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Brain Stroke Detection System Based on CT Image Using Deep Learning

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Abstract: *Stroke is recognized as one of the most critical medical conditions, leading to high rates of mortality and long-term disability worldwide. It occurs when the supply of blood to the brain is interrupted, either due to an obstruction in the vessels (ischemic stroke) or internal bleeding (hemorrhagic stroke). The consequences of stroke are often severe, including impaired mobility, loss of memory, and difficulties in performing daily activities. Early diagnosis and timely intervention are therefore essential to reduce fatality rates and improve recovery outcomes. However, conventional diagnostic tools such as CT scans and MRI, while effective, are often expensive, time-consuming, and dependent on advanced medical infrastructure. Limitations make them unsuitable for large-scale, real-time, and low- cost stroke detection, especially in developing regions.*

Presents a computer-aided stroke prediction model using advanced deep learning approaches. In this study, medical data were collected and preprocessed to design predictive models (CNN), DenseNet, and VGG-16 architectures. Each model was evaluated metrics like accuracy, precision, and execution speed, the study aimed to find the most efficient technique. The outcomes show that the CNN-based model consistently achieved better outcomes compared to DenseNet and VGG-16, demonstrating higher prediction accuracy and faster computation. By effectively learning complex patterns from patient data, the CNN model enables accurate identification of individuals at risk of stroke.

The proposed framework highlights the role of AI in modern healthcare, particularly in non-invasive and cost- effective disease prediction. It provides a decision-support system that can assist clinicians in early risk assessment and timely medical intervention, reducing the likelihood of fatal outcomes. To improve patient monitoring, minimize healthcare costs, and ultimately contribute to the global effort in combating stroke-related mortality and disability.

Keywords: Stroke Prediction, DL, (CNN), DenseNet, VGG-16, Machine Learning, Computer-Aided Diagnosis (CAD), Medical Imaging, Healthcare Analytics, Early Detection

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