

Chapter 11

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%.

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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 (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.

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 problems similar to the current one and tries to apply those solutions to the current problem (Ceyhun Burak, 2011; Worrington & Smeulders, 2000).

For the satisfaction with the search results, have provided Observers' classification to the retrieval system, which contains a mechanism to learn the radiologists and physician information needs. The schema of the medical image retrieval system is shown in Figure 1.

An overview of the retrieval framework implemented with the identification of state-of-the art modules and methods for input data, feature extraction and query image processing is discussed in the Figure 2. Three approaches are implemented and followed for medical image retrieval. The first approach includes distance based medical image retrieval. The second approach includes transform based retrieval. The third approach is implemented using CBMIR. At the end of the chapter, presented best methods used to retrieve medical images. An analysis of the most

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