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The Predictive Location Based Quality of Service Routing Protocol for the VANET

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Abstract: the predictive location based quality of Service routing protocol is based on the prediction of the location of nodes in ADHOC wireless networks. The two types of update messages are sent type1 and type2 .In establishing the connection to the destination, the source S first has to predict the geographic location of node D.PLBQR protocol uses location and delay prediction schemes which reduce to some extent the problem arising due to the presence of stale routing information. It estimates the path breaks from the quality of service session and finds the alternate path to reroute the session quickly.

Keyword: predictive location based Quality of Service routing protocol,type1 update message,type1 update message, Quality of service Routing etc;

I. INTRODUCTION

The large number of protocols is proposed for MANET and then applied to VANET. Road Traffic Information System is a key component of the modern intelligent transportation system. The VANET architecture provides an excellent framework to develop an advanced road traffic signaling system. VANET can be implemented in V-2-V, V-2-I or I-2-I modes. One of the most promising protocols is predictive based quality of service routing protocol for V2V network mode. The Quality of Service Routing protocol search for routes with sufficient resources in order to satisfy the quality of service requirements of flow. The information regarding the availability of resources is managed by resource management module which assists the quality of service routing protocol. In its search for the quality of service feasible paths. The quality of service routing protocol should find the paths that consume minimum resources. The Quality of Service metrics can be classified as additive metrics, concave metrics and multiplicative metrics.

II. ANALYSIS

1. In reference [4] they discuss about the research challenge of routing in vanets and survey recent routing protocols .vanes has been seen to useful in road safety and many commercial applications
2. In paper [5] Rethinking vehicular communications: merging vanet with cloud computing

III. PROPOSED SCHEME

The Predictive location Based Quality of Service routing protocol (PLBQR) is based on the prediction of the location of nodes in ad hoc wireless networks. The prediction scheme overcomes to some extent the problem arising due to presence of stale routing information. No Resources are reserved along the path from the Source to the destination, but Quality of Service aware admission control is performed. The network Does its best to support the Quality of Service requirements of the connection as specified by the application. The Quality of Service routing protocol takes the help of an update protocol and location and delay prediction schemes. The update protocol aids each node in broadcasting its geographical location. And resource information to its neighbors. Using the Update message received from the neighbors, each node updates its own view of network topology. The update protocol has two types of network messages, namely Type1 update and type 2 update. Each node generates a Type 1 update message periodically. A type 2 update message is generated when there is a considerable change in the node's velocity or direction of motion. From its recent update messages, each node can calculate an expected geographical location where it should be located at a particular instant and then periodically checks if it has deviated by a distance greater than delta from this expected location. If it has deviated, a Type 2 Update message is generated.

a) *Location And Delay Predictions:*

In establishing a connection to the destination D, The source S first has to predict the geographic location of node D and the intermediate nodes, at the instant when the first packet reaches the respective nodes. Hence this step involves location prediction as well as propagation delay prediction. The location prediction is used to predict the geographic location of the node at a particular instant t_f in the future when the packet reaches that node. The propagation delay prediction is used to estimate the value of t_f used in the above location prediction. These predictions are performed based on the previous update message received from the respective nodes.

b) *Location Prediction*

Let (x1,y1) at t1 and (x2,y2) at t2 (t2>t1) be the latest two updates D to the source node S.Assume that the 2^{nd} Update message also indicates v,which is the velocity of D at (x2,y2).Assume that node S wants to predict the location(xf,yf) of node D at some instant t_f in future. This situation is depicted in figure1. The value of t_f has to be estimated first using the delay prediction scheme, which will be explained later in this section. From the figure 1, using the similarity of triangles, the following equation is obtained.

Y2-y1 / yf-y1 = x2-x1/xf-x1

By solving the above equation for $y_{f,}$

$$Y_{f} = y1 + \frac{(Xf-x1)\ (Y2-y1)}{(X2-x1)}$$

By using the Pythagorean Theorem

$(x_f-x2)^2 + (yf-y2)^2 = v^2(t_f-t2)^2$

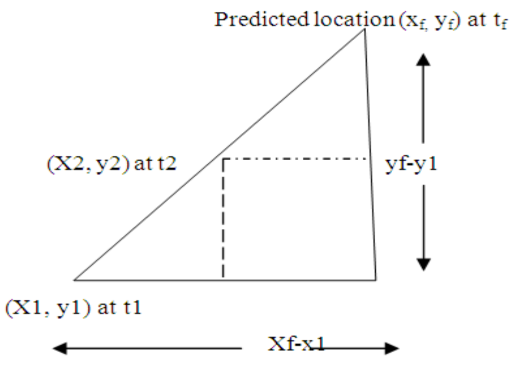

Figure: prediction of location at a future time by node S using the last two updates s

Substituting for y_f-y2 from equation 10.5.3 in the above equation 10.5.4 and solving for x_f, the following equation is obtained:

$$xf = x2 + \frac{v\ (t_f-t1)\ (x2-x1)}{Sqrt\ ((x_2-x_1)^2 + (y_2-y_1)^2}$$

By solving the above equation for $y_{f,}$

$$Y_{f=} y1 + \frac{(X_f-x1)\ (Y2-y1)}{(X2\ -x1)}$$

By using the Pythagorean Theorem

$$(x_f-x2)^2 + (yf-y2)^2 = v^2\ (t_f-t2)^2$$

Node A receives an update message from node B, node A update the corresponding entry for node B in update table. in that entry, node A store the ID of node B , the time instant at which the update packet was sent ,the time at which the update packet was received ,the geographic coordinate ,speed ,resource parameter of node B ,and optionally the direction of motion of node B . For each node N in the network node A stores the last two update packet received from that node in its update table. For some node, node A also maintain proximity list. The proximity list of node K is a list of all node lying within distance 1.5*transmission range of node K. the proximity list are used during route computation. by maintaining a proximity list rather than neighbor list for node K , node A also consider the node that were outside the node K's transmission range at the time their respective last update were sent ,but that have since moved into node K's transmission range , while computing the neighbor of node K. the routing table at node A contain information about all active connection with node A as source .when as update message from any node in the network reaches node A ,it checks if any of the routes in its routing table is broken or is about to be broken . In either case, route recompilation is initiated .using the location prediction based on the updates, it is possible to predict whether any link on the path is about to break. Thus, rout recompilation can be initiated even before the route actually breaks.

The route algorithm gives in works as follows .the source node S first runs location and delay prediction on each node in its proximity list in order to obtain a list of its neighbor at present. It determines which of these neighbors have the resource to satisfy the Quality of Service requirement of the connection (the neighbors that satisfy the QOS requirement is called candidates). Then it perform a depth-first search for the destination ,starting with each of these candidate neighbors to find all candidate route satisfying the Quality of Service requirement of the connection request . From the resulting candidate routes, the geographically shortest route is chosen and the connection is established. Data packet are forwarded along this chosen route until the end of the connection or until the route is recomputed in anticipation of breakage. Note that only node S uses its view of the network for the entire computation.

Advantage and Disadvantage

PLBQR protocol uses location and delay prediction schemes which reduce to some extent the problem arising due to the presence of stale routing to some the prediction schemes ,it estimates when a QOS session will experience path breaks and proactively find an alternate path to route the QOS secession quickly. But, as no resource is reserved along the route from the source to destination, it is not possible to provide hard QOS guaranteed using this protocol. Even soft Quality of Service guarantee may be broken in case when the network load is high .since the location prediction mechanism inherently depends on the delay predication mechanism, the inaccuracy in delay prediction adds to the inaccuracy of the location prediction. The end to end delay for a packet depend on several factors such as the size of the packet , current traffic load in the network , scheduling policy and processing capability of intermediate node, and capacity of links. As the delay prediction mechanism does not take into consideration some of the above factors, the predictions made by the location prediction mechanism may not be accurate, resulting in Quality of Service violations for the real-time traffic.

IV. CONCLUSION

In this paper we have seen the predictive location based quality of service protocol. In the section 1 location and delay prediction in section 2 location prediction, The predictive location based quality of service protocol can be used over VANET to provide the alert signals to communicate within the Vehicle to vehicle mode. This can increase the safety on road while driving the vehicles. there are large many facilities which can be embedded to enhance the accuracy of this protocol which can be the future scope of this paper.

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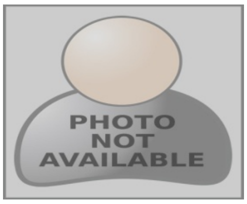

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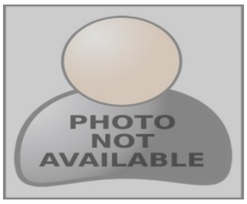

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