Dementia Detection from Longitudinal Data: GRU-D with SHAP Interpretability

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Abstract:

Early and accurate detection of dementia, particularly Alzheimer's disease, is critical for timely intervention and improved patient outcomes. In this study, we propose a time-aware and interpretable machine learning framework for dementia detection using longitudinal clinical data from the OASIS-2 dataset. Our approach leverages the GRU-D model, a variant of gated recurrent units designed to handle multivariate time series with missing values—a common challenge in medical datasets. To enhance clinical trust and interpretability, we incorporate SHapley Additive exPlanations (SHAP), providing feature-level insights into the model's predictions.

Keywords:

Dementia, explainable AI, GRU-D, machine learning.