Dear Editor,

We are pleased to submit our manuscript entitled '*Empirical Analysis of Performance Bottlenecks in Graph Neural Network Training and Inference with GPUs'* for your consideration. Our manuscript is in the scope of performance bottleneck analysis of machine learning systems. We believe readers of *Neurocomputing* will be very interested in our work.

Graph neural network (GNN) has become a popular research area in the field of artificial intelligence due to the state-of-the-art performance achieved in graph-related applications. At the same time, various graph neural network systems/libraries have emerged. These systems/libraries have adopted different skills in implementation. However, there exists little work to discuss or analyze the performance bottleneck in GNN training and inference in depth.

In this study, we select typical graph neural networks by complexity of vertex/edge calculation for evaluation. We analyze the performance bottleneck by breaking down the training/inference time, evaluate the effects of hyper-parameters, verify the effectiveness of the sampling techniques, and explore the factors that affect the memory usage. We finally put forward some insights for efficient GNN training and inference. It will be interesting to researchers in the field of developing GNN systems.

We confirm that this work is original. It has not been published nor submitted simultaneously elsewhere. All authors have checked the manuscript and have agreed on the submission.

Thank you very much for your attention and consideration. We are looking forward to your reply.

Sincerely yours,

Rong Gu, Ph.D., Associate Researcher
Yihua Huang, Ph.D., Professor
Department of Computer Science and Technology, Nanjing University
No. 163 Xianlin Avenue, Nanjing, 210023, Jiangsu Province, China
E-mail: Rong Gu (gurong@nju.edu.cn), Yihua Huang (yhuang@nju.edu.cn)