Anticipating Trends and Innovations for A Sustainable Automotive Industrial Revolution

Krasini S[1] and H. Jayamangala[2]

PG Student, Department of Computer Applications[1]

Assistant Professor, Department of Computer Applications[2]

Vels Institute of Science Technology and Advanced Studies, Pallavaram, Chennai, India

22304159@vistas.ac.in and jayamangala.scs@velsuniv.ac.in

Abstract: *Graph classification aims to predict the label associated with a graph and is an important graph analytic task with widespread applications. Recently, graph neural networks (GNNs) have achieved state-of-the-art results on purely supervised graph classification by virtue of the powerful representation ability of neural networks. However, almost all of them ignore the fact that graph classification usually lacks reasonably sufficient labelled data in practical scenarios due to the inherent labelling difficulty caused by the high complexity of graph data. The existing semi-supervised GNNs typically focus on the task of node classification and are incapable of dealing with graph classification. To tackle the challenging but practically useful scenario, we propose a novel and general semi-supervised GNN framework for graph classification, which takes full advantage of a slight amount of labelled graphs and abundant unlabelled graph data. In our framework, we train two GNNs as complementary views for collaboratively learning high-quality classifiers using both labelled and unlabelled graphs. To further exploit the view itself, we constantly select pseudo-labelled graph examples with high confidence from its own view for enlarging the labelled graph dataset and enhancing predictions on graphs. Furthermore, the proposed framework is investigated on two specific implementation regimes with a few labelled graphs and the extremely few labelled graphs, respectively. Extensive experimental results demonstrate the effectiveness of our proposed semi-supervised GNN framework for graph classification on several benchmark datasets*

Keywords: automotive, graph classification, Graph Neural Network