PAGAE: Improving Graph Autoencoder by Dual Enhanced Adversary

Gongju Wang
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Mengyao Li
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Hanbin Feng
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Long Yan
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Yulun Song
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Yang Li
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Yinghao Song
China Unicom Digital Technology Co., Ltd., BEIJING, Beijing, China

Abstract

Autoencoder frameworks have received attention for graph embedding, particularly those utilizing generative adversarial networks (GAN). However, GAN-based frameworks do not fully utilize the original graph information and lack stable updates in the GAN component. To bridge this gap, we propose a dual-adversarial framework for graph embedding that expands mutual information (MI) in positive and negative samples for adversarial training using GAN. We further improve model performance by incorporating reinforcement learning ideas. Our framework includes two variants: a pessimistic adversarial graph autoencoder (PAGAE), and a pessimistic adversarial graph autoencoder with PO loss (PAGAEPO). Essentially, we present a pessimistic module to negative sample generator to boost original discriminator, thereby reinforcing the generator's ability. Additionally, we designed a PO loss function on discriminator to stabilize the learning process and it will further improve the ability of model. Experimental results show that our models are competitive with state-of-the-art GAEs on benchmark datasets.

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