Chapter 11
Segmentation of Spine Tumour Using K-Means and Active Contour and Feature Extraction Using GLCM

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ABSTRACT

MRI imaging technique is used to detect spine tumours. After getting the spine image through MRI scans calculation of area, size, and position of the spine tumour are important to give treatment for the patient. The earlier the tumour portion of the spine is detected using manual labeling. This is a challenging task for the radiologist, and also it is a time-consuming process. Manual labeling of the tumour is a tiring, tedious process for the radiologist. Accurate detection of tumour is important for the doctor because by knowing the position and the stage of the tumour, the doctor can decide the type of treatment for the patient. Next, important consideration in the detection of a tumour is earlier diagnosis of a tumour; this will improve the lifetime of the patient. Hence, a method which helps to segment the tumour region automatically is proposed. Most of the research work uses clustering techniques for segmentation. The research work used k-means clustering and active contour segmentation to find the tumour portion.

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INTRODUCTION

A spine tumour is abandoned growth of cells, which was found in the spinal cord. It grows uncontrollably. It may cancerous (Malignant) or non-cancerous (Benign). It may cause neurologic problems and in some cases it produces paralysis. It may occur in the region of the spine. The two types of tumour are primary and secondary. The primary tumour starts in the spinal cord and secondary spreads to another part of the spine. Based on the region of the spine it may occur in cervical, thoracic lumber and sacrum. Based on the location of the spine it may be classified into three types like Intradural-extramedullary, intramedullary and extradural. (Yezzi et al., 1997) The clear and accurate visual arrangements of an internal organ of our body have been generated using various medical imaging modalities like CT (Computed Tomography), MRI (Magnetic Resonance Imaging). This can be used to provide the internal organizations of bone and skin. The various diseases of the human body should be identified with the help of Medical imaging techniques. It can be used to generate an actual structure of the human body to detect the abnormalities. MRI, CT, Ultrasound, Positron Emission Tomography (PET), etc. were the different kinds of medical imaging techniques.

(Hai, S, Fuyong Xing & Lin Yang 2016) Demonstrates the various brain imaging techniques. For the CT images the tomography is the word, which originates from two Greek words like tomos and graphia. The word tomos represents slice or section and graphia represents the picture. From this, it will understand that CT provides the detailed structure of internal organ of the human body. CT utilizes X-rays to reproduce the internal organization of the human body. After CT imaging, the reconstruction of an image depends on the X-ray absorption profile.

One of the dynamic and flexible radio imaging technique was MRI. The technique uses electromagnetic radiation to acquire the internal structure of the human body. The abnormalities in the soft region were found by the invasive MRI imaging methods. The technology helps the physicians to find the abnormalities in chest, lungs, bones etc. Unlike X–ray MRI does not uses harmful radiation. During MRI imaging the human body aligns the hydrogen atoms of the body.

X-rays are electromagnetic waves which are used to provide useful information about the human body. The X-ray absorption profile will differ for every tissue. Dense tissue seems like white on CT film and soft tissue looks like gray. During CT imaging techniques the appearance of the Lungs is black because the hollow space within the lungs is filled with air. Unlike X-ray CT does not use the dangerous radiation, it affects the human body. CT is one of the best medical imaging technique and it helps to diagnose the diseases in various human body parts like Brain, Pelvis, Liver, Chest, Abdomen, and Spine etc. Hence the suggested method utilizes MRI Imaging Techniques to find tumour in the spinal cord.