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Extensive Framework for Query-Dependent Local Landmark Scheme

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Abstract— In recent days the graph size is continuously increasing because of this it is necessary to shortest path between two nodes in computer engineering. This kind of approach is effectively used in various applications such as social network, communication network, and internet. Varity of algorithm have already been developed by different authors such as Dijkshtra's algorithm, A* search algorithm. In query-independent global landmark selection introduce large relative error for nearby nodes that are distant from global landmark to overcome this inaccuracy the local landmark scheme has been developed to find a local landmark for a particular pair of nodes after that it find the distance among two query nodes as the sum of their shortest distances to local landmark which is closer than the global one. In a social network with a huge amount of nodes, the technology among the whole SPT re-computation by traditional static algorithms is extremely ineffective. It will take tremendous computation time. Therefore we developed Extensive Framework for Query-Dependent Local Landmark Scheme to extend previously presented robust method with improved SPT approach. In this paper, we propose an improved algorithm for the dynamic SPT update to solve the above problems. The proposed algorithm is based on the understanding of the dynamic update process to reduce redundancy.

Keywords— Local landmark embedding, least common ancestor, local search, query optimization etc.

I. INTRODUCTION

To locate a shortest distance between node different methods are available that uses graph embedding, one of the method is landmark embedding in this method graph node is selected as landmark. This method is used online to provide approximate distance between two graph nodes using triangular inequalities. To overcome the limitations of existing methods presented for landmark embedding approach, recently new method presented which is called as a query-dependent local landmark scheme [1] that find a local landmark close to both query nodes to improve distance estimation accuracy.

Local landmark is known as least common ancestor (LCA) of two query nodes in the shortest path tree rooted at one of the global landmark. The local landmark scheme locate a local landmark for a exacting pair of nodes later that it find the space linking two query nodes as the sum of their shortest distances to local landmark which is nearer than the global one using shortest path tree. Local landmark scheme generate two procedure, graph compression and local search to get better their performance. Graph compression is used to decrease the embedding index size by compressing graph nodes. Local search performs limited scope online search to advance distance estimation correctness. In case of large graph index become too big to fit in the memory. Due to this reason LLS proposed disk-based index on relational database because of its powerful indexing and query optimization mechanisms.

In a network with a large number of nodes, the technology with the whole SPT re-computation by traditional static algorithms is very inefficient. It will take tremendous computation time and make routing table instability by unnecessary changes in an existing SPT. In this paper, we propose an improved algorithm for the dynamic SPT update to solve the all of these problems. The proposed algorithm is based on the understanding of the dynamic update process to reduce redundancy.

II. RELATED WORK

A.V. Goldberg and C. Harrelson [3] proposed shortest path algorithms that use A* search in combination with a new graph-theoretic lower-bounding technique based on landmarks and the triangle inequality. This algorithm computes optimal shortest paths and work on any directed graph. Give experimental results showing that the most efficient of our new algorithms outperforms previous algorithms, in particular A* search with Euclidean bounds, by a wide margin on road net works and on some synthetic problem families.

T.S.E. Ng and H. Zhang [5] propose a system to use coordinates-based mechanisms in a peer-to-peer architecture to predict Internet network distance (i.e. round-trip propagation and transmission delay). They study two mechanisms.

The first is a previously proposed scheme, called the triangulated heuristic, which is based on relative coordinates that are simply the distances from a host to some special network nodes. They proposed the second mechanism, called Global Network Positioning (GNP), which is based on absolute coordinates computed from modelling the Internet as a geometric space. Since end hosts maintain their own coordinates, these approaches allow end hosts to compute their inter-host distances as soon as they discover each other. Moreover coordinates are very efficient in summarizing inter-host distances, making these approaches very scalable. By performing experiments using measured Internet distance data, we show that both coordinates-based schemes are more accurate than the existing state of the art system IDMaps, and the GNP approach achieves the highest accuracy and robustness among them.

C. Shahabi, M. Kolahdouzan, and M. Sharifzadeh [6] proposed a very important class of queries in GIS applications is the class of K-Nearest Neighbour queries. Most of the current studies on the K-Nearest Neighbour queries utilize spatial index structures and hence are based on the Euclidean distances between the points. In real-world road networks, however, the shortest distance between two points depends on the actual path connecting the points and cannot be computed accurately using one of the Murkowski metrics. Thus, the Euclidean distance may not properly approximate the real distance. This system applies an embedding technique to transform a road network to a high dimensional space in order to utilize computationally simple Murkowski metrics for distance measurement. Subsequently, they extend approach to dynamically transform new points into the embedding space. Finally, they proposed an efficient technique that can find the actual shortest path between two points in the original road network using only the embedding space. Empirical experiments indicate that the Chessboard distance metric (L1) in the embedding space preserves the ordering of the distances between a point and its neighbours more precisely as compared to the Euclidean distance in the original road network.

III. SCOPE OF WORK

The main objective of this system is to presented efficient, scalable and faster method for landmark embedding framework. In a social network with a huge amount of nodes, the technology among the whole SPT re-computation by traditional static algorithms is extremely ineffective. It will take tremendous computation time. Therefore we tend to extend previously presented robust method with improved SPT approach.

IV. PROBLEM DEFINITION

In the usual landmark embedding such as query-independent global landmark selection introduces a huge comparative error, particularly for nearby query nodes that are distant from the global landmarks. The landmark embedding approach may initiate a large comparative error, particularly when the landmark set is isolated from both nodes in a query but the two nodes themselves are nearby.

V. PERSPECTIVE SOLUTION

To overcome the limitations of existing methods presented for landmark embedding approach, recently new method presented which is called as a query-dependent local landmark scheme [1] which identifies a local landmark specific to a pair of query nodes. In these approach first needs to find query-dependent “local landmark” which is close to both query nodes for more accurate distance estimation. Then, the distance between the two query nodes is estimated as the sum of their shortest distances to the local landmark, which is much nearer than the global one. This method is only focusing on reducing the distance estimation error. However the other parameters like computation time, processing speed which is very vital in online social networking. The native landmark theme proves to be a strong embedding answer that well reduces the dependency of question performance on the global landmark choice strategy. This system solves all of these problems by using improved algorithm that not only minimizes the computation time, but also achieves the least running time.

VI. PROPOSED WORK

In the traditional landmark embedding, we discover that the query-independent global landmark selection introduces a huge relative error, particularly for nearby query nodes that are distant from the global landmarks. To beat this, a query-dependent local landmark scheme that finds a local landmark close to both query nodes to improve the distance assessment correctness. The local landmark scheme proves to be a tough embedding solution that considerably reduces the dependency of query performance on the global landmark selection strategy. Given a query node pair, the local landmark scheme finds a local landmark, which is stated as the least common ancestor (LCA) of the two query nodes in the SPT rooted at one of the global landmarks. Facing the challenge of immense graphs whose index may not fit in the memory, we also learn to store the embedding in relational database (RDB), so that a query of the local landmark scheme can be expressed with relational operators. We performed extensive experiments on large-scale social networks and road networks with both memory and relational database implementations.

A new improved algorithm is proposed based on the analysis of the probability of edges contributed to the construction of the new SPT. The number of edges considered in the new algorithm is far less than any other algorithms in the literature. The proposed algorithm not only reduces the computational complexity required to update an old SPT, but also maintains the routing table stability by keeping the topology of an existing SPT as much as possible. The algorithm complexity is proved to be better than that of any existing dynamic SPT algorithms.

VII. PROPOSED ARCHITECTURE

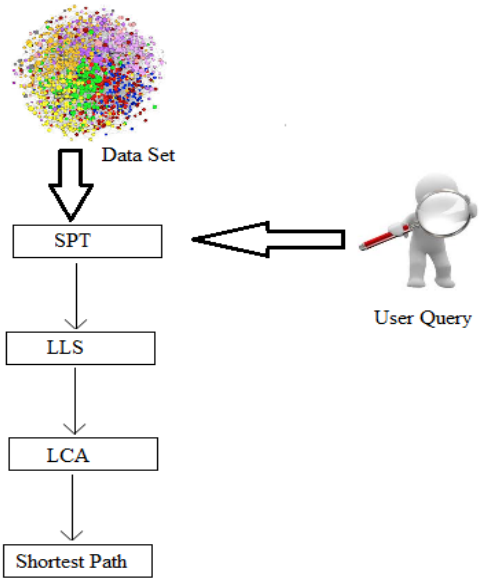

Figure: Architecture for Extensive Framework for Query-Dependent Local Landmark Scheme

VIII. CONCLUSION AND FUTURE SCOPE

In this paper, a new efficient algorithm has been presented for dynamically computing a new Shortest Path Tree (SPT) in a network based on the outdated SPT. The new algorithm not only minimizes the computation time, but also makes the minimum number of changes to the SPT structure as well. Thus, it removes the disadvantage caused by static algorithms for SPT update. Compared with all other known dynamic algorithms, the new algorithm achieves the least running time.

REFERENCES

[1] Miao Qiao, Hong Cheng, Lijun Chang, and Jeffrey Xu Yu, Senior Member, IEEE "Approximate Shortest Distance Computing: A Query-Dependent Local Landmark Scheme" Published by the IEEE Computer Society, vol. 26, No. 1, JANUARY 2014.

[2] E.W. Dijkstra, "A Note on Two Problems in Connexion with Graphs," Numerical Mathematic, vol. 1, no. 1, pp. 269-271, 1959.

[3] A.V. Goldberg and C. Harrelson, "Computing the Shortest Path: A* Search Meets Graph Theory," Proc. 16th Ann. ACM-SIAM Symp. Discrete Algorithms (SODA '05), pp. 156-165, 2005.

[4] A.V. Goldberg, H. Kaplan, and R.F. Werneck, "Reach for A*: Efficient Point-to-Point Shortest Path Algorithms," Proc. SIAM Workshop Algorithms Eng. and Experimentation, pp. 129-143, 2006.

[5] T.S.E. Ng and H. Zhang, "Predicting Internet Network Distance with Coordinates-Based Approaches," Proc. IEEE INFOCOM, pp. 170-179, 2002.

[6] C. Shahabi, M. Kolahdouzan, and M. Sharifzadeh, "A Road Network Embedding Technique for K-Nearest Neighbour Search in Moving Object Databases," Proc. 10th ACM Int'l Symp. Advances in Geographic Information Systems (GIS '02), pp. 94-100, 2002.

[7] M. Thorup and U. Zwick, "Approximate Distance Oracles," J. ACM, vol. 52, no. 1, pp. 1-24, 2005.

[8] M.A. Bender and M. Farach-Colton, "The LCA Problem Revisited," Proc. Fourth Latin Am. Symp. Theoretical Informatics (LATIN '00) , pp. 88-94, 2000.

