A Novel Method of Violated Constraint Prediction with Modified Spatial Analysis Based Fuzzy Sorting

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Abstract:Mobility Prediction of a Moving Node and Network Delay is an important performance characteristic of a wireless network. The Data delivery Delay of a network specifies how long it takes for a data to travel across the network from one node or endpoint to another. It is typically measured in multiples or fractions of seconds.The work presented here belongs to domain of data mining in wireless network , the Real Time Early Prediction of network delay based on mobility is done using the proposed spatial analysis for constraint violation prediction method. A New application is presented concerning the Delivery delays of UDP packets in GPRS network.The GPS points that are collected from GPS module is analyzed using proposed spatial analysis, for future location prediction using Timestamps as primary data .

INDEX TERMS: Monitoring system, Delay Analysis, GPRS, GPS, UDP/IP, Time Constraint, Map matching

I.INTRODUCTION:

Real Time Applications usually impose strict time constraints which affect the Grade of service. Time constraints Restricts the Time gap between 2 locations. IP network delays can range from just a few milliseconds to several hundred milliseconds. When two devices communicate with each other using a packet-switched network(GPRS), it takes a certain amount of time for information to transmit and receive the data. The total time that it takes for this chunk of information, commonly called a packet, to travel end-to-end is called network delay.

In this Proposed Violation Prediction method ,Communication or operating delays between 2 datas are bounded and are taken into account by verifying a global time constraint. The uncertainty induced by these delays generates an uncertainty on the verification that results in a possibility measure associated with constraint verification. Freschet Distance (1999) based prediction lack of True path of Moving Object[1]. The performance of Kalman filter approach depends only on the quality of electronic map data and error sources (2011) associated with positioning devices were not considered[13]. Coorelation ananlysis (2012) shift the received signal by delay and multiply it with other series[12]. Even Fuzzy Logic based matching does not consider error sources when estimating the location. Dynamic time windows (2011) based delay estimation based on Kalman Filter restricted to stastitical data [6].
Our Objective is therefore to study the particular problem that whenever vehicle location request is made its current position will not be retrieved accurately,instead its previous position will not be retrieved accurately,instead its previous position alone sent to requested client. For that, we suppose that communication delays between devices are bounded. This uncertainty on communication delays induces an uncertainty on the time constraint verification. The exploitation of the obtained results allows recognising in a distributed way, the occurrence of the failure symptom with a certain possibility. If a target node moves linearly, through zone prediction method we can predict the location accurately. However, on the other side, when a target does not move direction such as though spiral way. When a device on a packet switching network sends information to another device, it takes a certain amount of time for that information, or data, to travel across the network and be received at the other end.This delay still becomes worst when using Unreliable UDP packets.On low sampling rate GPS trajectories with ≥ 5 and maximum Backoff attempt is 15 times

a.) A GPS log

Is a collection of GPS points = { 1, 2, … } .,Each GPS point ∈ contains latitude . , longitude. and timestamp . .

b.) GPS Trajectory

A GPS Trajectory is a sequence of GPS points with the time interval between any consecutive GPS points not exceeding a certain threshold, i.e.:

c) Road Segment

A road segment e is a directed edge that is associated with an id $e.\ eid$, a typical travel speed $e.\ v$, a length value $e.\ l$, a starting point $e.\ start$, an ending point $e.\ end$ and a list of intermediate points that describes the road using a polyline.

d) Network

A network is a directed graph$G(V, E)$, where V is a set of vertices representing the intersections and terminal points of the road segments, and E is a set of edges representing road segments.

e.) Path

Given two vertices, in a road network, a path is a set of connected road segments that start at and end at

f.) Timestamps Start time of each iterations represent the Timestamps of that data set. This elapsed time for each trajectory is obtained from Tic function using MATLAB.

II .ANALYSIS ON SPATIAL CONSTRAINTS:

Existing localization techniques which mostly rely on GPS technology are not able to provide reliable positioning accuracy in all situations. This spatial based map matching technique will satisfy the real time constraints to reduce data delivery time and further provide accuracy than existing methods. The Important terms used are described in this section.

III. HARDWARE AND SOFTWARE REQUIREMENTS:

GPS and GPRS module BN35-USB receiver and SIM 300which is a Triband GSM/GPRS engine works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz is preferred for Getting the Location data such as Latitude Longitude and Timestamps are Analyzed in MATLAB Tool and command using lat_calc(i)=str2double(at(1,3)) function for 10 iterations. Obtained values are used as references for improving Map matching accuracy.Tic and toc commands are used for internal stopwatch timer interval recordings for each trajectory set.

IV PROPOSED ARCHITECTURE:

In this spatial based location prediction method , the target location at an instance of time is predicted based on previous good locations using an iterative process. Once the zone of the target is predicted with respect a relative origin, the Previous location Points from trajectory data is used to find future location and packet delivery speed enhancement . This is done using Timestamps from which the data is sent and time of its arrival. The values are Recorded for each transmission of a packet to find out the transmission time which is the difference between Arrival and sent. WGS 84 coordinate datum is converted to Decimal Degrees as first step to enhance accuracy in prediction.

Consequential Movements is given as Tj, Tj+1□

TJ+1 - Tj ≤ Maximum Time gap.

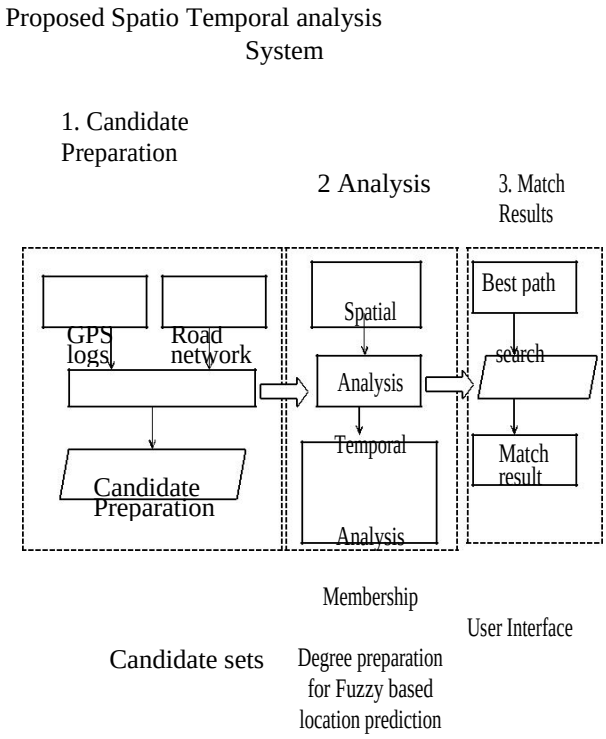

Fig 1 :Proposed Spatial Analysis Based Constraint Prediction.

The strict Timing constraints has to be satisfied for achieving best map matching accuracy and packet delay analysis. To fulfill this need in networks in which the topology changes frequently, these changes should not affect the Quality of Service (QoS) for data delivery. The maximum gap defined by Floating point Time difference between 2 successive GPS points.

The IP configuration for sending and receiving packets is carried out using UDP socket creation in DOS prompt, since this prediction is carried over Client , Server Architecture.

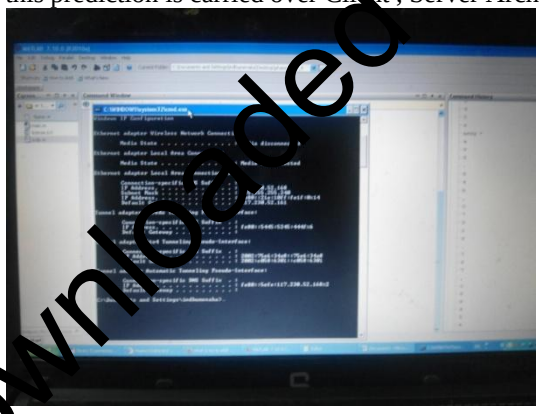

Fig 1(b) –IP configuration using IP Address.

Fuzzy Sorting- It is not always possible to do computations with real values.,due to unknown GPS noise and error values obtained, if interval between the values related to uncertained sequences are considered for fuzzy sorting.Rules related to satisfy those time Time constraints are created manually and checked for all sequent points.If number„n‟‟of intervals is of form[ai,bi], permutation is created Cj contains all [aij,bij] to satisfy all constraints c1□ ≤ c3 ≤c2cn≤. If the Times point when compared with current GPS point is smaller than timestamp of last data of previous trajectory , then Each rule assigned a measure degree α and β source using Rectangular Grid over tracking region. Error point over each edge of grid is considered for future mobility prediction.

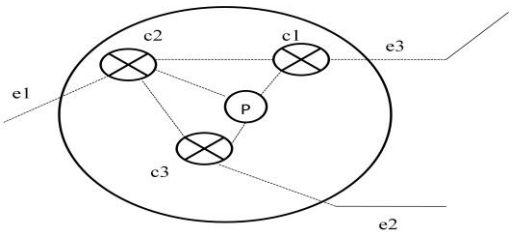

Fig 2 - Trajectory Of Gps Assisted vehicle path

Constraints are expressed by timing relationships between Trajectory(GPS point) A constraint can, for example, express a transport time window between two locations. To determine the Time window constraints consider the observed sample and characteristics of the correctly operating system are used to create a confidence space of possible timing relationships between Gps Trajectory obtained from the system. To execute simulation for zone finding, MATLAB is used as a simulation tool. The UDP packet socket is created using Send and Receive Arguments with IP configuration.

From the given point P, Within radius „r‟‟ canditate projection is a line drawn from point P to the Road side of the segment.Line segment is projected from the point P to the road segment e, and named as C. shortest distance between p and c is the road that vehicle is choosen to travel as an assumption for this the proposed concept. In spatial analysis, both geometric and topological information of the road network is used to evaluate the candidate points are used for Time instance evaluation. If any value greater than max Gap is obtained ,

The observation probability(geometric information) is defined as the likelihood that a GPS sampling point matches a candidate point computed based on the distance between the two points Transmission Probability(topological information) is used to identify the true path if a cross path is located wrongly. In this if a cross path is identified wrongly, then the previous P point is compared and the path is follower regarding it. The nodal delays accumulate and give an end-to-end delay,

Time difference = Timestamp of packet Received –Packet Sent Time

End- End delay = Arrival time –Received time / number of iterations used. Here 10

The Total Number of iterations used is 10. One of the major concerns of this research is to keep track the moving target as well as stationary target. As the target can move any direction dynamic references used for applying proper geometry in triangulation based map matching method instead of stationary references.

That‟s‟‟why modified spatia done here to reduce the execution time of proposed method .The iteration process earned the execution time of 0.0019 sec with respect to The Algorithm defines t timing relationship (Timestamps) and their Sequencing relationship.

V. PROPOSED ALGORITHM BASED ON TIME CONSTRAINTS

STEP 1: Initialize list of candidate points an an empty list
STEP 2: For i= 1 to n do

STEP3: Get candidate values for observed GPS node positions. From the given point P, Within radius r canditarete projection is a line drawn from point P to the road side of the segment. Line segment is projected from the point P to the road segment e, and named as C.

STEP 4: Time Difference between successive GPS points are recorded in Mantissa format to include temporally similarity with respect to current point received. (Here VB event driven programming language is used)

STEP5: Line segment is projected from the point P to the road segment e, and named as C. Shortest distance between p and c is the road that vehicle is choosen to travel

STEP6: The observation probability(geometric information) is defined as the likelihood that a GPS sampling point matches a candidate point computed based on the Time difference between the two points

STEP7: Transmission Probability (topological information) is used to identify the true path if a cross path is located wrongly. In this if a cross path is identified wrongly, then the previous P points is compared and the path is follower regarding it.

STEP8: Binary exponential backoff (truncated exponential backoff) is used to transmit datas data with number of attempts restricted to 15.

STEP9: The Candidate graph is constructed to find the relative sequence to be matched for prediction Violations of Constraints due to Measurement errors.

STEP10: Return the matched sequence with less delay using membership functions based on Fuzzy sorting

It takes for last Iteration of data received with 2.400 sec delay and total execution time is 0.0019 sec which is less then the existing map match method Hidden Markov model and kalman filter implementation. AT commands such as CIPSTART, CIPCLOSE are used to Initiate and stop GPS device and Time Difference between points obtained from OSM or Google Map can be used to visually represent the violated constraint.

Values of Final Iteration

Sample no	Latitude	Longitude	Delay(sec)	Process Time
1	2400.00000	12100.00000	2.1000 sec	0.00037
2	2400.01000	12100.00000	0.7000 sec	0.00028
3	2400.02000	12100.00000	1.3000 sec	0.00020
4	2400.03000	12100.01000	0.4000 sec	0.00019
5	2400.04000	12100.00000	4.7000 sec	0.00019

6	2400.05000	12100.00000	3.9000 sec	0.00019
7	2400.06000	12100.02000	1.4000 sec	0.00019
8	2400.07000	12100.00000	4.3000 sec	0.00019
9	2400.08000	12100.00000	2.4000 sec	0.00019

Thus, Delivery delay is determined using Absolute departure time of 1st data and last data by monitoring the time windows.This can be further expanded By Fuzzy based sorting using Membership functions in near future. samples are analysed with MATLAB for defined spacing relationship of GPS points with various sampling rates.If one constraint is found to be violated therefore delay occurs on forthcoming Data deliveries.Hence all the forthcoming coming constraints are to checked on the assumed route with constant sampling rate trajectories.

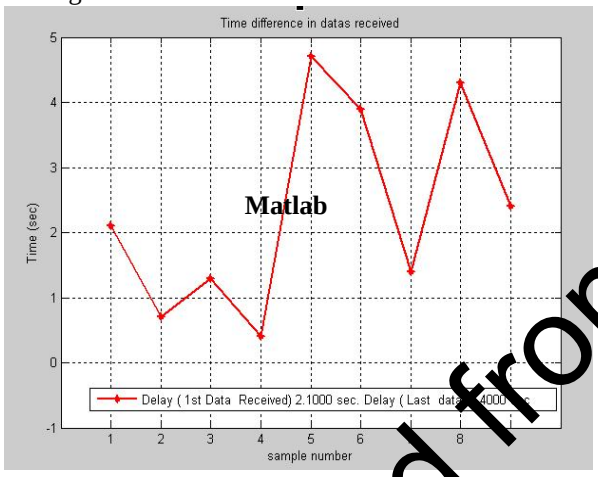

Fig 4 Time Difference execution using

Fig 3 –Delay obtained for packet through Iterated Time constraint analysis

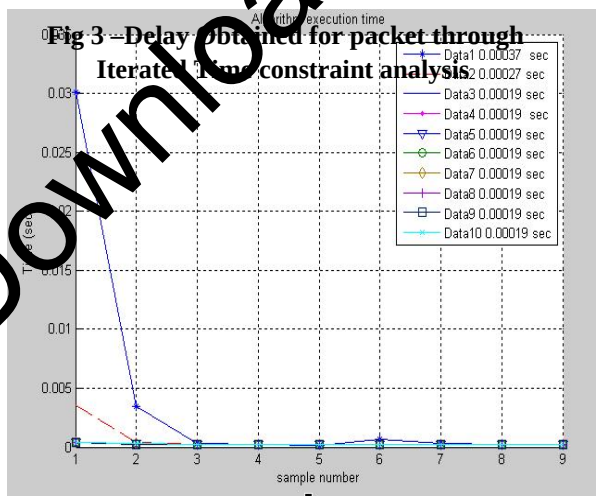

Fig 5 –Observed Sample vs Execution Time for delay prediction

Map matching is a Error correction technique done for pattern identification of latitude, Longitude points and also for packet delivery delay constraints formulation. This method can be useful for any kind of Physical network in Future mainly for Distributed systems, Peer-peer Networks to determine the END-END delay before packet reaches destination in network.

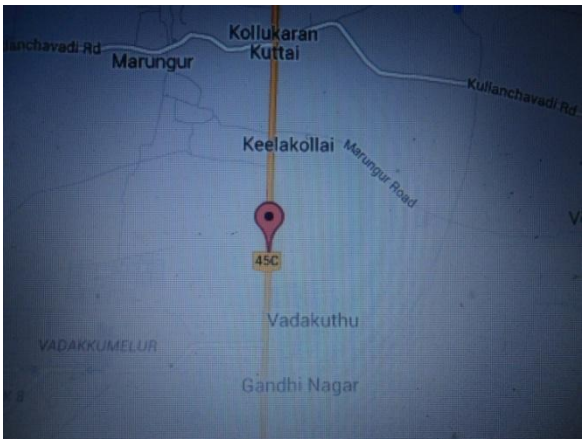

Fig 6 –Time constaint violation monitoring in Google Map near Villupuram,Tamilnadu

VI.CONCLUSION:

This Paper clearly examine the performance of algorithm and datas from correctly observed operating system to predict the delivery delay before the packet Reaches the destination. The time from when the packet is sent and time it received at the Receiver is recorded and it becomes crucial later more than the threshold value here assumed Maximum Gap of 0.00019 seconds, the time difference is further applied using Fuzzy sorting to observe Error sources. So far,Spatial Analysis Results that are found is presented in this paper and membership function Estimation for Fuzzy based Interval value sorting process is in progress and presented in Future. Delays are predicted earlier within the reach of it to destination using Advanced Time Constraint violation Prediction Algorithm , at the same time by plotting the obtained values in Google map using appropriate interface,up-to date data receival with less delay and more accuracy is achieved by the proposed method.The Future Scope implies that Delay prediction is possible for GPRS, 3G Networks and delay diagnosis can be done by expanding the concept using FUZZY Sorting by proposed Algorithm by 2016.

REFERENCES

[1] Jensen C. S. Capturing the uncertainty of moving-object representations based on Freschet Distance, in Proceedings of the 6th International Symposium on Advances in Spatial Databases, 111-132, 1999

[2] Samet, H., Sankaranarayanan, J., and Alborzi, H. Scalable network distance browsing in spatial databases. In Proceedings of the 2008 ACM SIGMOD international Conference on Management of Data, 43-54, 2008

[3] Zheng, Y., Chen, Y., Xie, X., and Ma, W. GeoLife2.0: a location-based social networking service.In proceedings of International Conference on Mobile Data Management, 2009.

[4] H. Jula, M. Dessouky, and P. A. Ioannou,"Truck route planning in no networks with time windows at customer locations,"*IEEETrans.Intell. Transp. Syst.*, vol.7, no. 1, pp. 51–62, Mar. 2006.

[5] S. Murugananham andeal P. R time web based vehicle tracking using *J*.GPS," *World Acad. Sci. Eng. Technol.*, vol. 61, pp. 91– 99,Jan. 2010.