

Research Proposal: Utilizing Graph Theory to Explore Brain Diseases

1. Title: Exploring the Applications of Graph Theory in Understanding and Diagnosing Brain Diseases

2. Introduction: Graph theory offers a powerful framework for modeling complex systems, making it a valuable tool in neuroscience. This research aims to investigate how graph theoretical concepts can enhance our understanding of brain network alterations associated with various brain diseases, including Alzheimer's disease, schizophrenia, and epilepsy. By applying graph-theoretic methods to neuroimaging data, we hope to identify biomarkers and develop novel diagnostic techniques.

3. Objectives:

- To analyze brain network topologies in patients with specific brain diseases using graph theoretical approaches.
- To identify significant alterations in network properties (e.g., connectivity, clustering, and centrality) in affected populations compared to healthy controls.
- To explore the potential of graph metrics as diagnostic tools or biomarkers for early detection of brain diseases.