International Journal of Enhanced Research in Management & Computer Applications, ISSN: 2319-7471
Vol. 2 Issue 8, August-2013, pp: (14-17), Available online at: www.erpublications.com

An efficient implementation of content based image retrieval in image libraries using Fuzzy Sets for extra large data set

Amit Sur[1], Nilotpal Mrinal[2], Reetu Bhartee[3], Rakesh Roshan[4], Keshav Kishlay[5]
[125] Department of Information Technology, Bengal College of Engineering and Technology, Durgapur, India
[34]Department of Computer Science & Engg., Bengal College of Engineering and Technology, Durgapur, India

Abstract: Content Based Image Searching characterizes image by its contents. As the internet becomes more popular for getting knowledge users are not satisfied with the old method of searching on the basis of content of that image. In this Busy Life time has a vital importance all want to do their desired work in less time. In This paper, we developed an efficient algorithm for image searching based on content using fuzzy sets. We used Fuzzy Sets in This paper for performing Image searching very efficiently because traditional search is taking more time than a fuzzy based system.

Keywords: Image Database, Fuzzy Rule based System, Color Space and Image Retrieval.

Introduction

Human vision is the most advanced of all our senses and as such we gather majority of information from the real world by visual sense. As the diversity and size of digital image collections have grown exponentially, efficient image retrieval is becoming very important. Large image databases are difficult to browse with traditional text searches because the task of user based annotation become very time consuming, as the text often fails to convey the rich structure of images. That's why we implement a new technique to retrieve an image from large Data Set. We know that Fuzzy Methods are not a solution to all problems; they are useful in situations in which the concepts are vague. This is often the situation in computer vision. There is uncertainty in many aspects of image Processing and computer vision. Visual patterns are inherently ambiguous, image features are corrupted and distorted by the acquisition process and object definitions are not always crisp. Content Based means searching of Images on the basis Of their Content. Before Content Based Image Retrieval (CBIR) we were using a traditional method which wasn't an efficient method. That time it was impossible to search an image on the basis of their content that's why it took very much time in searching.

Fuzzy Rule Based Algorithm for Content Based Image Retrieval

When performing image understanding, we need to represent properties and attributes of image regions and spatial relations among regions. Fuzzy rule based systems are ideally suited for this purpose. For example, a usual rule in a rule-based scene understanding system could be:

IF brightness of a pixel is high
AND the granularity within a 3x3 window, centred in the pixel, is medium
THEN the pixel belongs to . . .

Terms as brightness, high, granularity and medium are intrinsically vague. Fuzzy set theory provides a natural mechanism to represent such vagueness effectively. Flexibility and power provided by fuzzy set theory for knowledge representation makes fuzzy rule-based systems very attractive, when compared with traditional rule-based systems. Furthermore, rule-based approaches must address the problem of conflict resolution when the preconditions for several (partially) conflicting rules are simultaneously satisfied. There are sophisticated control strategies to solve this problem in traditional systems. In contrast, with fuzzy rule-based classifier systems, problems such as these are attacked by manipulating certainty factors and/or firing strengths to combine the rules. In computer vision applications, membership fictions are not always subjective evaluations of vague concepts, but rather a means to model the uncertainty contained in The input information such as images and/or features extracted from images. Therefore, to get appropriate methods for membership function generations it is important that they formalize expert's knowledge and its uncertainty.

Content Based Image Retrieval

The earliest use of the term *content-based image retrieval* in the literature seems to have been by Kato [1992], to describe his experiments into automatic retrieval of images from a database by color and shape feature. The term has since been

widely used to describe the process of retrieving desired images from a large collection on the basis of features (such as color, texture and shape) that can be automatically extracted from the images themselves. The features used for retrieval can be either primitive or semantic, but the extraction process must be predominantly automatic. Retrieval of images by manually-assigned keywords is definitely not CBIR as the term is generally understood – even if the keywords describe image content. CBIR draws many of its methods from the field of image processing and computer vision, and is regarded by some as a subset of that field. It differs from these fields principally through its emphasis on the retrieval of images with desired characteristics from a collection of significant size. Image processing covers a much wider field, including image enhancement, compression, transmission, and interpretation. While there are grey areas (such as object recognition by feature analysis), the distinction between mainstream image analysis and CBIR is usually fairly clear-cut. An example may make this clear. Many police forces now use automatic face recognition systems. Such systems may be used in one of two ways. Firstly, the image in front of the camera may be compared with a single individual's database record to verify his or her identity. In this case, only two images are matched, a process few observers would call CBIR. Secondly, the entire database may be searched to find the most closely matching images. This is a genuine example of CBIR. The Main use of CBIR is in Web Search, Education, and Cultural Heritage.

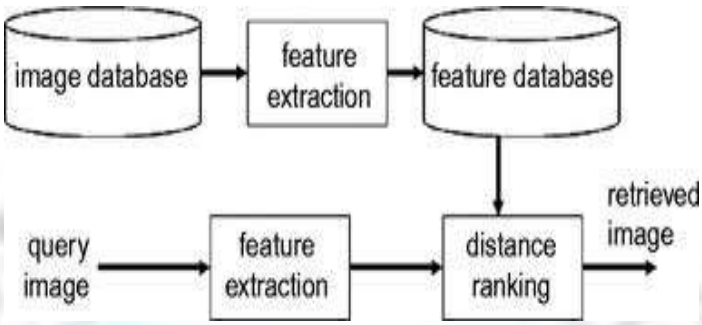

Figure 1: General Architecture Of Content Based Image Retrieval System

Software Architecture of This Paper

The Steps to make this system Successful is given below:

- First of all we have three options in our system Image Indexing, Add Image to Database and Search Image.
- Then we added Many Images into Database.
- After Addition of Images into Database we are capable to Search an image on the basis of their content or query. We have two options to search An Image First is Search Using Traditional search and second is search using Fuzzy Based Search. Traditional Search takes more time then Fuzzy Based Search.
- Then we get an interface on which we get Best Results according to our given query.

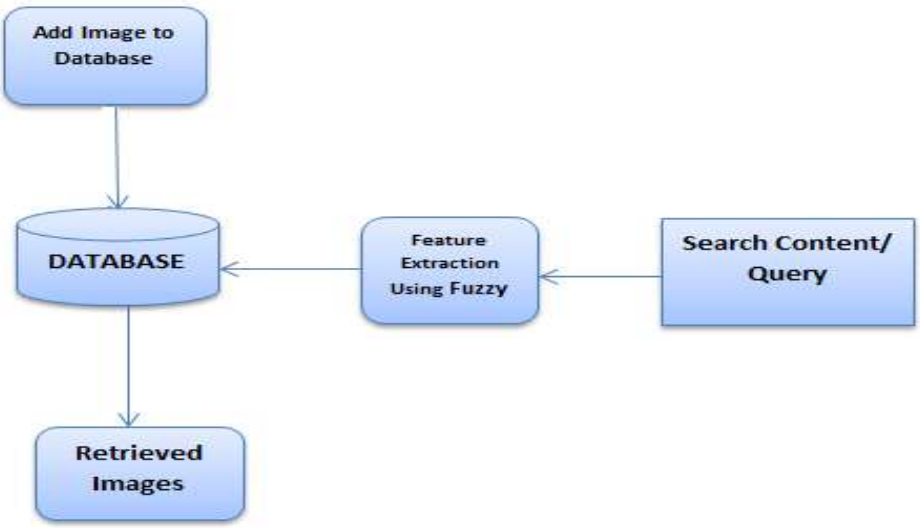

Figure 2: System Architecture of Our System

Results

Figure 3: Creating a New CBIR system

Figure 4: Adding New Images into Database

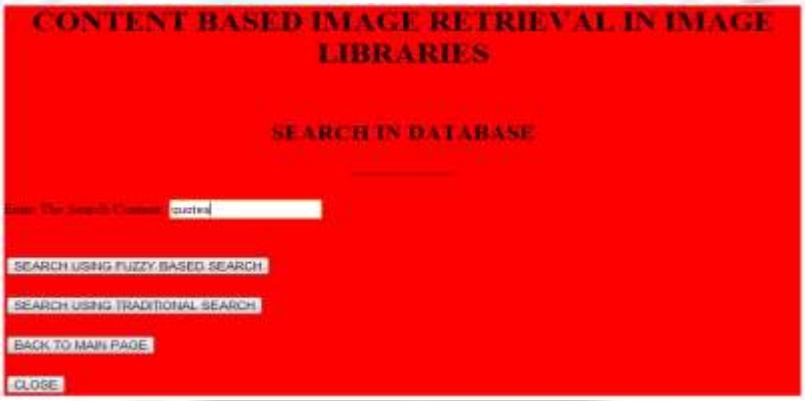

Figure 5: Searching Images from Database Using Contents of Image

Figure 5: Showing Best Results According To Given Contents

Conclusion

The present paper emphasizes on the design and development of an image searching system based on content. We have tried to generate a working solution to build up such a system and are successful in developing it. In this paper, the preliminary results show that the related image can be successfully found by using the algorithm from a large dataset. The present work is capable of finding all images from a large dataset on the basis of contents and it also shows the related images of that content. So this approach must be considered as an image searching system based on content using Fuzzy for time saving. Hence, we may conclude that Content Based Image Retrieval using fuzzy is the best approach to find images from large dataset in very few time.

Acknowledgement

The authors pay gratitude to "International Journal of Enhanced Research in Management & Computer Applications" and ER Publications, India for providing a wonderful platform to present their research work.

References

[1]. Sharma,N., Rawat, P., and Singh,J., "Efficient CBIR Using Color Histogram Processing, Signal & Image Processing", An International Journal(SIPIJ) Vol.2, No.1,(March 2011).
[2]. Ni L. and Leng H C, "Curvelet Transform and Its Application in Image Retrieval", 3rd International Symposium on Multispectral Image Processing and Pattern Recognition, Proceedings of SPIE, 5286, (2003).
[3]. Russ, J.C., "The image processing handbook", CRC Press, (1999).
[4]. Fuller, R., "On product-sum of triangular fuzzy numbers, Fuzzy Sets and Systems", Vol. 41, No. 1, pp. 83–87, (1991).
[5]. Y. Rui, T.S. Huang, M. Ortega, and S. Mehrotra, "Relevance feedback: A power tool for interactive content-based image retrieval," IEEE Trans. on Circuits and Video Technology, vol. 8, no. 5, pp. 644-655, 1998.
[6]. N. Vasconcelos and A. Lippman, "Learning from user feedback in image retrieval systems," Proc of NIPS'99, Denver, Colorado, 1999.
[7]. J. Laaksonen, M. Koskela, and E. Oja, "PicSom-self-organizing image retrieval with MPEG-7 content descriptions," IEEE Trans. on Neural Network, vol. 13, no. 4, pp. 841-853, July 2002.
[8]. S. F. Chang, A. Eleftheriadis and R. Mcclintock, "Next Generation Content Representation, Creation and Searching for New Media and Application in Education," in Proc. IEEE, vol.86, pp. 15-31, 1998.
[9]. J. R. Smith and S.-F. Chang, "VisualSEEK: A fully automated content-based image query system", In Proc. of the 4th ACM international Conference on Multimedia, 1996.
[10]. T.P. Hong, K.Y. Lin, and S.L. Wang, "Mining Fuzzy Generalized Association Rules from Quantitative Data under Fuzzy Taxonomic Structures," International Journal of Fuzzy Systems, Vol. 5, No. 4, 2003, 239-246.
[11]. A. K. Talukder, M. Kirley, and R. Buyya, Multi-Objective Differential Evolution for Scheduling Workflow Applications on Global Grids,‖ John Wiley and Sons, Ltd., DOI: 10.1002/cpe.1417.