UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

PAGAE: Improving Graph Autoencoder by Dual Enhanced Adversary

Permalink

https://escholarship.org/uc/item/90z6d255

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 45(45)

Authors

Wang, Gongju Li, Mengyao Feng, Hanbin <u>et al.</u>

Publication Date

2023

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at https://creativecommons.org/licenses/by/4.0/

Peer reviewed

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.

In M. Goldwater, F. K. Anggoro, B. K. Hayes, & D. C. Ong (Eds.), Proceedings of the 45th Annual Conference of the Cognitive Science Society. ©2023 The Author(s). This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY).