the system

Step 2:
Once the image inserted then it will classify the feature in accordance with shape, color and texture

Step 3:
This feature was extracted by suing C4.5 algorithm

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Step 4:
The extracted feature was compared with CNN model which was trained with some of the features available in the dataset

Step 5:
If the result matches with the extracted feature in the database then the image with highest accuracy will shown into the system after search

IV. RESULT

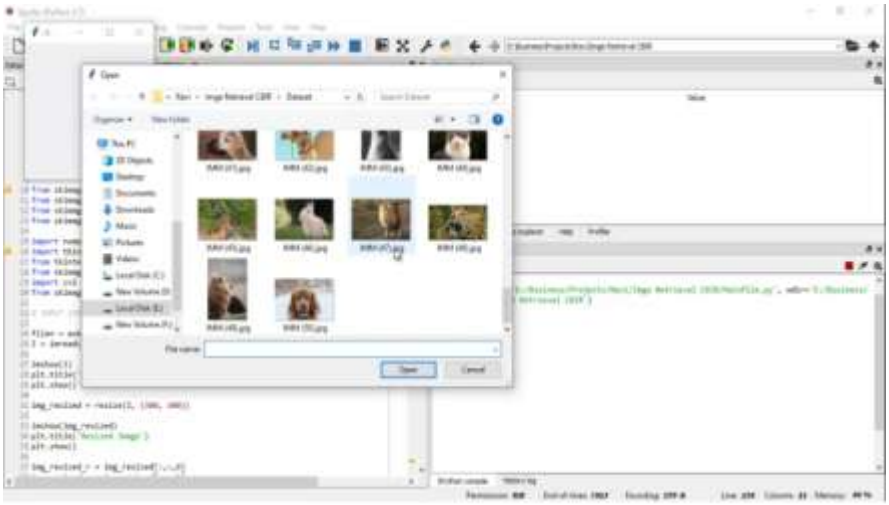

Fig.3 Selection of input

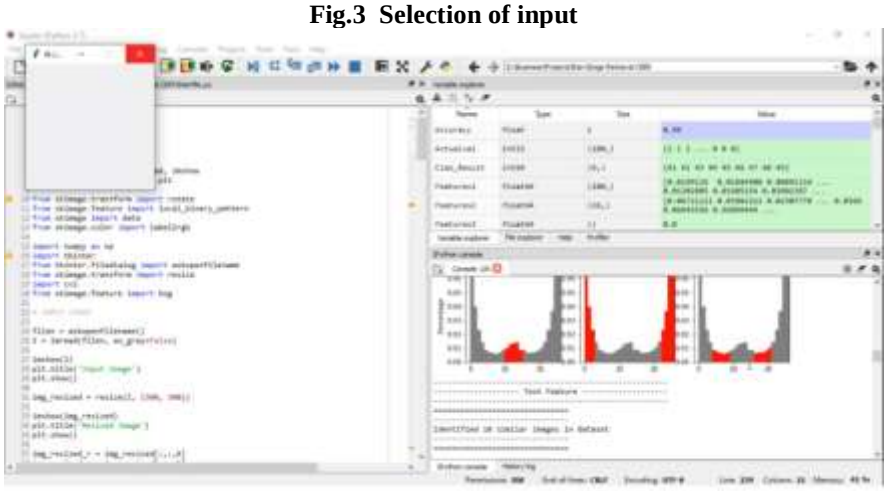

Fig. 4 Classification of feature of compressed image

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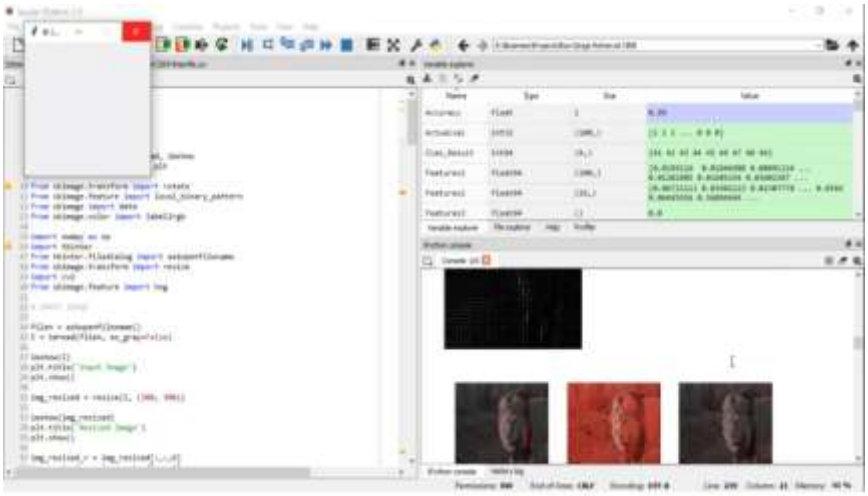

Fig. 5 Result of feature extraction

V. CONCLUSION AND FUTURE SCOPE

In this way the method of retrieval of image can be achieved by making the classification of feature of images such as color, texture and shapes. The main objective is to reduce the time of processing and helps to identify the correct image while retrieving. The research can extend the ork by classification the image in various other features and helps to increase the accuracy of the system. C4. 5 algorithm helps for the extraction of the image feature and model created through CNN helps to configured the image comparison with the query of the image.

Despite the different research methodologies in the past decade on image retreival, there is still scope of improvement in terms of semantic gap filling and retreival accuracy along with the reduced time. In this work, we have proposed novel methods for address-ing these issues and there is scope of extending the solution to the other multimedia domain including the video image retreival and graphical image processing. The idea can also be looked towards DWT based compressed images as used in JPEG 2000 coding standard. Also for semantic-aware retrieval, deep learning meth-ods like supervised or semi-supervised methods needs to be more tuned.

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