

## Chapter 49

# A Comparative Study of Medical Image Retrieval Using Distance, Transform, Texture, and Shape

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### ABSTRACT

*Content-based medical image retrieval (CBMIR) is the application of computer vision techniques to the problem of medical image search in large databases. Three main techniques are applied to check the applicability. The first technique implemented is distance metrics-based retrieval. The second technique implemented is transform-based retrieval. The transform which has lesser performance is combined with higher performance, to check the applicability of the results. The third technique implemented is content-based medical image retrieval. Texture and shape-based retrieval techniques are also applied. Shape-based retrieval is processed using canny edge with the Otsu method. The multifeature-based technique is also applied and analyzed. The best retrieval rate is achieved by multifeature-based retrieval with 100/50%. Based on more relevant retrieved images all the three, brain, liver, and knee, images are found to be retrieved more with 100/50%.*

### INTRODUCTION

The various techniques of retrieval such as Distance metrics based retrieval, Transform based retrieval and Content based retrieval are introduced and applied in this article. It is often difficult to assess their performance since it usually depends on the chosen test images. But this has been handled well and justified by the retrieved results with the Observers' classification. CAD systems are distinguished into two main types and the research is especially focused on computer aided diagnosis (Gletsos, 2003). CAD

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(Computer Aided Diagnosis) provides automated interpretation of imaging examinations as a second opinion to radiologists (Depeursinge, 2011) .

## **RELATED WORK**

Although image retrieval have been frequently proposed for use in medical image management, only a few systems have been developed specifically for medical images Manjunath (1996); Shyu (1999); Smelders (2000); Shao Hong (2005); Dimitrovski (2015) and Van kitanovski (2017). Techniques applied for huge image based databases for exact clinical diagnosis with medical justification in this research is provided. A brief survey is given in Table 1.

*Table 1. Brief summary of the image feature descriptors used in medical domain*

S. No.	Year	Author	Title of the Paper	Comments
1	1999	Comaniciu D	Image guided decision support system for pathology	(a) Representation by color. (b)Using histogram.
2	2003	Gletsos M	A computer aided diagnostic system to characterize CT focal liver lesions: design and optimization of a neural network classifier	(a) Representation by gray scale. (b) Moments based.
3	1999	Shyu C R	ASSERT: A physician in the loop content based image retrieval system for HRCT image databases.	(a) Representation by gray scale (b) Texture Co-occurrence
4	2002	Kwak D.M	Content-based ultrasound image retrieval using a coarse to fine approach	(a) Representation by gray scale (b) Wavelet based
5	2005	Cauvin JM	Computer-assisted diagnosis system in digestive endoscopy	(a) Anatomic location, shape and color are the descriptors used (b) Block based
6	2007	Rahman M	A framework for medical image retrieval using machine learning and statistical similarity matching techniques with relevance feedback.	(a) Using edge histograms (b)By contours/curves
7	2000	Wang J Z	Pathfinder: multiresolution region –based searching for pathology images using IRM.	(a) By region and parts (b) By wavelet based region descriptors
8	2005	Pokrajac D	Applying spatial distribution analysis techniques to classification of 3-D medical images.	(a) By region and parts (b)Spatial distribution of ROI.
9	2007	Toews M	A statistical parts-based model of anatomical variability.	(a) By region and parts (b) By statistical anatomical parts model
10	2005	Qian X N	Optimal embedding for shape indexing in medical image databases.	(a) By point sets (b) By shape spaces

## **MATERIALS AND METHODS**

Computer-aided diagnosis helps in supporting clinical decision making (Shao Hong 2005). One clinical decision-making technique is case-based reasoning, which searches for previous, already-solved prob-

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