



Image processing applications in medical field: a survey

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ABSTRACT

In recent years, image processing in the medical field has been used to recovery, rapid in identification disease and treatment of disease. In various disease, especially cancer, early diagnosis and proper treatment can increase prognosis and patient survival. So image processing, as a tool for decision support, can help doctors in early disease diagnosis and can be used as a simple and non-invasive method to identify cancer cells. The image processing means converting an image into digital image and applying some operations on it to extract useful information from it. The purposes of image processing are image improvement, pattern recognition and final diagnosis. The general steps in image processing are image acquisition, image retrieval, image preprocessing, image analysis and classification. In this paper, a number of recent developments in medical imaging are outlined.

Keywords: Image processing, medical field, Cancer detection, Diabetes detection, Glaucoma detection.

1. INTRODUCTION

In the early '60s, the field of image processing began with applying decisions on transmitted pictures of spacecraft Ranger 7 belongs to NASA by laboratory JetPropulsion. Since 1964, the field of image processing has great growth and numerous applications. In addition to space research, image processing techniques are widely used in astronomy, biology, geography and in different industries such as aerospace, packaging, printing, pharmaceutical, medical, electronic, food processing, steel, aluminum, copper and other industries [1, 2].

Image processing in the medical field can be considered as one of the most important applications of image processing because, in various disease, especially cancer, early diagnosis, and proper treatment can increase probability recovery and patient survival. Image processing, as a tool for decision support, can help the doctor in early disease diagnosis and it can be used as a simple and non-invasive way to identify cancer cells.

Medical imaging plays an important role in all phases of prediction, screening, detection, staging, treatment planning, treatment response, relapse and disease relief. In other words, the medical images have the potential to present functional, metabolic, structural and morphological information and they are helpful with the other tools in clinical decision-making. Imaging systems can be divided into groups such as X-ray procedures, radiography, CT Scan, MRI, nuclear medicine and UV methods. Made pictures with these methods cannot be used in row forms, so fast and extensive processes are done on them that generally involve image processing, extracting useful information, finding noteworthy positions, reconstructing images on a computer in three-dimensional, removing noise, assign color and generally improving the quality of the image.

In recent years, image processing in the medical field is used for disease diagnosis such as lung cancer, breast cancer, bone cancer, laryngeal cancer, and down syndrome. Due to the importance of image processing in the medical field, this paper aims to present details of image processing and its role in the medical field, investigating recently research and their achievements.

The rest of this paper is organized as follow: Section 2 include retinal image processing in the medical field and section 3 is cancer detection with image processing. Finally, section 4 is the conclusion of the paper.