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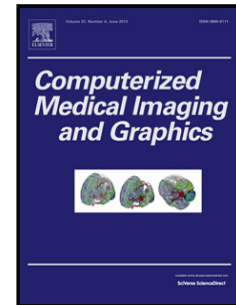
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Manuscript Title:

Case-control Comparison Brain Lesion Segmentation for Early Infarct Detection

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Computed Tomography (CT) images are widely used for the identification of abnormal brain tissues following infarct and hemorrhage of a stroke. The treatment of this medical condition mainly depends on doctors' experience. While manual lesion delineation by medical doctors is currently considered as the standard approach, it is time-consuming and dependent on each doctor's expertise and experience. In this study, a case-control comparison brain lesion segmentation (CCBLS) method is proposed to segment the region pertaining to brain injury by comparing the voxel intensity of CT images between control subjects and stroke patients. The method is able to segment the brain lesion from the stacked CT images automatically without prior knowledge of the location or the presence of the lesion. The aim is to reduce medical doctors' burden and assist them in making an accurate diagnosis. A case study with 300 sets of CT images from control subjects and stroke patients is conducted. Comparing with other existing methods, the outcome ascertains the effectiveness of the proposed method in detecting brain infarct of stroke patients.

Keywords:

Medical imaging processing; Brain lesion; Stroke; Biomedical engineering; Computerized support of stroke diagnosis.

1.0 Introduction

Stroke is one of the main causes of mortality [1][2][3]. At present, there are about 40,000 Malaysian citizens suffering from this disease every year. It is also known as a cerebrovascular insult (CVI), cerebrovascular accident (CVA), or brain attack [4]. It happens when a low blood supply to the brain occurs, which causes the death of brain cells. There are two major categories of stroke, namely ischemic and haemorrhagic. Haemorrhagic stroke is due to bleeding because of rupture of the blood vessels, while ischemic stroke is due to blockage of the blood vessels.

In comparison with Magnetic Resonance Imaging (MRI), Computed Tomography (CT) scan is more commonly used, due to its widespread accessibility and short image acquisition time. During an emergency, a CT scan without contrast agent injection is usually used to validate or exclude haemorrhage cases. Indeed, performing an immediate CT scan on suspected stroke patients is the most effective procedure in comparison with other strategies such as delayed imaging or optional scanning on selected patients [5].

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