

Advancing Kidney Disease Diagnosis Using Convolutional Neural Networks on Medical Imaging.

Author

Monoronjon Dutta

Md Atiqur Rahman

Md Shafikul Islam

Chonchal Khan

Abstract:

Kidney disease is a prominent worldwide health issue, and several imaging modalities are employed for detection. This study suggested using CT and MRI images with CNN-based transfer learning models incorporating an additive attention architecture called "KidNet24," which represents notable progress in healthcare systems. Applying various augmentation techniques such as rotation, zoom, and flip improves the model's efficiency. In addition, ablation research is conducted to determine the effects of several hyperparameters, such as batch size, learning rate, and optimizer, on the performance and stability of the model. The proposed model demonstrates exceptional accuracy, achieving a remarkable 0.9881% when tested on a dataset of 1,760 images and trained on a separate 9,996 images for validation. In addition, the model exhibited a precision of 0.9881%, a recall of 0.9880%, and an F1-score of 0.9880%. This inquiry emphasizes the capacity of recently popularized deep learning techniques to address difficulties in medical imaging, connecting them to more comprehensive applications in the area. This technique demonstrates superior efficacy compared to the recently developed model in accurately categorizing kidney disease.

2025 International Conference on Electrical, Computer and Communication Engineering, ECCE 2025

Conference Paper2025

ISBN:979-8-3503-5751-6

EID: 2-s2.0-105007711005

DOI: 10.1109/ECCE64574.2025.11013262

