

AN IMAGE REGISTRATION METHOD FOR HEAD CT AND MR IMAGING BASED ON OPTIMAL RETRIEVAL

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ABSTRACT. *Image registration is an important problem and a fundamental task in computer vision and image processing field. Recently, many image registration techniques are introduced such as PET with CT image and abnormalities can be easily detected by using image information. One of the multi modal images, CT and MR imaging of the head for diagnosis and surgical planning indicates that physicians and surgeons gain important information from these modalities. In radiotherapy planning, manual registration techniques are performed on MR and CT images of the brain. In general, physicians segment the volumes of interest (VOIs) from each set of slices on the MR and CT images manually. However, manual registration of the object may require several hours for analysis based on anatomical knowledge. In this paper, we describes a new method for automatic registration of head images which is obtained CT and MRI by using an optimal retrieval on neighbor VOIs in several extracted data and maximization of mutual information. In the experimental results, we can reduce the computational times. The primary objective of this study is to increase accuracy of the registration and reduce the computational processing time.*

Keywords: Image registration, Mutual information, CT, MRI

1. Introduction. During the last decades, various imaging equipments such as computed tomography (CT), ultrasound (US) and magnetic resonance imaging (MRI), have been introduced into medical fields. Especially, high resolution helical CT (HRCT) is one of the most useful diagnosis systems because it provides a high resolution image to medical doctors as a clear image. Radiologist can easily detect abnormalities by use of the clear images. However, they should spend a lot of time for visual screening than the past. Accordingly, many related image processing techniques have been proposed into medical fields for extraction of abnormal area [1-3].

Image registration is the most important problem and a fundamental task in medical image analysis, computer vision, etc. It is the process of superposing two or more images of the same image taken at different times. Medical doctor can analyze and detect the abnormality and register the image by use of human expert knowledge employing their anatomical knowledge even if it is a complex and difficult problem. In the medical image processing field, some image registration techniques are proposed to find a geometrical transformation that relates the points of an image to their corresponding points of another image. There are two types of the registration method which obtains same modality or different modality. In recent years, multi-modal image registration techniques are proposed for analyzing which obtained the different modal images. Especially, CT and