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Online Alternative Path With Traffic Statistics And Offline Shortest Path

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ABSTRACT

In this paper the online alternative path is computed with traffic statistics by an approach called live traffic index (LTI). All the previous researches shows only one shortest path using GPS for that path the traffic statistics will be provided and then broadcast them over radio or wireless network using LTI. And the reported paths are approximate results and the system does not provide accuracy guarantee and server response time is slow. In this work we introduce a mobile application, for both online and offline process. In online process more than one alternative route is displayed with corresponding traffic statistics and accuracy. In offline process we provide best shortest path route using the trained dataset.

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INTRODUCTION

Shortest path computation is very useful function in smart phones and has been extensive. This function helps a driver to figure out the shortest path from his current position to destination. Typically, the shortest path is computed by offline data pre-stored in the database and estimated by the road distance or historical data. With live traffic circumstances, the route returned by the navigation system is providing us with approximate statistics. For example Suppose that we are driving from Lord & Taylor (label A) to Mt Vernon Hotel Museum (label B) in Manhattan,NY. In fact, if we take more than one alternative route provided with traffic circumstances into account, then we prefer the route rather than other route.

Nowadays, several online services provide live traffic. Nowadays, several online services provide live traffic data (by analyzing collected data from road sensors, traffic cameras, and crowd sourcing techniques), such as Google-Map, Nave, INRIX Traffic Information Provider, and Tom-tom NV, etc. These systems can calculate the snapshot shortest path queries based on current live client-server architecture; it cannot scale well with a large Number of users, as discussed above. In addition, the reported paths are approximate results and the system doesn't provide any accuracy guarantee. An alternative solution is to broadcast live traffic data over wireless network (e.g., 3G, LTE, Mobile WIMAX, etc.). The navigation system receives the live traffic data from the broadcast channel and executes the computation locally (called raw transmission model). The traffic data are broadcasted by a sequence of packets for each broadcast cycle. To answer shortest path queries based on live traffic circumstances, the navigation system must fetch those updated packets for each broadcast cycle.

We summarize that by making use of smart phones we can switch on to both online and offline mode. In online process provide us more than one alternative route with the corresponding traffic statistics. This happens by using 3 steps

1. Searching
2. Traffic statistics
3. Display

In Searching, once the source and destination is given it provide us alternative routes. The Traffic statistics, are also given by using live traffic index provide us traffic status for that alternative route. Graph partitioning technique is used to provide alternative route with traffic percentage.

In offline process we provide the best alternative route in offline mode the best alternative route is provided from the dataset based on user choice of source-destination. This happens by using 3 steps

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1. Updating
2. Clustering
3. Extracting results

Updating:
Data owner will provide the pre-defined data's to the database based on the road distance.

Clustering:
Based on the user source destination, the related alternative paths are displayed there by using graph portioning. By group clustering we can cluster the entire alternative route and gives the best path solution.

Extracting results:
From the clustered alternatives the best alternatives route is provided.

Related Work:
Shortest path computation is one of the most common queries in location-based services that involve transportation networks. In this model data are continuously transmitted on the air and the location server repeatedly broadcasts the data on the air while clients time in the broadcast channel and process their queries locally. Advantage of the broadcast model is that it can support number of user's quries."G.Kellis and K.Mouratids"(2011). This paper we study one of the most common variants of the problem, where the goal is to find a point-point shortest path in a weighted directed graph."A.V Goldberg and C.Harrelson (2005).In large graph both preprocessing and size of the resulting database are exclusively burdensome .This implementation can be usually complex. They introduce a concept called reach which allows shortest path computation speed. Advantage is that "reach" concept it easily handles multiple origins and destination deals withcomplexroutingproblems."R.J.Gutman"(2004).P roximity search in database enables simple "focusing" queries based on general relationships among objects, helpful for interactive query sessions."R.Goldman, N.Shivakumar, S.Venkatasubramanian & H.Garcia-Molina"(1998).A shortest path query on a graph finds the shortest path for the given source and target vertices in the graph. However, they suffer from drawbacks of scalability. To address these problems, we propose TEDI, an indexing and query processing scheme for the shortest path query answering."F.Wei" (2010).

Existing System:
In the existing system we develop a framework called LTI which enables the driver to collect the Live Traffic Information. Therefore the Live Traffic information for the shortest route be provided Once the client gives the source and destination the process starts the query and the query will be processed and the corresponding shortest path is extracted from the Google map. This approach called LTI (live traffic index) which collects the live traffic information for the shortest route and the extracted result is displayed to the client. To our best knowledge, there is no efficient system/solution that can offer affordable cost at both client and server side for online computation. This scheme says that it cannot scale well with a large number of users and the reported paths are approximate results and the system does not provide any accuracy guarantee.

Proposed System:
In this proposed system, we are going to propose mobile application by making use of a smart phone .In this application both online and offline process are available .In both the process for a particular source to destination the required solutions will be provided to the client .In online mode, the client will give source and destination then the corresponding alternative routes will be provided based on the similarity search. By making use of Live Traffic Information we provide a traffic statistics for that alternative route .In offline mode , the shortest path is evaluated based on dijkstra's algorithm .Graph clustering method is used to cluster all the alternative routes .Therefore alternative paths can be determined efficiently and server response time will get reduced. Genetic algorithm technique is used to determine the best alternative route to the client.

Lti:
LTI is optimized by two techniques; graph partitioning and stochastic-based construction.LTI efficiently maintains the index for live traffic circumstances by dynamic shortest path tree.

- The traffic provider collects the live traffic circumstances from the traffic monitors via techniques like road sensors and traffic video analysis.
- The service provider periodically receives live traffic updates from traffic provider and broadcast the live traffic index on radio or wireless network.
- When a mobile client wishes to compute and monitor a alternative path, it listens to the live traffic index and reads the relevant portion of the index for computing the alternative path. The following are the objectives of LTI:

i. Efficient maintenance strategy.
ii. Light index overhead.
iii. Efficient computation on a portion of entire index

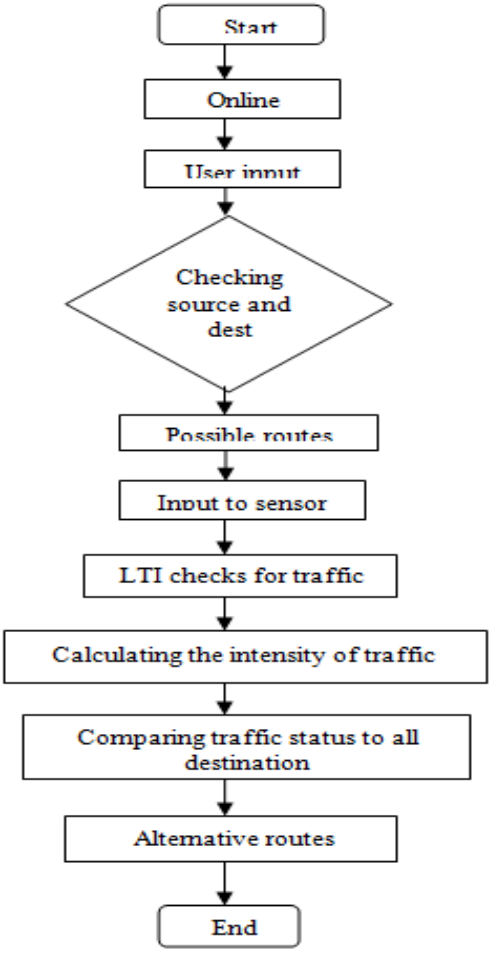
LTI construction:
To the best of our knowledge this is the first work to analyze the hierarchical index structure and exploit the stochastic process to optimize the index.

LTI on Air:

To broadcast a hierarchical index using the interleaving Scheme,we first partition the index into two components: The index structure and the weight of edges. The Former stores the index structure (e.g., graph vertices, Graph edges, and shortcut edges) and the latter stores the weight of edges. In order to keep the freshness of LTI, our system is required to broadcast the latest weight of Edges periodically. The format of header/data packet in our model. It is the offset of the packet in the present broadcast cycle and checksum is used for error-checking of the header and data. Note that the packet does not store any offset information to the next broadcast cycle or broadcast segment. The offset can be matched up by the corresponding id since the structure of LTI is pre-stored at each client. In our model, the header packet stores a time stamp set T for Checking new updates and data loss recovery.

I. Online mode:

In Online process the client gives the source and destination then by using the similarity search the corresponding alternative path will be displayed. By making use of the LTI concept it will sense the live traffic information for that alternative path. Then the corresponding extracted results will be displayed to the client We summarize that once the client has given the source and destination verification of the input is done then the corresponding alternative routes are extracted from the online services such as google Map, Navteq. Then the corresponding routes are given as input to the sensor. The work of sensor is to sense the live traffic information using (LTI). Intensity value for each of the destination is calculated and then comparing that intensity value, finally the alternative routes and the corresponding traffic statistics are shown.



ii. Offline mode:

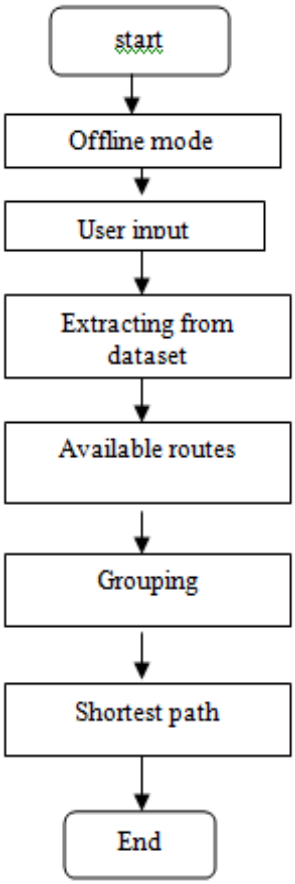
In this the user will give source and destination then the corresponding routes will be listed there by extracting from the dataset .Then by Graph Clustering it will cluster all the alternatives. From that clustered routes the best alternative route is determined based on the algorithm called genetic algorithm.

Offline Process:

In offline process client gives the source and destination then the corresponding routes are extracted from the dataset .The available routes are

displayed by grouping all the routes and the shortest path is calculated based on the kilometer.

In offline process client gives the source and destination then the corresponding routes are extracted from the dataset .The available routes are displayed by grouping all the routes the shortest path is calculated based on the kilometer. Here the user gives the source-destination, it will go to the dataset and the dataset will verify with user data which means it will determine the current location based on that query it will select the route from the dataset and by graph clustering technique it will cluster all the alternative route, it gives the best shortest path using genetic algorithm and accuracy is improved for that particular path.



Graph Clustering:

Finding patterns in data, or grouping similar groups of data-points together into *clusters*.

Clustering algorithms for numeric data:

Lloyd's K-means, EM clustering, spectral clustering etc.

General clustering paradigms:

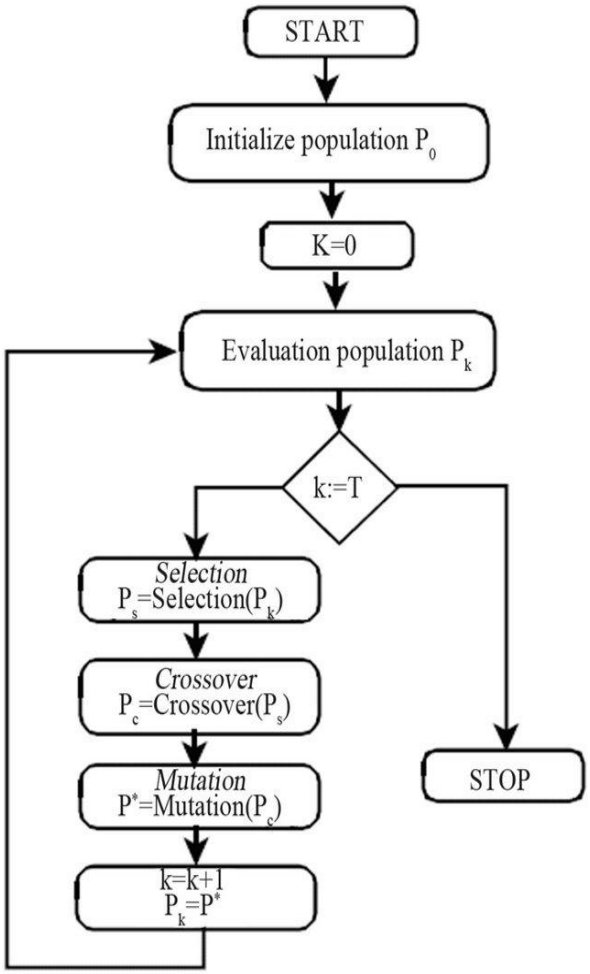
Hierarchical:

Top down

Bottom up

Genetic algorithm:

A genetic algorithm (or GA) is a search technique used in computing to find true or approximate solutions to optimization and search problems. Genetic algorithms are categorized as global search heuristics. Genetic algorithms are a particular class of evolutionary that use techniques inspired by evolutionary biology such as inheritance, mutation,selectionand crossover(also called recombination).



Outline of the Basic Genetic Algorithm:

1. [Start] Generate random population of n chromosomes (suitable solutions for the problem).
2. [Fitness] Evaluate the fitness f(x) of each chromosome x in the population.
3. [New population] Create a new population by repeating following steps until the new population is complete.

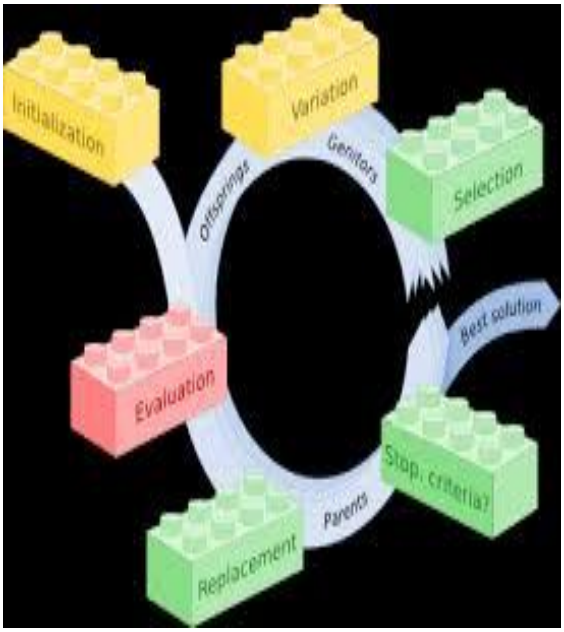
a. [Selection] Select two parent chromosomes from a population according to their fitness (the better fitness, the bigger chance to be selected).

b. [Crossover] with a crossover probability cross over the parents to form a new offspring (children). If no crossover was performed, offspring is an exact copy of parents.

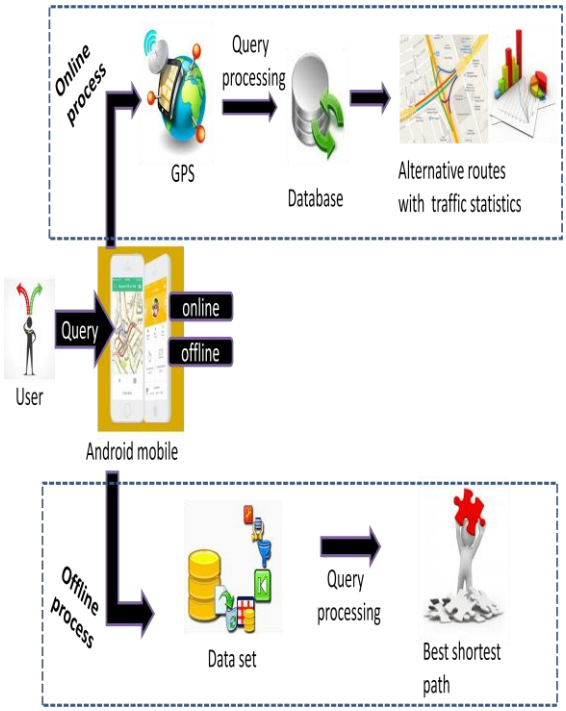
c. [Mutation] With a mutation probability mutate new offspring at each locus (position in chromosome).

d .[Accepting] Place new offspring in a new population.

4. [Replace] Use new generated population for a further run of algorithm.
5. [Test] If the end condition is satisfied, stop, and return the best solution in current population.
6. [Loop] Go to step 2.



System Architecture:



Conclusion:

In this paper we studied how efficiently we make use of smart phone. Here a mobile application is created in which we have both process available online alternative path computation with traffic statistics based on live traffic information and offline shortest path result is computed. We carefully analyze the existing work and discuss their inapplicability to the problem due to their prohibitive maintenance time and large transmission. To address the problem, we suggest a promising architecture that broadcasts the index on the air. We first identify an important feature of the similarity search which enables us to compute alternative path on a small portion of index. This important feature is thoroughly used in our solution, LTI. Our experiments confirm that LTI is a Pareto optimal solution in terms of four performance factors for online alternative path and offline shortest path computation.

In the future, we will extend our solution on automobiles. This is a very interesting topic since the decision path depends not only on current traffic data but also based on the predicted traffic circumstances.

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