Summary of Changes

Dear Editor and fellow reviewers:

This paper is an extension of our pervious conference paper (the 42nd International Conference on Very Large Data Bases (VLDB 2016)), entitled "Effective Community Search for Large Attributed Graphs".

Given an attributed graph G and a vertex $q \in G$, we investigate the attributed community query (ACQ) that returns the attributed communities (ACs) which satisfy both structure cohesiveness (i.e., its vertices are tightly connected) and keyword cohesiveness (i.e., its vertices share common keywords). An AC contains more precise information than that of existing community search and detection methods. Moreover, an AC can be "personalized"; for example, an ACQ user may specify that an AC returned should be related to some specific keywords like "research" and "sports". In the conference version, we have developed the CL-tree index structure and three algorithms based on it to enable efficient AC search. We evaluate our solutions on four large graphs and the results show that ACQ is more effective and efficient than existing community retrieval approaches.

In this extension, we propose solutions for the CL-tree index maintenance on dynamic social networks, whose keywords and edges can change with time. Moreover, we study two new problems related to the ACQ problem and propose index-based query algorithms for them. To summarize, our new contributions are:

(1) We propose efficient algorithms for maintaining the CL-tree on dynamic graphs, including keyword update and edge update (**Section 7**).
(2) We define two problems related to ACQ, i.e., ACQ-A and ACQ-M. The ACQ-A is an approximate version of ACQ, which relaxes the keyword constraints. The ACQ-M is concerned about finding ACs that contain two or more vertices. We study efficient query algorithms based on the CL-tree index for these two problems (**Section 8**).
(3) We evaluate our solutions on six large real datasets, and the results show that the index maintenance algorithms are more efficient and effective than rebuilding the CL-tree index. We further conduct experiments and compare performance of the index-based query algorithms with the basic query algorithms for ACQ-A and ACQ-M (**Section 9**).

We have also highlighted the new parts in blue. The extension, now 25 pages, is around 10 pages more than our previous VLDB submission. Thank you for reviewing our paper. We look forward to your invaluable comments.

Your sincerely,
Yixiang, Reynold, Yankai, Siqiang, Jiafeng