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A Novel Approach to Predict Optimized Routes for Multimode Travel Options

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Abstract: ***Now a day's various traveling vehicles are available for the purpose of traveling and goods carrying. An efficient way to control traffic during peak hours. For this, various modern techniques and models are developed like route optimization, fleet route planning, multi-stop route planning, etc. Using these methods in addition of route prediction algorithm path way from one node to another node can be predicted from jam condition. An optimal solution from a source to destination need a clearly verified road and route map from each and every area in the whole path. It is a need to predict the optimal path to traverse from a source to destination. The input in taking account with Cost(C), Time(T), Distance(D) and Flight(F), Train(T), Bus(B) and its combination along with traffic. By selecting various route path a special data is assimilated. By this method maximum amount of congestion can be controlled. Analysis from all possible route nodes from real-time traffic in the data base can be submitted to the control unit. This can lead a best and better method to travel from a source to destination safely with right time.***

Keywords: ***Route Optimization, Multi-Stop Route Planning, Fleet Route Planning, Route Prediction Algorithm, Real-time traffic.***

I. INTRODUCTION

It is the data or information that identifies the geographic location of features and boundaries on Earth, such as natural or constructed features, oceans, and more. Geospatial analysis is an approach to applying statistical analysis and other informational techniques to data which has a geographical or geospatial aspect. Such analysis would typically employ software capable of geospatial representation and processing, and apply analytical methods to terrestrial or geographic datasets, including the use of geographic information systems and geomatics. Spatial data is also known as geospatial data or geographic information. Spatial data is usually stored as coordinates and topology, and is data that can be mapped.

A spatial database, or geo database is a database that is optimized to store and query data that represents objects defined in a geometric space. Most spatial databases allow representing simple geometric objects such as points, lines and polygons. Some spatial databases handle more complex structures such as 3D objects, topological covergens, linear networks, and TINs. While typical databases are designed to manage various numeric and character types of data, additional functionality needs to be added for databases to process spatial data types efficiently. These are typically called geometry or feature.A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data. GIS is a broad term that can refer to a number of different technologies, processes, and methods. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business.

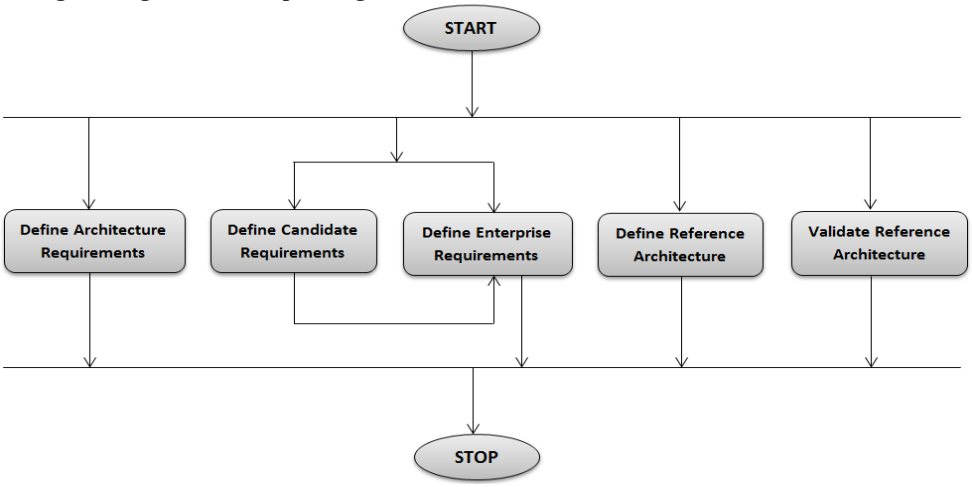

Fig.1 Work flow of Geospatial Architecture

GIS can relate unrelated information by using location as the key index variable. Locations or extents in the Earth space–time may be recorded as dates/times of occurrence, and x, y, and z coordinates representing, longitude, latitude, and elevation, respectively.Geomatics, also known as geospatial technology, geomatics engineering, or geomatic engineering, in French géomatique, is the discipline of gathering, storing, processing, and delivering geographic information, or spatially referenced information. In other words, it "consists of products, services and tools involved in the collection, integration and management of geographic data".

When events and trends are seen within the context of recognizable maps,they are easier to understand and act upon.

Geospatial analytics can help organizations anticipate and prepare for possible changes due to changing spatial conditions or location-based events. Location-based analysis can help decision-makers understand why solutions that work in one place often fail in another.

Final Route

After finding the common routes, transient nodes and common nodes for the given input selection, the next module is to predict the final optimal route. This is done by selecting the common routes for selected criteria as well as selected modes given by the user as input for given source and destination. The Path between common nodes are selected from particular mode route in percentage basis. The final route contains the in between nodes of source and destination and the required criterion values between the nodes with traffic information.The Final route is predicted by finding the common routes as well as common nodes for selected all possible Modes and Criteria's for given Source and Destinations. It selects the path between the common nodes from selected modes and from selected particular criteria. The final optimal route also gets predicted by taking traffic in account.

II. INITIAL RETRIEVAL

The first Module is the Initial Retrieval which initializes the approach by getting inputs from the user. The inputs are Source, Destination, Modes and Criteria. The Modes can be selected as individual or as combinations as B00, 0T0, 00F, BT0, 0TF, B0F, BTF. The modes are Bus(B), Train(T), Flight(F). The Criteria also can be selected as individual or as combinations as D00, 0T0, 00C, DT0, 0TC, D0C, DTC. The criteria's are Distance(D), Time(T), Cost(C).

The initial module which gets inputs as source, destination, modes and criteria from the user and checks with the combinations of modes and criteria, if the given inputs are legal, then the system allows to proceed further.Else,asks the possible combinations. The source entered will be processed using the geographical information system and retrieves the information about the location such as longitude, latitude, adjacent nodes

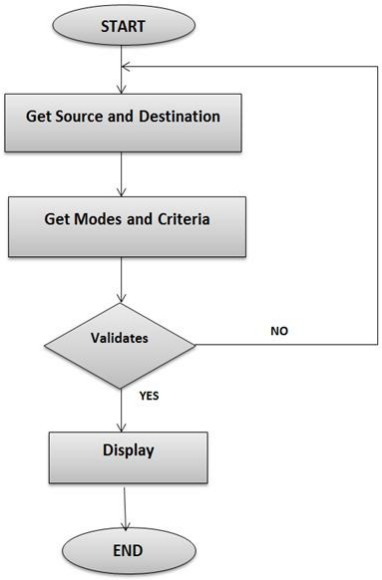

Fig.2 Initial Retrieval

III. ROUTE PLANNING

Route planning is an important problem for a number of diverse applications including intelligent transportation systems, space applications, autonomous robotics, and military guidance and navigation systems. The main issue which is important in our society is Mobility. Peoples used to travel from one location to another, in effect increasing the use of public transportation. Travellers aims in determining the best route to reach destination from source. Traversing from source to destination faces various types of congestions. The three major travel modes are only by Road, Rail and Air. According to the geographical position of the world, the distance, time and cost varies in this three modes between the same source and destination.

The basic route planning models the problem as a graph. The nodes of the graph represent geographic locations, such as nodes, and edges. A valid connection, from a source node to a destination node, is a sequence of edges connecting source and destination. Each edge is assigned a non-negative weight, for example the length of the road or an estimation of the travel time required to reach from one end to the other. The optimization problem is to find a shortest path between a source node and a destination node.

A* algorithm provides the general solution for Shortest route in a particular map. It also provides the backtracking facility, that is appropriate for this application. This algorithm (A*) is used for all modes (B,T,F) to find shortest route, in addition to that it can also be utilized for fastest as well as cheapest predictions also. From the Transient Routes, common nodes are taken in account and the transient route between common nodes are calculated. To do so, the magnitude is calculated in percentage basis. Final route is found by combining by all the above results.

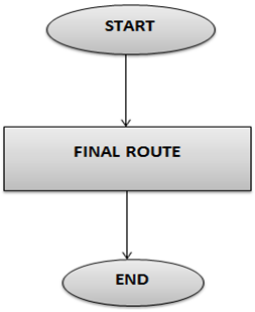

Fig.3 Final Route

IV. ENHANCEMENT OF THE MODULES

SUB LINEAR REGRET

The real-time traffic situation matches to the predictor using historical data. It consider the given source as a context space and form subspaces. The context subspaces are created by uniformly partitioning the context space on each dimension. The prediction is based on the sub linear regret formed by the partitioned subspaces. It consumes more time to partition the context spaces so as to predict the route according to traffic. It can only be apply to a particular area with selected modes and criteria i.e., for Bus and Distance. The partitioning doesn't include transient nodes.

NOVEL APPROACH

The system proposes an RP Algorithm which takes source and destination as input along with the user required modes and criteria and its combinations. The routes are predicted based on shortest , fastest and cheapest routes. The routes are selected by finding common nodes between source and destination for shortest, fastest as well as cheapest. Each three provides three routes based on the selections made by user which can be in fourty nine ways (MULTIMODE Criteria). The average value of the three routes are calculated and each yields a route. Finally, the preferred route are predicted and given to the user. The system uses RP algorithm to predict routes based on the user required MULTIMODE Criteria Travel options along with the mandatory criteria i.e., traffic.

V. CONCLUSION

The Route Prediction algorithm aims in predicting the routes available between various source and destination based on the live circumstances. The Route Prediction Algorithm achieves route prediction from source to destination by including transient nodes i.e., in between nodes for various multimode criteria combinations. The system provides optimal result for all user required Multimode & criteria combinations between the source and destinations. Provides real time traffic analysis between transient routes. Predict all possible routes for source & destination. Predict traffic for all possible distributed areas. Predicts routes along with traffic in global. Efficiently predicts traffic for all transient routes. Analyze real time traffic based on statistical data. It provides the transient routes between the source & destination including traffic for all possible user required multimode & criteria combinations. Achieve global traffic prediction by coordinating distributed entities.

VI. FUTURE WORK

In global route prediction for transient routes are achieved by coordinating the distributed entities along with traffic for 2 countries. It even predicts the transient routes from source to destination for MULTIMODE travel options with various criteria by using Route Prediction Algorithm.

By extending the algorithm to achieve global traffic and route prediction for about 5 countries with MULTIMODE criteria travel options and also embedding with networking to obtain results through online. It can be designed to trace traffic and send traffic alert messages to users. The establishment of connection to Network allow the user to Predict Route through online. The user can get alert messages if the suggested route gets sudden traffic, any congestion or un suspected incident.

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