Survey Paper on Sketch Based Image Retreival

Rejin Moncy A[1], Priya Sekhar S[2]

[1] *M.Tech student,Dept of CSE, Lourdes Matha College of Science and Technology ,Trivandrum,india*
[2] *Associate Professor,Dept of IT,Lourdes Matha College of Science and Technology ,Trivandrum,india*

Abstract - This survey paper reviews the sketch-based image retrieval system (SBIR).SBIR is one of the effective methods which are not need to have a high skill to draw the query sketch. Sketch based image retrieval (SBIR) is a relevant means of searching large image database.Sketch base communication is the earliest form of communication.In which sketch plots rough shape of object. Sketch-based image retrieval (SBIR) can therefore be a very important information search tool. Although sketch is good way to express people's thought. Here analyze each paper and find advantages and disadvantages.

Key words: SBIR, sketch, re-ranking,image retrieval.

I. INTRODUCTION

Sketch-based communication is the oldest form of writing. In which sketch depicts rough shape of object. Sketch-based image retrieval (SBIR) can therefore be a very valuable information search tool. Although sketch is good way to express people's thoughts, there is a large gap in the appearance of user sketches and photorealistic images, when people sketch, they usually focus on the main structure of an object and only draw the semantic contour boundary. In contrast, photo-realistic images contain the color, texture and detailed shape of an object, which makes it very difficult to directly match a sketch and the corresponding photo-realistic image. Therefore, this is fundamental challenge in SBIR.

A Sketch is swiftly accomplished freehand picture which serves various purposes, it might trace something that artist visualize, it might trace or increase an idea for later use or it might also be used as a rapid means of graphically representing an idea and an image. A sketch is rough or unfinished drawing, often made to assist in making a more finished picture. A style of painting that resembles photography in its meticulous attention to realistic detail. Although edge extraction can bridge the appearance gap between sketches and photo-realistic images to some extent, it is quite common for noisy edges from background clutter, object detail and texture to be extracted with the object shaping edges. These noisy edges usually widen the appearance gap and degrade retrieval performance. Therefore, retrieval performance can be enhanced if the impact of noisy edges is reduced. Retrieval performance of the human visual system is not sensitive to these noisy edges since humans are able to distinguish object boundaries or contours from noisy edges based on their inference ability.

Commercial image search engines, such as Google1, Yahoo2 and Bing3, usually index web images using textual information, such as images' titles, ALT text and surrounding texts on web pages. However, such text information may not describe the content of images. This fact can severely degrade the search performance of web images. Several approaches have been investigated to boost the performance of web image search. One approach is image annotation, which aims to associate several keywords to an image to describe its content based on machine learning and computer vision techniques. However, although great progress has been made in the past few years, automatic annotation of large-scale web images can still hardly achieve satisfactory performance due to the well-known semantic gap. Another approach is web image search re-ranking. Different from annotation that aims to enhance the text indexing of web images, re-ranking is applied to directly adjust search results by mining images visual content.

A sketch-based image retrieval often needs to optimize the tradeoff between efficiency and precision. Index structures are typically applied to large-scale databases to realize efficient retrievals. However, the performance can be affected by quantization errors. Moreover, the ambiguousness of user-provided examples may also degrade the performance, when compared with traditional image retrieval methods. Sketch-based image retrieval systems that preserve the index structure are challenging. So here propose an effective sketch-based image retrieval approach with re-ranking and relevance feedback schemes.

II. LITERATURE REVIEW

1.Shu Wang, Jian Zhang,Tony X. Han, and Zhenjiang Miao, "Sketch-Based Image Retrieval Through Hypothesis-Driven Object Boundary Selection With HLR Descriptor" in IEEE transaction on multimedia, Vol. 17, No. 7, July 2015[1].

The appearance gap between sketches and photo- realistic images is a fundamental challenge in sketch-based image retrieval (SBIR) systems. The existence of noisy edges on photo- realistic images is a key factor in the enlargement of the appearance gap and significantly degrades retrieval performance. To bridge the gap, we propose a framework consisting of a new line segment -based descriptor named histogram of line relationship (HLR) and a new noise impact reduction algorithm known as object boundary selection. HLR treats sketches and extracted edges of photo- realistic images as a series of piece-wise line segments and captures the relationship between them. Based on the HLR, the object boundary selection algorithm aims to reduce the impact of noisy edges by selecting the shaping edges that best correspond to the object boundaries. Multiple hypotheses are

National conference on Technology innovation in Mechatronics,Energy Management and Intelligent communication(NCTIMEMIC-2017)

International Journal of Advanced Scientific Technologies , Engineering and Management Sciences (IJASTEMS-ISSN: 2454-356X)   Volume.3,Special Issue.1,April.2017

generated for descriptors by hypothetical edge selection. The selection algorithm is formulated to find the best combination of hypotheses to maximize the retrieval score; a fast method is also proposed. To reduce the distraction of false matches in the scoring process, two constraints on spatial and coherent aspects was introduced. Here tested the HLR descriptor and the proposed framework on public datasets and a new image dataset of three million images, which recently collected for SBIR evaluation purposes. Compared the proposed HLR with state-of-the-art descriptors (SHoG, GF-HOG),The experimental results show that our HLR descriptor outperforms them. Combined with the object boundary selection algorithm, this framework significantly improves SBIR performance.

Advantages
- This method achieves significant performance improvement in SBIR.
- Merging of both the proactive and reactive scheme to work together helps to reduce the wastage of resources.

Disadvantages

- No provision for decrease the impact of quantization errors in the descriptor mapping procedure.

2. Furuya and R. Ohbuchi, "Visual saliency weighting and cross-domain manifold ranking for sketch-based image retrieval," in Proc. Int. Conf. Multimedia Modeling, 2014, pp. 37–49[2].

T. Furuya and R. Ohbuchi [2], it employs Visual Saliency Weighting (VSW) to suppress background clutter in images. The features extracted from edge images processed by VSW are compared against the feature of a sketch query by using the Cross-Domain Manifold Ranking (CDMR), a distance metric learning algorithm adept at comparing heterogeneous feature domains.

- Visual Saliency Weighting of edge image: It converts (2D) images in a database into saliency-weighted edge images for comparison with sketches. The algorithm first computes Canny edge image from the database image. Then, edges due to background clutters are suppressed by using Visual Saliency Weighting (VSW). Visual saliency map is computed by using the MRSD algorithm. The "background-ness" is propagated from image periphery at four sides of the image toward the center. The "foreground-ness" is propagated from the foreground regions over the graph of super pixel.
- Cross-Domain Manifold Ranking (CDMR): The CDMR consists of two stages; Cross-Domain Manifold (CDM) generation stage and relevance diffusion stage. In the CDM generation

A CDM matrix W is generated. W is a graph whose vertices are the features from a sketch domain and an image domain. The similarity w(i, j) is computed by using the equation after normalizing the distance d(i, j) of features i and j to range [0,1].

$$W(i,j) = exp(-d(i,j)/\sigma) \; if \; i{\neq}j$$
$$0 \quad otherwise$$

Advantages
- Combination of VSW and CDMR significantly improves retrieval accuracy.

Disadvantages
- Stroke noise such as disconnected lines makes the comparison difficult.
- CDMR is expensive to compute for a large database.

3. Miguelena Bada, A.M.; de Jesus Hoyos Rivera, G.; Marin Hernandez, A. "Garabato:A proposal of a sketch-based Image Retrieval system for the Web" Electronics,Communications and Computers (CONIELECOMP), International Conference. PAGES:183-188 DATE-26-28 FEB 2014[3].

Miguelena Bada, A.M.; de Jesus Hoyos Rivera, G.; Marin Hernandez, A.[3] presented A proposal for a queried-by-sketch image retrieval system is introduced as an alternative to text-based image search on the Web. The user will create a sketch as a query that will be matched with the edges extracted from natural images. The main challenge regarding

Edge detection for Content-based Image Retrieval consists in finding edges for larger regions and avoiding the ones Corresponding to textures. For this purpose, a combination of selective smoothing and color segmentation is applied prior edge extraction. An evolutionary algorithm is deployed to optimize the image-processing parameters. Similarity between the user´s sketch and the image's edges will be measured regarding two local aspects: spatial proximity and edge orientation. A full architecture for image search on the Web is proposed and preliminary results are reported using a trial database.

An architecture for a queried-by-sketch image retrieval system for the Web was proposed. Two essential modules were distinguished: salient edge extraction to establish a database and edge description and matching. Salient edge detection is addressed by an evolutionary algorithm to guarantee that an optimal solution will be searched for each image. In this way, the success of the salient edge detection is not conditioned by the characteristics of the image. This method proved to be effective for a collection of diverse images. To generate the descriptors we proposed a novel way to estimate the orientation of edges without using the gradient. The descriptors are used to compare the resulting salient edges with a sketch. Image search results of the implementation in low scale show that the proposed methodology is a viable way to search using a sketch query. Some improves can be make in the similarity measure as the orientation a location are only local characteristics. A next step is to create refinement methods according to structural characteristics of the curves and length of the matching lines. This will address result in better similarity measuring and partial matches will be ranked lower. In future implementations, the amount of images will be increased to prove scalability of the method as a requirement to develop a search engine for the Web.

National conference on Technology innovation in Mechatronics,Energy Management and Intelligent communication(NCTIMEMIC-2017)

International Journal of Advanced Scientific Technologies , Engineering and Management Sciences (IJASTEMS-ISSN: 2454-356X)   Volume.3,Special Issue.1,April.2017

Increasing the database will also result in a greater probability to obtain more similar images in the set of results.
Advantages

- This methodology is a viable way to search using a sketch query.

Disadvantages

- Amount of images will be less for develop a search engine for the web.
- Scalability will be decreased.

4. Fendarkar J. D., Gulve K. A. "*Utilizing Effective Way of Sketches for Content-based Image Retrieval System*" International Journal of Computer Applications Volume: 116 – No.: 15, pages: 23-28,April 2015[4].

Fendarkar J. D Gulve K. A. [4] System (CBIR) and sketch based image retrieval system (SBIR). In this paper, we present the problems and challenges concerned with the design and the creation of CBIR systems, which is based on a free hand sketch (i.e. SBIR). The use of the existing methods, describe a possible result, how to design and implement a task specific descriptor, which can handle the informational gap between a sketch a colored image to make an opportunity for the efficient search. The CBIR system first computes the similarity between the query and the images stored in the database.The development of content based image retrieval.

Two main aspects were taken into an account. The retrieval process has to be unconventional and highly interactive. The robustness of the technique is important in some scale of noise, which might also be in case of simple images. The drawn image without modifications cannot be compare with color image, or its edge representation. On the other hand a distance transform step was introduced. The simple smooth and edge detection based method was improved, which had a similar importance as the previous step. User can choose the relevant image to further process the query, and this process can be iterated many times until the user find the desired images. Also we can compare the different methods of feature matching sketch which one is better and check the effectiveness of the methods. Also we can create the mosaics of images. The goal is to develop a content-based associative search engine, which databases are available for anyone looking back to by hand drawing. The user has a drawing area, where he can draw all shapes and moments, which are predictable to occur in the given location and with a given size. The most important task is to bridge the information gap between the drawing and the picture, which is helped by own preprocessing renovation process. In system the iteration of the utilization process is possible, by the current results look again, thus raising the precision.
Advantages

- The method was highly accurate.

Disadvantages

- Output image efficiency is less.

5. Khobragade S., Nikose S., Shaikh M., "*Content Based Image Retrieval System Use for Similarity Analysis of Images*" International Journal of Computer Science and Information Technologies Vol.: 5 (2) pages: 1701-1704,2014[5].

Khobragade S., Nikose S., Shaikh M.[5] Content-based image retrieval (CBIR) is a digital image processing system . Available image search tools are based on a literal interpretation of the images. In these devices, the images manually annotated with keywords and then using text- based search tool . This method will not promising results . The goal of the visual features of CBIR is to extract and display the required image. Using SBIR this paper, issues and challenges concerned with the design and construction of CBIR systems is to applied .Results sketch – based system for users to use a clever device allows search queries. The technique of digital libraries , crime prevention , and photo sharing sites can be used in many applications . One possible application for a gallery of mug shot images matching a forensic sketch. In the field of image processing on a wide spectrum of functionality demanded the return of the query image based on the picture to view the content of this paper focus.
Content-based image retrieval systems and dynamic parameterized retrieval system implementation was compared. It was examined with the database. In our experience, in most cases, content -based image retrieval system was significantly better than text- based retrieval. However, the situation is not so simple. In the other case, the more detailed the better results can be achieved, while the edge histogram descriptor information primarily to poor sample viewed. Classification of response recovery is likely that a major decision was delivered to the user in the way, he can choose from more groups of words. Finally, we succeeded in large databases showing the contents of the image similarity.

Advantages

- It shows better efficiency,retrieval precision and compactness.
- Retrieval system is accurate and efficient.

Disadvantages
The adopted DoG interest point detector is relatively expensive to compute , which degrades the efficiency of edge –SIFT extraction.

REFERENCES

[1].Shu Wang, Jian Zhang,Tony X. Han, and Zhenjiang Miao, "Sketch-Based Image Retrieval Through Hypothesis-Driven Object Boundary Selection With HLR Descriptor" in IEEE transaction on multimedia, Vol. 17, No. 7, July 2015.

[2].Furuya and R. Ohbuchi, "Visual saliency weighting and cross-domain manifold ranking for sketch-based image retrieval," in Proc. Int. Conf. Multimedia Modeling, 2014, pp. 37–49.

[3].Miguelena Bada, A.M.; de Jesus Hoyos Rivera, G.; Marin Hernandez, A. "Garabato:A proposal of a sketch-based Image Retrieval system for the Web" Electronics,Communications and Computers (CONIELECOMP), International Conference. PAGES:183-188 DATE-26-28 FEB 2014.

[4].Fendarkar J. D., Gulve K. A. "Utilizing Effective Way of Sketches for Content-based Image Retrieval System" International

National conference on Technology innovation in Mechatronics,Energy Management and Intelligent communication(NCTIMEMIC-2017)

International Journal of Advanced Scientific Technologies , Engineering and Management Sciences (IJASTEMS-ISSN: 2454-356X)   Volume.3,Special Issue.1,April.2017

Journal of Computer Applications Volume: 116 – No.: 15, pages: 23-28,April 2015.

[5].Khobragade S., Nikose S., Shaikh M., "Content Based Image Retrieval System Use for Similarity Analysis of Images" International Journal of Computer Science and Information Technologies Vol.: 5 (2) pages: 1701-1704,2014

[6].Xueming Qian, Member, IEEE, Xianglong Tan, Yuting Zhang, Richang Hong, Member, IEEE, and Meng Wang, Member, IEEE," Enhancing Sketch-Based Image Retrieval by Re-Ranking and Relevance Feedback", IEEE transactions on image processing , vol. 25, no. 1,January 2016.