COLLEGE OF ENGINEERING AND COMPUTER SCIENCE
FLORIDA ATLANTIC UNIVERSITY

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Min Shi

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"Multifaceted Embedding Learning for Networked Data and Systems"

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DEPARTMENT:
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ABSTRACT OF DISSERTATION
Network embedding learning is important for analyzing many real-world applications and systems, i.e., social networks, citation networks and communication networks. It targets at learning low-dimensional vector representations of nodes with preserved graph structure (e.g., link relations) and content (e.g., texts) information. The derived node representations can be directly applied in many downstream applications, including node classification, clustering and visualization. In addition to the complex network structures, nodes may have rich non-structure information such as labels and contents. Therefore, structure, label and content constitute different aspects of the entire network system that reflect node similarities from multiple complementary facets. This thesis focuses on multifaceted network embedding learning, which aims to efficiently incorporate distinct aspects of information such as node labels and node contents for cooperative low-dimensional representation learning together with node topology. Existing network embedding methods are mainly specialized in networks where each node on the network only has one single label and network nodes follow a balanced label (or class) distribution, which may fail to handle multi-label and class-imbalanced networks for effective representation learning. In addition, the strong assumption that network topology and node content have alignment similarities to explain relationships between nodes could also degrade the performance of existing methods, especially in situations where nodes have many irrelevant and/or missing links on the network. We propose to take above problem settings into account, aiming to achieve effective and robust embedding learning with preserved multifaceted node information. Furthermore, the proposed network embedding techniques are applied in more realistic Web service network systems by preserving multiple aspects of information such as service tags, text descriptions and link structures, demonstrating superior performance over state-of-the-art.

BIOGRAPHICAL SKETCH
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B.S., Yangtze University, Hubei, Jingzhou, China, 2014
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Published Papers:

Shi M, Tang Y, Zhu X, Wilson D, Liu J. "Multi-Class Imbalanced Graph Convolutional Network Learning", International Joint Conference on Artificial Intelligence (IJCAI), 2020. (Accepted)

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