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Image Searching and Re-ranking using GBVS Technique

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Abstract: The main aim of the proposed system is use image click-through data, which can be viewed as the implicit feedback from users to overcome the intention gap, and further improve the image search performance. This paper presents a novel re-ranking approach, named spectral clustering re-ranking with click-based similarity and typicality using graph base visual saliencing technique (GBVST). The saliencing technique can be used to differentiate foreground and background region according to saliency distribution. To achieve an appropriate similarity dimension, we propose click-based multi-feature similarity learning algorithm. Then based on the learnt click-based image similarity measure, we organized spectral clustering to group visually and semantically similar images into same clusters. The final re-rank list by calculating click-based clusters typicality and within- clusters click-based image typicality in descending order. Our experiment improves the initial image search result.

Keywords: Image search, search re-ranking, saliencing technique, click base similarity, typicality.

I. INTRODUCTION

Thousands of images are uploaded to the internet with incredible growth of online social media and the fame of capture devices thus building satisfying image retrieval system is the key to improve user search experience. In order to advance search result, image search re-ranking, which adjusts the initial ranking orders by mining visual content or leveraging some auxiliary knowledge is proposed, and has been the focus of attention in both academia and industry in recent years.
In order to learn appropriate image similarity and typicality measurements, meanwhile explore the effects of click-through data to reduce intent gap, we proposed a novel image search re-ranking, named spectral clustering re-ranking with click-based similarity and typicality (SCCST). In image search re-ranking named spectral clustering re-ranking with clicked based similarity and typicality which use first use image click information to guide image similarity learning for multiple features, and then conduct spectral clustering to group visually and semantically similar images into clusters.

Finally obtain the re-ranking results by calculating click-based clusters typicality and within-clusters click based image typicality in descending order. In clicked base multi feature similarity learning uses click through data and multiple features simultaneously to learn image similarity. It increases the image search performance. To improve image classification result proposed re-ranking based image searching using graph base visual saliencing technique. Re-ranking provide proper image categorization. Saliency detection techniques can be used to differentiate the foreground and background regions according to the saliency distribution.

During the diffusion process, the image gradients in the salient regions are increased while those in non-salient regions are decreased. The background information are not preserved while the foreground information is preserved and important structures in the foreground are enhanced. The saliency driven multi-scale space of an image can be used to handle uncertain background information. An image is represented by the set of its multi-scale images after saliency driven nonlinear diffusion and the fusion of information from different scales. Then apply re-ranking. Saliency driven nonlinear multi-scale image representation has some advantages. In the nonlinear scale space, semantically important image structures are preserved at large scales, and the locations of the important image structures are not shifted after diffusion at any scale.

The following figure shows basic idea of image processing. The proposed system consist of collecting dataset, pre-processing, saliency map generation, feature extraction, and then classification of images and re-ranking methodthis paper is divided as follows: section II describes the related work; section III describes the proposed methodology section IV describes experimental result and conclusion in section V.

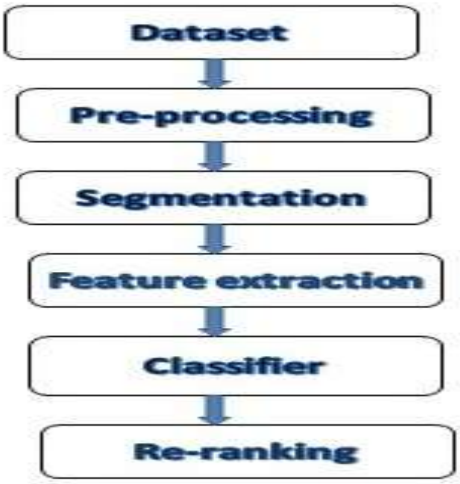

Fig : Basic pre-processing steps

II. LITERATURE SURVEY

YAUN LIU, TAO MEI, XIAN SHENG, MENG WANG: proposed an approach that estimate example of typicality without label information.Then presented a novel typicality base algorithm for image search re-ranking. It is fully unsupervised and automatic without any external knowledge. The experiment conduct on real word image data set .here visual search re-ranking algoritham is used. The svm classifier is used to classify the data.

Weiming Hu, Ruigung Hu, NianhuaXie, Haibin Ling, Stephen Maybank: the author present saliency driven multi scale nonlinear diffusion filtering by modifying the mathematical equation for nonlinear diffusion filtering. The saliency driven nonlinear multi scale space preserve and enhance information has been fused using weighted function of the distance between the image at different scale. The technique which is used in this paper are saliency nonlinear diffusion, vector quantization, feature extraction.

RadhakrishnaAchnanta, FranscioEsterda, Patrricawils: these author present novel re-ranking method of finding salient region in image using low level feature of colour and luminance which is easy to implement noise, noise tolerant and fast enough to be useful for real time application. It generate saliency map at same resolution as input image. The approach is to increase the effectiveness of method in detecting and segmenting salient region.

Jianwu, Zhiming Cui, Shengrong: this paper empiarically evaluated the performance in different situation such as scale and rotation change, blur change, illumination change and affine change. For the comparative study of sift and its variant the feature extraction technique is used.

III. PROPOSED METHODOLOGY

The proposed methodology contains the following flow of the diagram. The first step is image is given as input instead of text query. Then pre-processing technique used. The next step is using graph base visual saliencing. Then the feature extraction technique. Then classification using svm classifier and then applies re-ranking. All technique are describe briefly in below.

A. Image pre-processing:
The pre-processing technique is use to remove distortion or noise. We use median filter for the pre-processing
a.Median filter: It removes all type of noise. It averages the intensity of all neighbours pixel.It provides efficient noise reduction capability with considerable less blurring than any other filter. Hence we use median filter.

B. Saliency map generation using GBVS:
Saliency should be defined as the discriminativeness of features. Saliency maps contain information about where interesting information can be found in the image. These areas correspond to features considered as rare or informative, depending on the definition of saliency. High saliency regions correspond to objects or places they are most likely to be found, while lower saliency is associated to background.

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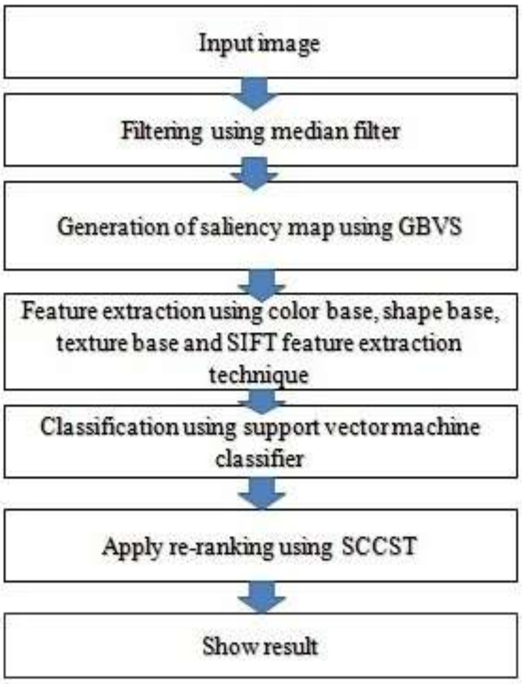

Fig 3.1: proposed technique

Graph-Based Visual Saliency (GBVS) is consists of two steps: first forming activation maps on certain feature channels, and then normalizing them in a way which highlights conspicuity and admits combination with other maps.
Graph Based Visual Saliency (GBVS) steps:
1. Compute raw feature map from input image.
2. Compute activation map from feature map.
3. Normalize activation map.
4. Average across map within each feature channels.
5. Divide each feature channel by number of maps in that channel.
6. Sum across feature channels.
7. Blur better result.
8. Save descriptive, rescaled

C. Feature extraction:
When we classify the image on the basis of input image needs to extract the features of input image. A feature is defined as capturing a certain visual property of an image. It is the main task in systems to retrieve the similar images from database similar to query image. In feature extraction, features such as colour, texture or shape from image are extracted and creates a feature vector for each image
a. Color: Color is the most important features that are easily familiar by humans in various images. Color features are the most widely used in CBIR systems. To take out the color features from an image, a color space and color feature extraction methods are required. The simplest method to represent colors in an image is to fill color histograms in which a count of the number of pixels of various colors is accumulated. The color base features are as follows.
b. HSV histogram: In HSV (or HSL, or HSB) space is extensively used in computer graphics and is a more perceptive way of telling color. Hue, Saturation, Value or HSV is a color representation that describes color (hue or tint) in terms of their shade (saturation or amount of gray) and their brightness (value or luminance). The hue is invariant to the changes in illumination and camera route and hence more suited for object retrieval.
c. Auto correlogram: The color auto correlogram only captures the spatial correlation between the same colors. It integrates the color information and the space information. For each pixel in the image, the auto-correlogram technique needs to go through all the neighbour of that pixel
d. Colormoment: Color moments are used to distinguish images based on their features of color. This moment is used to measure the color match between images. The basis of color moments lays in the statement that the division of color in an image can be interpreted as a probability distribution. If the color in an image follows a certain probability distribution, the moments of that distribution can then be used as features to recognize that image based on color. Three central moments of an images color distribution. They are mean, standard deviation and Skewness. A color can be

defined by 3 or more values (Red, Green, and Blue).Moments are designed for each of these channels in an image. The mean, variance and skewness color moments well-organized and useful in representing color distributions of images.

D. Shape:
In shape base feature the Gabor wavelet and wallet transform are used.
a. Gabor wavelet: A Gabor wavelet is linear filter used for boundary detection. Gabor wavelet is extensively adopted to extract texture from the images for retrieval and has been shown to be very capable. Gabor wavelets can be generally measured as orientation- and scale tannable edge and line detectors, and the statistics of these micro features are often used to describe texture information. Basically Gabor filters are a group of wavelets, with each wavelet capturing energy at an exact frequency and exact orientation. The scale and orientation tuneable property of Gabor filter makes it particularly useful for texture analysis. Among various wavelet bases, Gabor functions provide the best resolution in both the time and frequency domains, and the Gabor wavelet change seems to be the optimal basis to extract local features for several reasons.
b. Wavelet transform: Wavelet transforms are a mathematical means for performing signal investigation when signal frequency varies over time. For certain classes of signals and images, wavelet analysis provides more accurate information about signal data than other signal analysis techniques. The wavelet transform uses functions that are restricted in both the real and Fourier space.

E. SIFT Feature:
Scale Invariant Feature Transform (SIFT) features are features extracted from images to help in dependable matching between different views of the identical object. SIFT is an image local feature explanation algorithm based on scale-space. Due to its well-built matching ability, SIFT has many applications in different fields, such as image retrieval, image stitching, and machine vision. The extracted features are invariant to scale and orientation, and are extremely distinctive of the image. They are extracted in four steps. The first step calculates the locations of potential interest points in the image by detecting the maxima and minima of a set of Difference of Gaussian filters applied at dissimilar scales all over the image. Then, these locations are refined by removal points of low contrast. An orientation is then assigned to each key point based on local image features. Finally, a local feature descriptor is computed at each key point. This descriptor is based on the local image gradient, changed according to the orientation of the key point to provide orientation invariance. Every feature is a vector of dimension 128 distinctively identifying the zone around the key point.

F. Classification using SVM Classifier:
SVM classifier is a supervised machine learning algorithm which can be used for categorization or regression problems. It uses a technique called the kernel trick to change your data and then based on these transformations it findsan optimal boundary between the achievable outputs. In this SVM classifier used to classify images comparable to the input image before re-ranking.

G. Re-ranking of images:
For the re-ranking we use SCCST. In spectral clustering with click base similarity and typicality use image click through data to direct image similarity for multiple feature then conduct spectral clustering into group visually and semantically parallel image and finally obtained re-ranking by calculating clicked base cluster typicality and within cluster click based image typicality.

IV. EXPERIMENTAL RESULT

This research performs on search re-ranking scheme name spectral clustering re-ranking with click base similarity and typicality. We make use of color image as input. Then it pre-processes by some several technique of image processing and generate saliency map. The saliency map contains the interesting information which can be found in image. The result show the various saliency map fig generated at various scale.

Fig 4.1: input image

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Fig 4.2: Image after pre-processing

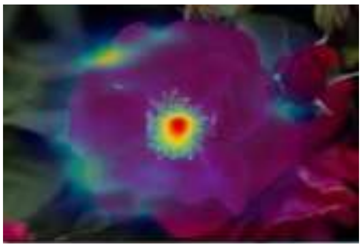

Fig 4.3:saliency map 1 after applyning blur at sacle 20%

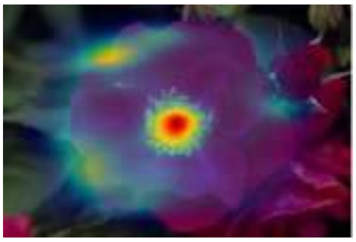

Fig 4.4: saliency map of image after applying blur at scale 40%

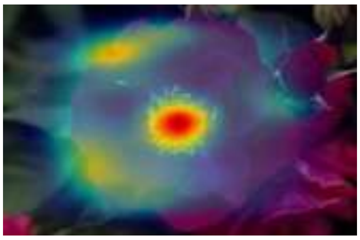

Fig 4.5: saliency map of image after applying blur at scale 60%

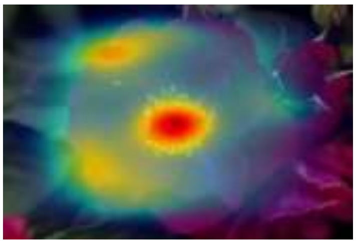

Fig 4.6: saliency map generation of image after applying blur at scale 80%

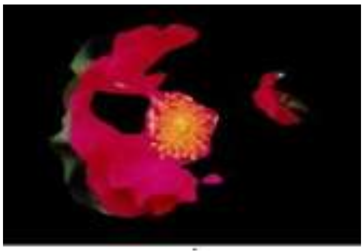

Fig 4.7: rescaled output from all the output images

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Fig 4.8(a): search result

Fig 4.8(b): search result

Fig 4.8(c): search result

The fig 4.1 is the input image which is to be given. Then fig 4.2 shows result image after preprocessing. For the preprocessing we use median filter. It removes the noise. Fig 4.3 is the image saliency map 1. In this we apply blur ratio 20%. Next fig 4.4 shows the saliency map 2 in which the blur ratio 40%. Then image 4.5 and 4.6 shows the saliency map 3 and saliency map 4 respectively in which we apply blur ratio 60% and 80%. The average rescaled output from all saliency maps is in fig 3.7. This shows the highly focused area. This image is used for finding the similar images by extracting the feature of only focused area. So less time require. This is the advantage of saliencing technique. Then fig 4.8 shows the similar images means the similarity output.

V. CONCLUSION

The system is to plan to improve the image search. We can use this system in any type of serarch engine and in smart phone. The saliencing technique is used to get the better search result in correspondence of the images. After applying saliencing technique we get rescaled outputThis output image used as input to get the similar images.The output images are visually and semantically similar. Further we can use spectral clustering with clicked base similarity and typicality algorithm.

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BIOGRAPHIES

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