ISSN:0975-9646



# Fuzzy Logic Based Texture, Queries for Image Retrieval System: An Analysis

Avdhesh Kumar Tiwari [1], Akash Awasthi [2],

*Research Scholar [1], Associate Professor[2]*
*[1][2]Department of CSE,Naraina Vidyapeeth Engineering & Management Institute, Kanpur, UttarPradesh*

***Abstract*** **In all the countries several organizations like Hospitals, Industries, Educational Institutes, Government Departments, Security and Research Agencies, etc are using various types of Image Processing Techniques liked authentication technique Biometrics Products, Citiscan, x-rays, ultrasounds, films, satellites communication and Traffic Control. In all these fields images are play very Curricles role. So the effective and efficient multimedia techniques are needed to store and retrieve these images fast and accurate. Images have many feature like Shape, Texture, Color etc which can extracted from any image can be store in the database. Tammura extraction technique is used to extract features from any image to make image database. A Novel Fuzzy Logic based CBIR System is proposed for the interpretation of texture based image query**

**Keywords :- Tamura Feature ,Fuzzy Clustering Algorithm, CBIR etc.**

## I. INTRODUCTION-

Recent years have seen an enormous increase in the number of images captured by digital cameras. The ease and convenience of capturing digital images and transmitting them between digital cameras and image databases is a contributing factor to the immense growth of image databases. These Databases having a wide range of applications, including military, environmental, astronomy, transportation, aviation, medical and multimedia. The storage format of the image data is relatively standardized; however, the effective retrieval of images from such databases remains a significant challenge. Automatic image-retrieval techniques are required for handling massive amounts of stored and exchanged image information. One of the main problems the researchers highlighted was the difficulty of locating a desired image in a large and varied collection. While it is perfectly feasible to identify a desired image from a small collection simply by browsing, more effective techniques are needed with collections containing thousands of items. Journalists requesting photographs of a particular type of event, designers looking for materials with a particular color or texture, and engineers looking for drawings of a particular type of part, all need some form of access by image content. Content-based image retrieval (CBIR) [12, 13] is an emerging research topic for multimedia databases and digital libraries. Since the number of images grows rapidly in today's digital archives and computer networks, effective techniques for finding images in a large repertory are urgently required. By content-based techniques, a user can query an image database by contents of interest, which may be colors, textures, shapes, and the spatial layout of target images.

## II. THE STUDY

**1.A Title:-** Heba Aboulmagd Ahmed, Neamat El Gayar, and Hoda Onsi, A New Approach in Content-Based Image Retrieval Using Fuzzy Logic, INFOS2008, March 27-29, 2008 Cairo-Egypt.

**The Work Done:** Exemplar Query, The user picks an image from the database, the system uses its graph to get the best ten matched images ordered by their similarity. The user can either choose to find the matched image with all attributes or to specify certain attributes to be matched (e.g.: find the similar image in label, Size and Spatial Relation). He can also weight each attribute according to his relevance/importance (e.g.: label is 3 times more important than other node attributes).Graphical Sketch Query, The user draws regions representing his image and specifies the attributes he wants for each region. The image is converted to a graph by representing each region by a node with the specified attributed for that region. The edge attribute is computed for each pair of nodes as specified one Edge attribute, which is Spatial Relation. The linguistic labels for this attribute are above, below, right, left, surrounded. The system uses this graph to get the most ten matched images from the database. Linguistic Query, The user expresses his query in words in a specific syntax (e.g.:" Big OR Medium ON Size AND High ON Contrast AND Cat ON Label above OR Left Road ON Label"). The following is the general syntax for the linguistic query:

**QUERY = { { OBJ}[{SR}{OBJ}[{QUERY}]]}**
**OBJ ={<Lik>[<AND|OR><Lil>] ON <Ai> [<AND|OR> <OBJ>]}**
**SR = {<Sk>[<AND|OR><Sl>]}**

**The Result :-** . In this system the image is represented by a Fuzzy Attributed Relational Graph (FARG) that describes each object in the image, its attributes and spatial relation. They proposed a new approach for graph matching that resemble the human thinking process.

**2.A Title-** S. Kulkarni and B. Verma, Fuzzy Logic based Texture Queries for CBIR, Proceedings of the Fifth International Conference on Computational Intelligence and

Multimedia Applications (ICCIMA'03) 0-7695-1957-1/03 © 2003.

**The Work Done:-** The texture database used to check the proposed technique consists of 96 different texture images. Each image is 512 x 512 pixels. Images D1 – D96 are from the Brodatz album. The collection of Brodatz textures consists of textures of both statistical and structural natures. Structural textures are considered to be consists of texture primitives which are repeated systematically within the texture. In statistical texture usually no repetitive texture can be identified. These are gray scale texture images that contain the texture of brick wall, wood grain, Woolen cloth, beach sand, lizard skin etc. The user can pose a query in terms of textual descriptors in natural language term and tamura feature such as fine coarseness and normal contrast.

**The Result :-** Tamura feature extraction technique is used to extract each texture feature of an image in the database. A term set on each Tamura feature is generated by a fuzzy clustering algorithm to pose a query in terms of natural language. The query can be expressed as a logic combination of natural language terms and Tamura feature values.

**3. A Title-** H.-C. Lin., C.-Y. Chiu and S.-N. Yang, Finding textures by textual descriptions, visual examples, and relevance feedbacks, Pattern Recognition Letters, 24(12):2255-2267, October 2003.

**The Work Done:-** Lin Star Texture contains two texture image databases. The first database (i.e., our Corel data base) contains 1570 192_128 texture images that are selected from Corel Gallery Collection. The second database (i.e., our VisTex database) is created as follows. First of all, we obtained 45 512_512 texture images from MIT VisTex. Foreach of the 45 images, 9 170_170 non-overlap sub-images were cropped into a group of relevant images. Consequently, we have a database that contains 405 170_170 texture images.

**The Result :-** . In this CBIR system, a user can submit textual descriptions and/or visual examples to find the desired textures. After the initial search, the user can give relevant and/or irrelevant examples to refine the query and improve the retrieval efficiency.

**4. A Title:-** H. Tamura, S. Mori and T. Yamawaki, Texture features corresponding to visual perception, IEEE Trans. Systems Man Cybernet. 8 (6), 1978, 460–473.

**The Work Done:-** The purpose of our experiments was to construct psychometric prototypes with which the computational measures could be compared. Thus in the psychological experiments, we did not use the real pictures from Brodatz's album but rather the digital versions. The human subjects consisted of 28 men and 20 women. Although a few people out of them were working in the picture processing field, nobody was concerned with this study. In advance of the experiments, a brief explanation of the basic concept of texture and the six specifications mentioned above was given to them (in Japanese, except for the names of features such as "coarseness-coarse versus fine "which were in English).

**The Result:-** In Result from H. Tamura, S. Mori and T. Yamawaki approximated six basic textural features, namely, coarseness, contrast, directionality, line likeness, regularity, and roughness. In comparison with psychological measurements for human subjects, the computational measures gave good correspondences in rank correlation of 16 typical texture patterns. Similarity measurements using these features were attempted.

**5. A Title: -** Nidhi Singhai,Prof. Shishir K.Shandilya A Survey On: Content Based Image Retrieval Systems, International Journal of Computer Applications (0975 – 8887) Volume 4 – No.2, July 2010.

**The Work Done: -** Support vector machines (SVM) are extensively used to learn from relevance feedback due to their capability of effectively tackling the above difficulties. However, the performances of SVM depend on the tuning of a number of parameters. It is a different approach based on the nearest neighbour paradigm. Each image is ranked according to a relevance score depending on nearest neighbor distances. This approach allows recalling a higher percentage of images with respect to SVM-based techniques there after quotient space granularity computing theory into image retrieval field, clarify the granularity thinking in image retrieval, and a novel image retrieval method is imported. Firstly, aiming at the Different behaviors under different granularities, obtain color features under different granularities, achieve different quotient spaces; secondly, do the attribute combination to the obtained quotient spaces according to the quotient space granularity combination principle; and then realize image retrieval using the combined attribute function.

**The Result: -** The purpose of this survey is to provide an overview of the functionality of content based image retrieval systems. Most systems use color and texture features, few systems use shape feature, and still less use layout features. Fuzzy logic has been used extensively in various areas to improve the performance of the system and to achieve better results in different applications. The fuzzy inference integrates various features perfectly in content based image retrieval system and reflects the user's subjective requirements, the experiments achieve good performance and demonstrate the efficiency and robustness of system.

## III RESULT & FINDING

After going through the above detailed study we find the following key result that plays a major role in any image Retrieval System. To study the fuzzy logic based texture queries we apply following technique.

**1:- The data :** That we acquire many type of images in various format.

**2:- Content-Based Image Retrieval:-**The CBIR define technique which uses visual contents to search image from

large scale image database according to users' interests. Images are matched based on the-Color, Texture, Shape.

**3:- Tamura Features:-**The tamura feature are designed in accordance with psychological studies on the human perception of texture. Coarseness, Contrast, Directionality.

**4:- Fuzzy Clustering Algorithm:-** Fuzzy c-means (FCM) is a method of clustering which allows one piece of data to belong to two or more clusters. This method developed to improve by frequently used in pattern recognition. It is based on minimization of the following objective function:

$$J_m = \sum_{i=1}^{N}\sum_{j=1}^{C} u_{ij}^{m} \left\| x_i - c_j \right\|^2 , \quad 1 \le m < \infty$$

where $m$ is any real number greater than 1, $u_{ij}$ is the degree of membership of $x_i$ in the cluster $j$, $x_i$ is the $i$th of d-dimensional measured data, $c_j$ is the d-dimension center of the cluster, and ||*|| is any norm expressing the similarity between any measured data and the center.

## IV CONCLUSIONS

Fuzzy logic for the interpretation of the texture queries for content-based image retrieval is proposed in this work. A user can submit visual examples to find the desired image from the database. In Tamura features, all six properties are visually meaningful so this texture representation becomes attractive in CBIR. This technique simplifies the similarity between the query image and the images in the database and works well for CBIR.A combined statistical and structural approach for texture description has been proposed. In feature attributes like shape, size can be added with this system, so that, more precise results can be generated.

## REFERENCES


[1] H. Tamura, S. Mori and T. Yamawaki, Texture features corresponding to visual perception, IEEE Trans. Systems Man Cybernet. 8 (6), 1978, 460–473.

[2] H.-C. Lin., C.-Y. Chiu and S.-N. Yang, Finding textures by textual descriptions, visual examples, and relevance feedbacks, Pattern Recognition Letters, 24(12):2255-2267, October 2003.

[3] C. W. Niblack, R. Barber, W. Equitz, M. D. Flickner, E. H. Glasman, D. Petkovic, P. Yanker, C. Faloutsos, and G. Taubin, QBIC project: querying images by content, using color, texture, and shape, Conference on Storage and Retrieval for Image and Video Databases, February 1993.

[4]J P. Eakins,"Automatic image content retrieval – are we getting anywhere?" Proceedings of Third International Conference on Electronic Library and Visual Information Research (ELVIRA3), De Montfort University, Milton Keynes, 1996, pp 123-135.

[5] C. Carson, S. Belongie, H. Grrenspan and J. Malik, Region-based Image Querying, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition, 1997, pp. 42-49.

[6] Swamp Medasani and Raghu Krishnapuram, A Fuzzy Approach to Content-Based Image Retrieval, 1999 IEEE International Fuzzy Systems Conference Proceedings, Seoul, Korea, August 22-25,1999.

[7] Dengsheng Zhang and Guojun Lu." Evaluation of similarity measurement for image retrieval."

[8] Chih-Yi Chiu, Hsin-Chih Lin, Shi-Nine Yam, a fuzzy logic CBIR system, The 12th IEEE International Conference on Fuzzy Systems,2003.

[9] S. Kulkarni and B. Verma, Fuzzy Logic based Texture Queries for CBIR, Proceedings of the Fifth International Conference on Computational Intelligence and Multimedia Applications (ICCIMA'03) 0-7695-1957-1/03 © 2003.

[10] Heba Aboulmagd Ahmed, Neamat El Gayar, and Hoda Onsi, A New Approach in Content-Based Image Retrieval Using Fuzzy Logic, INFOS2008, March 27-29, 2008 Cairo-Egypt.

[11] Nidhi Singhai,Prof. Shishir K.Shandilya A Survey On: Content Based Image Retrieval Systems, International Journal of Computer Applications (0975 – 8887) Volume 4 – No.2, July 2010.