Incremental Graph Pattern based Node Matching

Guohao Sun, Guanfeng Liu, Yan Wang, Mehmet A. Orgun
Department of Computing, Macquarie University, Sydney, NSW 2109, Australia
guohao.sun@students.mq.edu.au; {guanfeng.liu, yan.wang, mehmet.orgun}@mq.edu.au

Background
Graph Pattern based Node Matching (GPNM) is to find all the patterns in a data graph\( G_d \) based on a given pattern graph \( G_p \). GPNM has become increasingly important in many applications, e.g., group finding and expert recommendation.

Methodology

Step 1: Input the \( G_p \) and the node matching result \( N_{UI} \).
Step 2: When \( G_d \) updates (denoted as \( \Delta G_d \)), we use the indices we generated to check how \( \Delta G_d \) will influence the \( N_{UI} \). Then, we use \( P\text{-Match}^+ \) to deal with the situation when edges or nodes are inserted into \( G_d \), and use \( P\text{-Match}^- \) to deal with the situation when edges or nodes are deleted from \( G_d \).
Step 3: When \( G_d \) updates (denoted as \( \Delta G_d \)), we use the indices we use the indices we generated to check how \( \Delta G_d \) will influence the \( N_{UI\text{-temp}} \). Then, we use \( D\text{-Match}^+ \) to deal with the situation when edges or nodes are inserted into \( G_d \), and use \( D\text{-Match}^- \) to deal with the situation when edges or nodes are deleted from \( G_d \).

Experiment Results
In the experiments, we implement the most promising state-of-the-art graph pattern based node matching method as the BaseLine method, and then we compare the query processing time of the BaseLine method with that of our proposed INC-GPNM.

Conclusions
1. We have proposed an incuemental Graph Pattern node Matching method INC-GPNM to deliver the GPNM results based on the updates of both pattern graph and data graph.
2. The experiments on five real-world social graphs have demonstrated that our INC-GPNM significantly outperforms the state-of-the-art GPNM method in efficiency.
3. This paper has been accepted by ICDE 2018 (Rank A*).