

An Image Mining Prototype to Achieve Medical Image Diagnosis with Effectiveness

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Today the medical image repository is mounting day by day with a vast collection of medical images like CT scans, ECT images, PET scans, MRI images and 3D renderings. This paper provides a framework for the analysis of these images with the aid of different paradigms or prototypes of image mining. The prototypes of image mining used here are image classification and image association rule mining. In this framework, the already categorized/classified medical images are first segmented to obtain spatial relationships between the anatomical structures present in the images. These patterns, consisting of the spatial relationship and category of the images, are then mined to obtain semantic association rules. The semantic association rules are further catalogued based on their interestingness measures. From those rules, a subset of Class Semantic Association Rules(CSAR) are further utilized in the process of classifying new medical images. The results and discussions of the experiments done prove that the prototypes of image mining have highly facilitated the analysis of medical images, and thus created a new evolutionary leap in the field of medical imagery through the gateway of image mining.

Keywords : Classification, Image Mining, Interestingness Measures, Semantic Association Rule Mining, Spatial Pattern.

1. INTRODUCTION

The incredible increase in the amount of image collection has led to the evolvement of image mining as a major field of data mining. Image mining deals with revealing significant patterns, and thereby knowledge from images. The glory of image mining lies in the fact that it explores image meanings, as per human perception and detects relevant patterns in images or association between numerous images. Image mining deals with the extraction of implicit knowledge, image data relationship or other patterns not explicitly stored in the image databases. It is an interdisciplinary endeavor that essentially draws upon proficiency in computer vision, image processing, image retrieval, data mining, machine learning, database and artificial intelligence [1].

Image mining had its initial applications in re-

motely sensed images. It is used to discover interesting patterns in satellite images, which are huge in number. Now-a-days, image mining has been extended to vast arena. The various types of image archives consist of satellite images, medical images and photographs. Image mining incorporates steps from computer vision, pattern recognition, artificial intelligence and of course, mining to discover the knowledge hidden in vast amount of unstructured, unorganised image data. The great leap in the fields of image mining has of course accelerated growth in related areas like pattern recognition, machine learning, artificial intelligence, Content Based Image Retrieval (CBIR) and so on.

Among these, the medical images are of various types like CT scans, ECT images, PET scans, MRI images, 3D renderings and so on. The repository of medical imagery is daily growing

age and the body part of the semantic association rule, hence the name CSAR- Classification based on Semantic Association Rule. Once a match occurs, the image is classified under the class attribute of the rule. It is evident from the results that the CSAR method outperforms the Bayesian Classifier. Future work involves improvement on the class attributes from the general attribute Abnormal to exact disease names.

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