

A Survey On Sketch Based Image Retrieval Technique

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ABSTRACT

Recently, content based image retrieval is becoming a way of fast retrieval. Users are not satisfied with the usual information retrieval techniques. Retrieving the relevant information from keywords is very major task and this technique has been focused by researchers in many ways. Sketch is more natural and informative, that breaking down the language barrier and one of the strong media for communication in old era as well as in current scenarios. Hence currently sketch based image retrieval (SBIR) is also in focus for research purpose. Existing system descriptor SBIR is derived from two classic descriptor namely, SHoG and GF-HOG. This descriptor used to capture pixel-level features from image patches. It is very difficult task to isolate the features those are corresponds to certain edges from whole patches. Whereas, a line-based descriptor is highly adorable to tone down the impact of noisy edges but it suffers from noise problem. For effectiveness of SBIR it is mandatory to describe lines and their relationships, rather than describing image patches. For that matter some latest techniques should be discovered that attains the smart way of sketch matching with photo realistic images. Here based on review and research, histogram of line relationship (HLR) descriptor is having good hopes. A good object boundary selection algorithm and HLR and some other processes should be discovered so that work can be carried out on reducing the impact of noisy edges by selecting the shaping edges that best correspond to the object boundaries.

Keywords: Large-scale sketch region, HLR, SBIR.

1.Introduction

Relatively, sketch based systems are new area in modeling. Sketches mainly combines gestures, postures and some geographical information related to particular object. It depicts rough shapes of an object to provide the conceptual idea behind that object. Previously, peoples were communicating with the help of sketches. Communicating via sketches is more informative way to break the barrier between different languages. Existing system generates 3D effects from 2D for effectively retrieving the information [4], [5]. It simply creates an orthogonal view of an image. Sketch-based image retrieval is very precious tool for information searching. It acts as supporting tool for keywords-based search. SBIR system is more popular with use of smart phones and tablet's. Though SBIR is more effective way of information retrieval, it suffers from many problems such as, in existing SBIR systems, there is a large gap in the appearance of user sketches and photorealistic images, as photorealistic images having color, texture and detailed shape of an object whereas, sketch only contains rough pictorial shapes without having color and detailed shape of an object. Therefore, it is difficult to match particular drew sketches with photorealistic image [2]. For large scale sketch based image retrieval tensor based image descriptor was used. It helps to find a single vector which is closest to the parallel direction of the majority of the edges in a local region [7]. Practically, it is not efficient technique for image information retrieval. SHoG and GF-HOG, descriptors are classical descriptors that are designed for Structure Tensor in which sketches edges are treated as set of points. It helps to designed pixel-level features from image patches. This suffers from the problem of isolating the features that related to certain edges from the whole patch feature vector which aims to have an impact of noisy edges. In recent work, line segment-based representation motivates improving the performance under offline transform of image database system,

descriptor used in this only captures the relationship between two connected that are relatively closed to each other line segments. Their result of this system is based on key information [20].

In the study of HLR Descriptor we note that, it is deployed on each line segment which tends to bridge the gap between sketches and photo-realistic images. Also it determined each lines or edges of image rather than image patches. In the study of previously existed algorithm, we determined that Object boundary selection algorithm more efficient to reduce the noisy edges impact and it also identifies false matches that could aims to degrade the retrieval performance.

2 Literature Survey:

Shu Wang, Jian Zhang, Tony X. Han, and Zhenjiang Miao [1] proposed a systematic approach to overcome the appearance gap for SBIR. In this paper, sketches and extracted edges are treated as set of line segments, laying the foundation for better sketch edge description and noise impact reduction from a new angle. Object boundary selection algorithm is used to reduce the impact of noisy edges. In this paper, spatial constraint and coherent constraint are proposed to filter the false matches that degrade retrieval performance.

K. Bozas and E. Izquierdo[2], identified similarities between a hand drawn sketch and the natural images in a database. They used voting process to detect duplicate shape and structure patches. Local Sensitive Hashing technique is well suited for estimating the similarity between sets. In this system, impact of noisy edges in the image degrades the retrieval performance.

R. Zhou, L. Chen, and L. Zhang [3], proposes a sketch based algorithm for large scale image retrieval and practical prototype system is develop to search result from millions of images. Two candidate regions are used feature extraction, firstly orientation features are extracted and then these features are organized in a hierarchal way to generate global-to-local features. Therefore, hierarchical database index is structured and then image can be retrieved among large scale image database online. This system filters out a large number of irrelevant images quickly.

M. Eitz, K. Hildebrand, T. Boubekeur, M. Alexa[4] and R. Hu and J. Collomosse[5], defined general benchmark for evaluating the performance of any SBIR system. For matching pictures SBIR system uses the information contained in the designed 3D shape. M. Eitz, K. Hildebrand, T. Boubekeur *et al.*, introduces Spark feature for specialized SBIR in a Bag of Visual Words (BoVW) framework, GF-HOG is an image descriptor suitable for Sketch based Image Retrieval (SBIR). It treats sketches edges as a set of points, rather than describing image patches, describe lines and their relationships to extract image from dataset. It is much slower patch correlation based approach of Self-Similarity.

M. Eitz, K. Hildebrand *et al.* [6] and P.Sousa *et al.*[7] developed a tensor based image descriptor for large scale sketch based image retrieval. Tensor based image descriptor helps to find a single vector which is closest to the parallel direction of the majority of the edges in a local region. Whereas, Sousa *et al.* used topological information to retrieve vector drawings and geometric information is used for shape matching. Final impact of experimental result is very small and also there is need of improvement in geometric filtering.

R. Hu, T. Wang, J. Collomosse[8] and T. Menp and M. Pietikinen, J. Bigun and T. Gustavsson, Eds[9], defined bag of regions to built a sketch based image retrieval system. This system encodes the salient shapes at various levels of details in the form of enclosed contours of regions. They proposed BoW framework that is based on GF-HOG, SIFT and SSIM descriptor to localize the sketched object within the retrieved image. T. Menp and M. Pietikinen, J. Bigun and T. Gustavsson, Eds proposed multi-resolution LBP. It is a powerful mechanism to measure image textures. It uses Gaussian low-pass filters for collecting texture information for the multi-scale LBP. There are certain limitations with this system are, sparse sampling and inability to cope with a large number of different local neighborhoods.

O. Chum, J. Philbin, J. Sivic, M. Isard, and A. Zisserman [10] and C. Ma, X. Yang, C. Zhang, X. Ruan., *et al.*[11], used bag-of-features model to built feature set for sketches. In this large dataset of sketches collected to evaluate human recognition, certain limitations with this system are meaning of certain features might be dependent on context in the sketch, quite consistent for certain types of sketches as it contains temporal information about sketch

data. Hand-drawn sketch based on stroke features are introduced by C. Ma, X. Yang, C. Zhang *et al.*, for maintaining structural information of visual words codebook is organized in a hierarchical tree.

P. Salembier and T. Sikora[12], MPEG-7 is the standard is introduced by *P. Salembier and T. Sikora*, in this paper authors provided large library of core description tools and a DDL for describing multimedia data. It is expanded by *Eitz et al.* and motivated by Y.L. Lin, C.Y. Huang, H.J. Wang, and then it helps to generate multi-view sub-queries. These queries are based on approximated 3D sketch model and utilized by HOG model. Expanded sub-queries help to retrieve multiview images.

Y. J. Lee, C. L. Zitnick, and M. F. Cohen [13] and C. L. Zitnick[14], introduced the system that dynamically producing shadows generated or extracted from thousands of images. This system retrieves related images in real time based on incomplete sketches by the user. Sketch-Based Image Retrieval is effective with comparison of a line drawing sketch and a 2D image. For the comparison of a query line drawing sketch, SBIR convert a 2D image into an edge image. It results into unnecessary edges due to background clutter in an image. Visual Saliency Weighting (VSW) converts an image into edge image and suppresses edges due to background clutters. VSW and the CDMR together significantly improve retrieval accuracy.

Y. Cao, C. Wang, L. Zhang, and L. Zhang[15], X. Sun, C. Wang, C. Xu, and L. Zhang [16] proposed index structure and the corresponding raw contour-based matching algorithm to calculate the similarity between a query of sketch and natural images, and make sketch-based image retrieval scalable to millions of images. A visual word described using a triple (x, y, θ) of the position x and θ . It enables a highly efficient inverted index structure and makes possible to build a real-time large-scale sketch-based image search system. It also tolerates local distortions of users' sketch inputs. Authors compensate the lack of position-invariant matching, as in a large-scale search system.

J. Philbin, M. Isard, J. Sivic, and A. Zisserman[17] and L. Zheng, S. Wang, W. Zhou, and Q. Tian[18], determined, transforming descriptors prior to clustering for boosting baseline retrieval method and can produce results using visual words. Multi-vocabulary merging is an effective method for visual matching. It explicitly estimates the matching strength of the indexed features in the intersection sets by preserving difference between those sets. In this image- and feature level similarity of images are merged from multiple sets of indexed features thus, it reduces the impact of vocabulary correlation.

J. Canny [19] proposed edge detectors for arbitrary edge profiles. Detection and localization criteria in a mathematical form are used for this. This method is proposed for generation of highly directional masks at several orientations, and their integration into a single description.

E. Shechtman and M. Iran[20] presents an approach to match the similarity between visual entities such as, images and videos. This similarity is based on matching internal self-similarities. "Local self-similarity descriptor" is used to capture internal geometric layouts of local self-similarities such as, color, edges, repetitive patterns and complex textures in images/videos.

3. CONCLUSIONS

In this paper, we review some previous systems of SBIR. In the review study we examine that these systems are suffering with the problems such as, in existing SBIR systems, there is a large gap in the appearance of user sketches and photorealistic images, problem of isolating the features that related to certain edges from the whole patch feature vector. In this study we also examined that line segment-based representation motivates to improve the performance under offline transform of image database system, in this descriptor only captures the relationship between two connected that are relatively closed to each other line segments[20]. Also we determine that, HLR Descriptor overcomes the problem of noisy edges present in sketches as it has ability to describe the sketches and their extracted edges. To the best of our knowledge we conclude that, HLR Descriptor with Object Boundary Selection algorithm is more efficient for retrieving the image information in less time.

4. REFERENCES

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