GraphNet Framework for Schizophrenia Classification Using Sensor Data

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ABSTRACT

A GraphNet framework is introduced for the classification of schizophrenia using sensor-based motor activity data, aimed at modelling behavioural patterns and discerning variations in movement activity between afflicted people and control participants. The goal is to employ a structured graph representation to show changes in temporal activity. The approach uses a graph to show activity patterns, with nodes representing extracted characteristics and edges showing how things change over time. This makes it easy to understand how behaviour evolves. Before being turned into graph inputs to capture both short-term and long-term dependencies, sensor data are pre-processed, standardized, and broken up into useful time periods. Feature representation makes it easier to see activity patterns and understand how behaviour changes. The learning process identifies both individual and relationship patterns within the data. The PSYKOSE dataset is used for evaluation, and stratified K-fold validation is applied. The model achieves an accuracy of 95.45%, precision of 100.00%, recall of 90.91%, and F1-score of 95.24%.

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1. INTRODUCTION

A severe mental condition, schizophrenia impairs thought, behaviour, and everyday functioning. Changes in mood, diminished social contact, and difficulties with everyday tasks are common. Continuous monitoring and early detection aid therapy and quality of life. Clinical observation, interviews, and rating scales dominate traditional diagnosis [1]. Time, expertise, and variation are needed for these procedures. Thus, objective and continual evaluation procedures are needed. Recently, sensor-based data has helped healthcare research. Smart watches and phones can track movement and activity over time. These signals reveal everyday behaviour, sleep, and exercise. Motor activity abnormalities in schizophrenia include erratic movement patterns and decreased activity. Studying these patterns helps explain behavioural variations between afflicted and healthy people. Sensor data offers continuous monitoring without bothering the user, making it suited for real-world applications [2].

Machine learning is commonly employed to examine such data. These algorithms extract characteristics and discover patterns from huge datasets. Many conventional methodologies handle data as isolated observations and ignore time step connections. Ignoring time-related correlations in real-world