Automating Hemorrhage Detection: A CNN Approach

Abstract

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Brain hemorrhages are a critical medical emergency, contributing to a significant number of stroke-related deaths worldwide. Timely and accurate diagnosis is crucial but often hindered by the complexity and urgency of the situation. Our research aims to develop an advanced AI model to automatically detect and classify intracranial hemorrhages from CT scans. Leveraging a convolutional neural network (CNN) trained on a large, annotated dataset of medical images, our model is designed to identify various hemorrhage subtypes with high accuracy and robustness. We trained our model using 750k CT scans and optimized its performance through image preprocessing, dataset augmentation, and fine-tuning of the CNN architecture. Experimentation with various optimizers revealed AdamW to be optimal, achieving a test accuracy of 99%, validation accuracy of 100%, and loss of 0.59.

This study, supported by the Department of Computer Science within the School of Natural Sciences and Mathematics at Claflin University and under the expert guidance of Dr. Shrikant Pawar, demonstrates the transformative potential of integrating AI into healthcare systems. Our findings highlight advancements in medical research, education, and clinical practice, promising to significantly enhance patient care and outcomes.