**Title**

**Topological Interventions in Graphs for Improving Node Centrality and Ranks**

**Abstract**

In graph-structured data, the strategic modification of topology—particularly through the addition of edges—can significantly influence the centrality and ranking of nodes. This proposal explores methods to design purposeful topological interventions that promote or demote node prominence within a network. Recent advances in Graph Neural Networks (GNNs) and geometric deep learning provide promising tools for scalable and effective manipulation of graph structures to achieve desired ranking outcomes.

**Related Works**

**1. Efficient Node PageRank Improvement via Link-building using Geometric Deep Learning**

* This work presents a learning-based framework to optimize the addition of edges for maximizing a node's PageRank, tackling the NP-hard nature of link-building problems through geometric deep learning models.

**2. Inductive Graph Neural Networks for Node Centrality Approximation in Complex Networks**

* This paper introduces an inductive GNN approach capable of approximating node centrality measures such as closeness and betweenness in large-scale complex networks with high accuracy and scalability.

**3. Scaling Graph Neural Networks with Approximate PageRank**

* By leveraging personalized PageRank approximations, this study proposes a highly scalable GNN model that efficiently propagates information across large graphs, supporting fast and accurate node ranking.