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# Graph Prototypical Networks for Few-Shot Learning on Attributed Networks

Background Attributed networks provide high-impact data representation in many real-world complex systems, including social network analysis, financial fraud detection, and drug discovery. In these networks, users can be represented as nodes, which are classified based on the information available from the network. However, there are currently limited methods available to effectively label different node classes with higher accuracy and precision. Currently available approaches for this problem rely upon the availability of sufficient labels for different classes of nodes. In many real-world networks, a large portion of node classes only contain a limited number of labeled instances. This results in a long-tail distribution of node class labels, which results in low labeled instances for more than 30% of the classes (less than 10 each). Many practical applications require learning models to be able to effectively analyze these few-shot classes, where limited examples can be accessed. Invention Description Researchers at Arizona State University have developed a novel algorithm and system for graph few-shot learning. This algorithm uses a principled framework Graph Prototypical Network (GPN) which exploits graph neural networks and meta-learning to learn a powerful few-shot node classification model on attributed networks. This algorithm can be used for different downstream tasks, including node classification and anomaly detection. Potential Applications Attributed networks for: • Intrusion detection on traffic networks • Social network analysis • Financial fraud detection • Gene regulation • Drug discovery Benefits and Advantages • Leverages a small number of labeled anomalies for enforcing statistically significant deviations between abnormal and normal nodes on a network Related Publication: [Graph Prototypical Networks for Few-shot Learning on Attributed Networks](#)[Faculty Profile of Professor Huan Liu](#)

