

Neural Network Analysis of MRI Scans for FND Diagnosis

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Abstract

Functional Neurological Disorder (FND) currently lacks a definitive method of diagnosis, leading to an extremely high rate of misdiagnosis. The aim of this project was to address the question of improving diagnostic accuracy for FND by utilizing logistic regression models and neural networks, integrating patient MRI data and clinical history to differentiate FND from other neurological disorders. MRI scans were first pre-processed through noise reduction and feature engineering, and then used to train two types of models: logistic regression for general neurological disorder classification and a neural network specifically for FND diagnosis. The diagnostic performance was measured using the ROC AUC metric, with additional evaluation through accuracy, precision, recall, and the F1 score. By targeting the most relevant variables from the MRI data, both models demonstrated high efficacy, with the neural network showing a 92% accuracy rate in FND classification.

Keywords: diagnosis, Functional Neurological Disorder, logistic regression, MRI data scans, neural networks, receiver operating characteristic curves