Title : Evaluation of a Deep Learning Model for Skull Fracture Detection in Brain CT Scans: A Performance Assessment on an Independent Dataset

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ABSTRACT

This study evaluates the effectiveness of a deep learning model in detecting skull fractures from brain CT images. The model was developed using a dataset from Maharaj Nakorn Chiang Mai Hospital and tested on an independent dataset comprising 147 randomly selected patients with traumatic brain injuries admitted to Lampang Hospital between 2022 and 2024. The evaluation aimed to assess the model's performance on previously unseen data.

The model's diagnostic performance was measured using accuracy, precision, sensitivity, and specificity. Results showed a high sensitivity of 0.952, indicating its effectiveness in detecting skull fractures, while the specificity was 0.744. With an accuracy of 0.850, the model demonstrated strong predictive capability for both positive and negative cases. However, its precision of 0.759 suggests some misclassification in detecting depressed skull fractures.

Given these findings, the deep learning model shows promise as a screening tool for identifying skull fractures that require urgent surgical intervention. However, for optimal diagnosis and treatment planning, its use should be complemented by expert radiological assessment.

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