

Abstract 63 – Paper ID: 105**HemoSight: A Hybrid CNN and RAG Framework for Automated Intracranial Hemorrhage Detection and Report Generation**

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Abstract

In order to prevent fatal outcomes, intracranial haemorrhage (ICH), a potentially fatal medical condition marked by bleeding within the cranial vault, frequently necessitates prompt diagnosis and treatment. Conventional diagnosis techniques mainly depend on radiologists manually reviewing computed tomography (CT) scans, which can be laborious and prone to human error. This study introduces an AI-assisted diagnosis system that combines a Retrieval-Augmented Generation (RAG) module for comprehensive report generation with a Hybrid Convolutional Neural Network (CNN) for automated haemorrhage classification. Clinicians can upload CT images, get diagnostic predictions, and access structured medical reports thanks to the system's Flask-based web interface. The dataset consists of labelled CT images that have been divided into subtypes such as haematoma, left lateral ventricle haemorrhage, right lateral ventricle haemorrhage, brain middle haemorrhage, and non-hemorrhage cases. OpenCV and Pillow (PIL) are used for preprocessing in order to guarantee consistent greyscale input for the Hybrid CNN model. The RAG component creates contextual, medically relevant interpretations by utilising pre-trained language models. The suggested method provides an affordable and easily accessible diagnostic tool while achieving high classification accuracy and showing promise for integration into telemedicine and rural healthcare systems.

Keywords: Intracranial Hemorrhage (ICH), Hemorrhage Detection, Hybrid Convolutional Neural Networks (CNN), Deep Learning in Healthcare, Medical Image Analysis, Computed Tomography (CT) Scan, Radiological Diagnosis, Report Generation (RAG–Retrieval Augmented Generation), Flask Web Framework, MongoDB Database, Artificial Intelligence in Medicine, Telemedicine Applications, Computer-Aided Diagnosis (CAD), OpenCV and Image Preprocessing, Healthcare Chatbot