OCTOGONAL ROAD MODEL FOR EMERGENCY DATA TRANSMISSION IN VANET

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ABSTRACT - Vehicular Ad hoc Network (VANET), a subclass of mobile ad hoc networks (MANETs), is a promising approach for the intelligent transportation system (ITS).Vehicular Ad-hoc network is a fast mobile broadband wireless network, which can provide a variety security applications and business applications for vehicles such as traffic safety management, accident alarm, auxiliary driving, Internet information services. Even though VANETs are capable of enabling many novel applications, the design of effective inter vehicular communications remains as a challenge. The time varying vehicle density results in a rapid change in topology, which makes effective data transmission a difficult task. In this paper, we propose the Orthogonal Road connecting Model for Efficient Data Transmission Technique (EDTT) in vehicular adhoc networks, in which a Orthogonal road transmission model utilizes Geographic Information System and Google maps Information In this mechanism, the request-opath and confirm-opath are sent out to obtain the transmission path from a Source vehicle to a destination vehicle to improve the packet delivery ratio and average transmission delay of data. EDTT combines a dynamic multi-priority message queue management method with a greedy forwarding strategy based on position prediction to significantly reduce the end-to-end delay of packets We use NS2 to simulate EDTT and compare its GPRS,GPCR and AACAR performance with based on the packet delivery ratio, average transmission delay. The simulation results show that EDTT outperforms these previously proposed protocols

Keywords: **Greedy Forwarding Strategy,Octogonal Road Model,Roadlines, EDTT**

1.INTRODUCTION

VANETs provide two types of communications, namely, vehicle to vehicle (V2V) communication and vehicle to RSU (V2R) communication .

- In V2V communication, vehicles communicate directly with other vehicles to exchange the information.
- In V2R communication, vehicles communicate directly with RSUs which are fixed aside the roads.

Dedicated Short Range Communication (DSRC) is used for V2V and V2R communications in VANETs. The dedicated short-range communication (DSRC) [2] is an unprecedented wireless technology intended to support both infrastructure-to-vehicle (I2V) and Vehicle-to-vehicle (V2V) communications. In addition, it is desirable to enhance data dissemination performance by further exploiting the capacity of V2V communication. Sharing data items among vehicles hasthe potential to improve the bandwidth efficiency of the RSU, as it may reduce the redundancy of rebroadcasting the same data item via I2V communication. In addition, by appropriately exploiting the spatial reusability, multiple data items can be disseminated via V2V communication simultaneously without interference.Theapplications for V2V and V2I can be divided into the following three services: safety services, traffic management and user-oriented services

2.RELATED WORK

Zhang et al. [3] proposed a vehicular cooperative media access control (VC-MAC). It considers the scenario where vehicles are expected to retrieve common information when passing through the RSU via I2V communication, whereas some of them cannot be successfully served due to unreliable wireless data transmission.

Fujimura and Hasegawa [4] proposed a MAC protocol called Vehicle and Roadside Collaborative Protocol (VRCP) to support both I2V and V2V communications. It designs two channel access modes. One is ad-hoc mode (Mode-A) with nonpersistent CSMAschemefordecentralizedV2Vcommunication,andthe other is infrastructure mode (Mode-I) with TDMA scheme for centralizedI2Vcommunication.

R.B. Braga and H. Martin [5]proposed an algorithm that exploit geo location and local connectivity data for nodes in the network to make routing decisions, the intent of which is to find the best path to a destination node, given the constraints of local geography and thus graph topology produced by local connectivity between nodes. Common assumptions in geographical routing algorithms are that short distances between neighbouring nodes permit connections between nodes, and that streets and junctions providing lineof-sight connectivity between nodes form a natural planar graph

Greedy Perimeter Stateless Routing (GPSR) [7] follows greedy routing mechanism for routing in VANETs. During this protocol routing, every node sends a data packet to different intermediate nodes that are close to destination node, until the data reaches the destination. If there are not any neighboring nodes nearer to message's destination, it makes use of perimeter forwarding technique to come to a decision to which node the message should be delivered. GPCR is a stateless routing protocol which keeps information about its first hop neighbors' position that increases scalability of protocol over the shortest path ad hoc routing protocols.[12] A benefit of GPSR routing protocol is the dynamic forwarding packet decision it takes. This routing protocol comes across link failures that occur because of frequently changing topology of network and high mobility of the network. This drawback is handled via perimeter forwarding which causes huge data loss and because a large number of hops that is caused in perimeter forwarding technique, more latency time is taken. The information that is embedded in the packet header does not get updated, if destination node acquires a new position [9]

ACAR protocols find a route to a destination; it has unique characteristics that it maintains the cache of successful route between various source and destination pairs. It also predicts the position of destination vehicle repairs route as the position changes. Nodes using ACAR protocols send periodic Hello beacons that contain their velocity vector information. On receiving Hello beacons a n ode will record sender in its neighbor table and calculate its own velocity vector and velocity vector of its neighbor. Beacons can also be piggybacked on forwarded data packets to reduce wastage of bandwidth and congestion. Entries expire from the neighbor table when the distance between nodes exceeds the threshold value.[11,14] The ACAR protocols establishes the notation of a guard which is a g eographic marker message, it is buffered and passed from one vehicle to another to propagate the information. A guard is a temporary message that has an ID, a TTL (Time to live) counts, a radius and some state information. ACAR provides two forms of guards. The Standing guard and The Traveling guard. Routing errors may occur due to communication gap between anchor points or due to guards. So ACAR protocol has two recovery strategies to cope with the problem. The first strategy is Time out algorithm with active waiting cycle. The second strategy is walk around error recovery. The ACAR protocol has the ability to generate virtual information in the form of guards, which is a distinct advantage over other protocols

Hybrid Location-based Ad-hoc Routing (HLAR) Protocol[7]is an efficient position-based routing protocol is a scalable protocol that uses the positional information and helps in reduction of the routing control overhead in comparison to on-demand routing. HLAR protocol can act as on-demand routing protocol when either information of position is limited or is not sufficient enough and can overcome the problem where no nearer neighboring nodes to the destination node exist. HLAR also works as reactive routing protocol and helps in route discovery process[8]. When we do not get a route to the destination node, then the source node adds the data packet of its position and position of destination node to route request message to search for the nearest node existing to the destination. If any such node exists, then a route request message is further forwarded to it and if a closest node to the destination is found, then the source node broadcasts a request message to all of its neighboring nodes. [13]The mechanism is then repeated by the source node until the destination node is reached. Since the intermediate node does not have backward link to the source node, HLAR does not ensure if a reliable route exists.

3.PROBLEM STATEMENT

For the efficient data transmission during emergency ,the above mentioned existing protocols leads to high the end-to-end delay and does not guarantee the packet delivery ratio of different packets.So we proposed a Efficient Data Transmission Technique (EDTT) in vehicular adhoc networks for fast data transmission in emergency conditions, which yield better packet delivery ratio and lesser average transmission delay.

4.PROPOSED WORK

OCTOGONAL ROAD CONNECTING MODEL

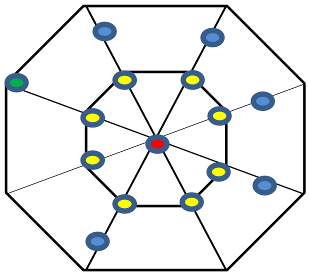
To solve the problem stated in Sec 3, we proposed to create Octogonal model for VANETs to obtain the transmission paths for emergency messages. The octagonal model is constructed by the roadlines and interconnecting roadlines.Roadlines begin from the center and form the framework of the structure. Interconnecting roads are the concentric circles around the center. The lines formed by road intersections with same layer are regarded as the Interconnecting roads. The road segments connecting the adjacent layer intersections can be regarded as the roadlines

In order to describe the mechanism, we define two types of control messages.

• request-opath is the request message sent by a source vehicle to a destination vehicle. It contains a priority flag, the source vehicle ID ,destination ID and intersections' ID which are in the routing path it need to forward.

. • response-opath is the confirmed message sent by a destination vehicle back to the source vehicles. It also contains a priority flag, the source vehicle ID ,destination ID and intersections' ID which are in the routing path from the source to the destination.

The main idea of EDTT is as follows. The source vehicle obtains its location, the destination vehicle's location and the road topology according to GIS and electronic map. By analysing these information, all available paths consisting of intersections from the source vehicle to the destination vehicle can be found. The source vehicle sends out the request-opath to the destination vehicle. The destination vehicle sends the response-opath along the original path back to the source vehicle after receiving the request. In Octogonal Road model, the source vehicle can select an efficient path with the shortest end-to-end delay. Between two adjacent intersections, the restricted greedy forwarding algorithm based on location prediction is used to forward packets. Each vehicle process the packets with the dynamic multi-priority queue management method according to the priority flag at the header of the packets. In this section, we implement the Octogonal Road model model.



Source Node Intersection node Ordinary Node Destination Node

4.1Establishment of the octagonal road model

S is the source vehicle, D is the destination vehicle, and the capital letters indicate the intersections as shown in Fig. 2. The source vehicle obtains the location of itself and the destination vehicle through GIS to determine the source intersection and the destination intersections. Subsequently, all available paths from source midpoint to destination midpoints arefound as below

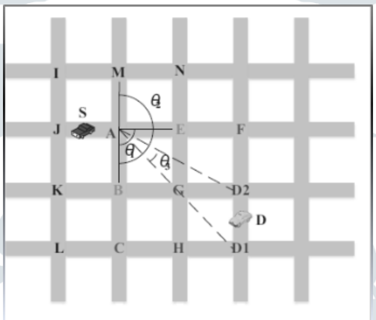


Fig 2 Determination of Search Area

4.2 Determining the source and the destination midpoints

There is only one source midpoint, but there are usually two destination midpoints defined in this paper. We select the source midpoint based on the distance between the source vehicle and the candidate midpoint, as well as the angle formed by the candidate midpoint, the source vehicle and the destination vehicle. Each candidate midpoint has a grade, and the candidate with the highest grade is selected as the source midpoint. The grade expression is as Eq. (1):

$$G(i) = \lambda(1-(d(i)/ L)) + (1-\lambda)D(i) \quad \rightarrow(1)$$

where L is the length of current road segment, d(i) is the distance between the source vehicle and the candidate midpoint i, λ is a weight parameter ($0< \lambda <1$). D(i) is the direction parameter expressed by Eq. (2).

$$D(i) = \begin{cases} 0 \ (\alpha > \pi\ 2) \\ 1 \ (\alpha < \pi\ 2) \text{ or } (\alpha = \pi\ 2 \ \& \ Dir = 1) \end{cases} \rightarrow(2)$$

In Eq. (2), α is the angle formed by the source vehicle, destination vehicle and the candidate midpoint, in which the source vehicle is as the vertex, the destination vehicle and the candidate midpoint are as the end points. Dir is the vehicle movement direction. If the vehicle is moving towards midpoint i, then Dir = 1, otherwise Dir = 0. For the destination midpoint, both ends of the road segment that the destination vehicle is located are generally considered as the destination midpoints. When the destination vehicle is at an midpoint, the current midpoint is considered to be the only destination midpoint.

4.3 Determining each-layer midpoints

A is the source midpoint, and D1 and D2 are the destination midpoints in Fig. 2. The midpoint B, E are determined as the first layer midpoints in the google map. The road segments of AB and AE are the roadlines in octagonal road model. Without loss of generality, we assume that I1 and I2 are the two neighbor midpoints of A, θ_{I1AI2} is the angle between the lines which connect A, I1 and A, I2. θ_{D1AD2} is the angle between the lines connecting A with D1, D2 in Fig. 3(a). AI1 and AI2 are defined as the roadlines. The condition θ_{I1AI2} and θ_{D1AD2} should satisfy Eq. (3)

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$$\theta_{D1AD2} \leq \theta_{I1AI2} \min \quad \rightarrow (3)$$

Note that when $\theta_{D1AD2} = 0$, there is only one destination midpoint. Besides, if AI1 and AD1 (AI2 and AD2) coincide, only the midpoint I1 (I2) is selected as the firstlayer midpoint. In that case there is only one first-layer midpoint. Otherwise θ^{I1AI2} min should be the minimum angle bigger than θ_{D1AD2}.

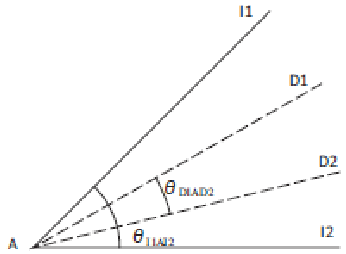


Fig 3a-First Layer Midpoint

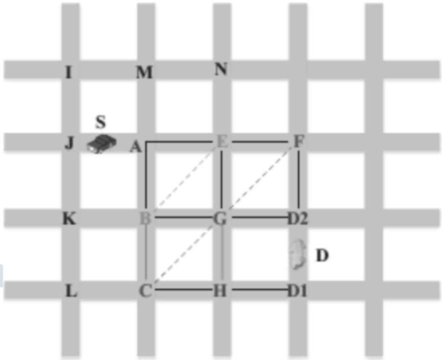


Fig 3b-Each layer Midpoint

Since the θ_{EAB} is the minimum angle bigger than θ_{D1AD2}, B and E are chosen to be the first-layer midpoints in Fig. 2. After finding the first-layer midpoints, the process will be repeated to find second-layer midpoints C, G, F. The process is repeated until the destination midpoints are searched. Through this strategy, we can construct the octagonal road model, according to which the available paths consisting of road midpoints can be found. The capital letters with the same color denote the midpoints of the same layer in Fig. 3(b). The black solid lines are the road segments, which referring to the searching paths represent the boundary road lines in this model. The dotted lines connecting the midpoint with same layer represent the interconnecting road lines which restrict the searching area. So the available paths consist of midpoints are ABCHD1, ABGHD1, AEGD2, AEFD2.

4.4 ***Selecting the transmission path***

Based on the available paths obtained in section A, the source vehicle sends out request-opath to the destination vehicle along each path before the transmission of data packets. When the destination vehicle receives a request-opath, it returns a response-opath to the source vehicle along the original path. The transmission delay of the path is calculated after the source vehicle receiving the response-opath. Besides, the source vehicle start a timer when it sends out the request-opath. If the request timer expires but there are no response-opath received, the source vehicle will restart to search the available paths, then it will send out request-opath again. The path which has the shortest transmission delay is chosen as the transmission path for emergency information

Table 1 shows the symbols used in algorithm path Discovery

Symbol	Description
ID_{sv}	ID of Source Vehicle
ID_{dv}	ID of destination Vehicle
ID_{nv}	ID if neighboring Vehcile
I_s	Source Midpoint
I_d	Destination Midpoint
w	Created octagonal model
t	Created path tree
T_s	Time Source ACAR send the request
T_r	Time Source ACAR receive the response

4.5 Algorithm for path Discovery

Procedure path_discover(ID sv,IDdv)
determine the Isv and Idv
create orthogonal road model w
create path tree t
get paths by DFS
send request-opath
activate (request_clock)
if receive response-opath when request clock is not timed out **then**
calculate packet delay(tr-ts)when receive response- opath
return the path with the smallest(Tr-Ts)
else
restart path discovery
end if
end if
end procedure

4.6 Greedy forwarding strategy

In this paper, we use a restricted greedy forwarding strategy based on location prediction to solve this problem. It predicts the location of neighbor nodes by calculating their information in neighbor list before forwarding packets.Then the forwarding node sends the data packet to the selected neighbor based on its predicted location. Each vehicle can determine whether it is an midpoint node. When an midpoint node broadcasts Hello messages which includes its location information, it identifies itself as an midpoint node in Hello messages. In this paper, vehicles are divided into midpoint nodes and ordinary nodes. Obstacles on the sides of the roads can obstruct the transmission of wireless signals. As a result, it is difficult to directly forward data packets from an ordinary node to another ordinary node in a different road segment, necessitating the help of an midpoint nodes to relay. In addition, the other reason why we divide nodes is because ordinary nodes' driving track is limited, but the movement of midpoint node is uncertain. In summary, it is necessary to divide vehicles into ordinary nodes and midpoint nodes, so that we can use different strategies to forward data packets. Vehicles in a highway environment can be assumed to be moving at a constant speed. But in an urban environment, the complex road conditions will lead to frequent change of vehicles speeds. In order to keep the calculation simple, we assume that the movement of vehicles is uniform acceleration linear motion in the Beacon period; this is justified due to the short duration of the beacon. The predicted position of node is given by Eqs. (4) and (5).

$$x = x_0 + v(t-t_0)\cos\theta + 1/2\alpha (t-t_0)^2 \cos\theta \quad \rightarrow (4)$$

$$y = y_0 + v(t-t_0)\sin\theta + 1/2\alpha (t-t_0)^2 \sin\theta \quad \rightarrow (5)$$

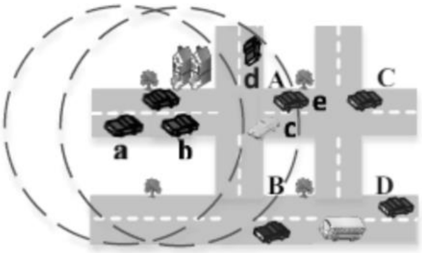
Set the rectangular coordinate system on the map, the origin of coordinates is the lower left corner of the map, the positive direction of the vertical axis (+Y) is north, and the positive direction of the horizontal axis (+X) is east. (x_0,y_0) denotes the position of the vehicle, v and a denotes the speed and the acceleration of the vehicle at time t_0. t_0 is the time that current node receives the Hello message. θ is the angle between the direction of movement and the positive direction of the x− axis. t is the current time, (x,y) is the predicted position of the vehicle at time t.

Forwarding from an ordinary node

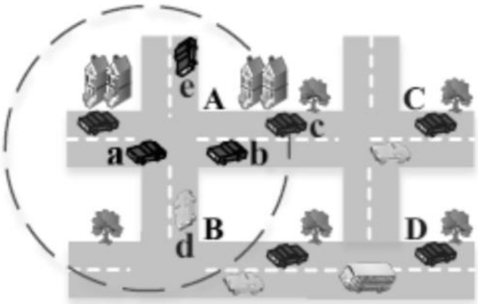
In the road segment between two adjacent midpoints, the ordinary forwarding vehicle predicts the real-time position of its neighbor vehicles before forwarding the data packet. If there is no available midpoint node in its neighbor list, the data packet is forwarded to the ordinary node which is closest to the next midpoint. If there are midpoint nodes in the neighbor list of the forwarding vehicle, it will check whether the current road segment and the subsequent road segment in the selected path can be combined into a long straight segment. If so, the forwarding vehicle will send the data packet to the neighbor node closest to the midpoint which is the farthest midpoint of this long straight segment. Otherwise, it will forward the data packet to the midpoint node which is at the corner midpoint in the transmission path. If there is no available node, the forwarding vehicle will ACARry the packet until it finds an available next hop

4.7 Forwarding from an midpoint node

The information at the header of the packet will be checked to determine the next road segment in the transmission path. Then the current midpoint node will forward the data packet to its neighbor which is closest to the next midpoint. Fig. 4 is a sketch to illustrate these situations. In Fig 4(a), a is an ordinary node who wants to forward data, b, d and e are predicted real-time location of the ordinary nodes. c is an midpoint node. Vehicle a forwards the data packet to the ordinary node b first. Then, if the next midpoint marked in the packet header is B, node b will forward the data packet to the midpoint node c. Else if the next midpoint is C, the data packet will be directly forwarded to the ordinary node e. This is because the current road segment and the next road segment can be combined into a long straight segment and e is the closest node to the remote end of this long straight segment. In Fig 4(b), a is the forwarding node, b, c, d and e are the real-time position predicted based on the information in the neighbor list of a. If the next midpoint is C, a will forward the data packet to ordinary node c because node c is the closest node to midpoint C.



4)a)Forwarding from Ordinary Node



4)b)Forwarding from Midpoint Node

4.8 Next hop Selection

The get current Midpoint and get next Midpoint functions are called to determine the current midpoint Ic(i.e., the last midpoint the packet passed, initialized with the source midpoint) and the next midpoint In (initialized with the source midpoint too) which is to be forwarded next The information of the transmission path is recorded in the packet header. Then, check Midpoint function will judge whether the current vehicle is an midpoint node. If it is an midpoint node, the data packet will be sent to the vehicle which is closest to In in its neighbor list . If the current node is an ordinary node, it will search the neighbor list to find whether there are midpoint nodes or not. If there are midpoint nodes in its neighbor list and the next road segment to be forwarded is located on the extension line of the current road segment, the data packet is sent directly to its neighbor node closest to the farthest midpoint of this long straight segment If not, a neighbor node at the next midpoint is selected as the next hop randomly, and the data packet is forwarded to it .If there is no midpoint node in its neighbor list, the forwarding vehicle will send the data packet to the neighbor node closest to the midpoint In

Algorithm for Nexthop Selection

procedure get_nexthop(ID)
I_C<- get current_Midpoint(ID,P)
I_n<-get next_Midpoint(P,I_c)
  If check_midpoint(ID)=1 **then**
    forward to its N_{nv} closet to In
  else
    if ID $_{iv}$ in ID_{nv} **then**
      if check_Segment(I_c,I_n,P)=1 **then**
        forward to its N_{nv} closest to I_n
    else
      random forward to ID_{iv} among its ID $_{nv}$
      end if
   else
     forward to its N_{nv} Closet to I_n
     nd if
  end if
end Procedure

V. DYNAMIC MULTI-PRIORITY SCHEDULING SCHEME FOR EMERGENCY PACKETS

In this paper, we divide data packets into three different priorities with Pq1, Pq2 and Pq3 according to the emergency levels of the events creating the packets, Pq1 represents emergency packets with highest priority with minimum time delay requirements, which are about public security and personnel life, such as traffic accidents causing casualties.. Next is Pq2, which are about public safety, but the delay requirements are lower than Pq1. In order to analyze the timeless of different priority data packets, in this paper we define the following variables: t is the end-to-end delay of the data packet forwarding from the

source vehicle to the destination vehicle, t(x,y) is the transmission delay for the data packet from vehicle x to vehicle y, t(x,y) is the waiting time for the packet sending from x to y. Thus, the end-to-end delay t for the data packet forwarding from source vehicle S to the destination vehicle D can be expressed as

$$t = t(S,D) + t'(S,D) \rightarrow (6)$$

t includes following four aspects. (1) the time for each vehicle to receive the data packet, denoted as t_r (2) the time for each vehicle to process the data packet, denoted a t_{proc} (3) the time for the each vehicle to push the data packet into the medium, denoted as d_s / v_t , where d_s is the size of the packet and v_t is the sending speed; (4) the transmission delay of the packet from the source vehicle to the destination vehicle, denoted as d/ vp, in which $d = \sum_{i-1}^{n} di$ is the total length of the routing path from the source vehicle to the destination vehicle and the v_p is the speed of propagation. The relationship between t(S,D) and these variables can be expressed by definition 1.

Definition 1: The transmission delay of packet from S to D.

$$t(S,D) = n * (tr + tproc + ds/Vt) + d/vp$$

t_r, v_t, and t_{proc} are equal when sending different priority data packets of the same size at the same vehicle. Therefore, if the forwarding paths for different priority data packets sent from S to D are same, the values of $t_{(S,D)}$ are equal. Thus, the end-to-end delay of different priority data packets is mainly affected by the waiting time $t'_{(S,D)}$. Assume that the packet needs to be forwarded by n nodes during the transmission from S to D. $N_{i,j}$ is the number of packets in the queue with the priority j (j = 1, 2, 3) at node i. $k_{i,j}$ represents the number of packets in queue with the priority whose deadlines are shorter than current packet. We define the packet waiting time as follows.

Definition 2: The total waiting time of the packet with priority j transmitted from S to D is

$$t^{\wedge\prime}(s,d) = \sum\_(i-1)^{\wedge}n = [((k\_(i,j) + N\_(i,1+\cdots.+)\, Ni,j-1) * (tr + tproc + ds/vt)]$$

By the definition 2, the complete waiting time of the packets with the priority Pr1 is shown in Eq (9).

$$t_1{}^{\wedge\prime} = \sum\_(i-1)^{\wedge}n = ((k\_(i,1) * (tr + tproc + ds/vt))$$

The data packets with priority Pr2 need to wait for transmission of all packets with the priority Pr1 and the packets whose deadlines are shorter than itself with priority Pr2. So, the total waiting time for it is shown in Eq (10)

$$t_2' = \sum\_(i-1)^{\wedge}n = ((k\_(i,2) + N\_(i,2\ \ +)\, Ni,1) * (tr + tproc + ds/vt)$$

Similarly, for the data packets with priority Pr3, the complete waiting time includes the waiting time of transmitting all packets with priority Pr1 and Pr2, and the waiting timeof transmitting the packets whose deadlines are shorter than itself with priority Pr3. It can be described as Eq (11).

$$t_3' = \sum_{i-1}^{n} \left((k_{i,3} + N_{i,2} + Ni,1) * (tr + tproc + \frac{ds}{vt}\right)]$$

According to Eqs. (9) , (10) and (11), it is obvious that t1 is the shortest, and t2 is shorter than t3. Thus, the end-to-end delay of the most emergency messages is the shortest. That proves our mechanism will deal the emergency messages first and it is useful to reduce the end-to-end delay of emergency messages. When a vehicle receives data packets, the vehicle pushes the packets into different priority queues based on the priority flag in the header of the data packets. The three priority queues share the same buffer. When the buffer is full, data packets will be disACARded from the lowest priority queue to ensure that the higher priority packets are not lost. Besides, the incoming packets with higher priority will be processed. However, the lower priority packets which arrived earlier need to wait until all packets with highe rpriority have been processed. The packet whose deadline is closest to current time in the current priority queue will be dequeued first.

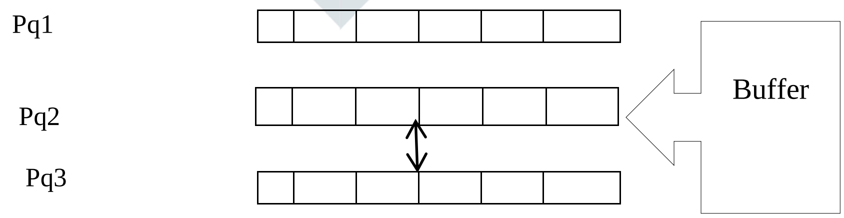


Table 2 Shows the terms used in algorithm of path Enque

Symbol	Description
Pe	*The packet enqueued*
Pd	*The Packet dequeued*
to_drop	*The packet to drop*
priority	*The priority of the packet*
q_lim	*Limited length of Queue*
q1	*Pr1 queue*
q2	*Pr2 queue*
q3	*Pr3 queue*

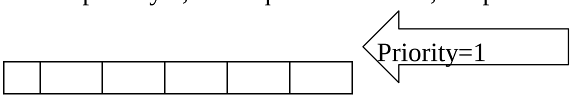
q1_l	*Length of q1*
q2_l	*Length of q2*
q3_l	*Length of q3*
Td	*The deadline of the Packet*
Tc	*Current Time*

Algorithm Path Enque

```
Input:Pe
Procedure enque(Pe)
Up on receiving packets
    If priority=1 then
        q1->enque(Pe)
          if( q1_l+q2_l+q3_l) q_lim then
              to_drop<-last packet of q3
             if  to_drop=0 then
                    to_drop<-last packet of q2
                if  to_drop=0 then
                    to_drop←Pe
                     drop to_drop
      else
         drop to_drop
        end if
else
         drop to_drop
        end if
end if
else if priority=2 then
  q2 →enque(Pe)
if( q1_l+q2_l+q3_l)>q_lim then
         to_drop←last packet of q3
              if to_drop=0 then
                if  to_drop=0 then
                         drop Pe
else
         drop to_drop
     end if
end if
else if priority=3 then
              q3→enque(Pe)
   if( q1_l+q2_l+q3_l)>q_lim then
             drop Pe
        end if
end if
end procedure
```

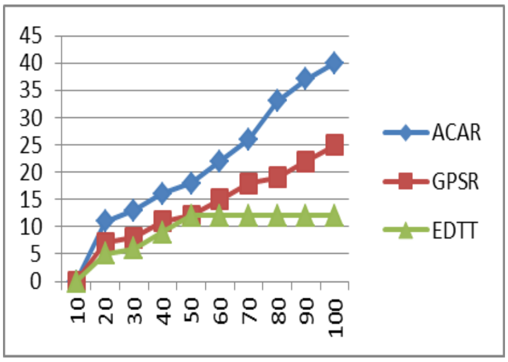
The above algorithm describes the process of the node inserting the packets into different priority queues. We use linked list to implement the priority queues. If the packet priority is 1, the packet is pushed directly into queue Pq1 . If the buffer is overflow after that, the tail packet in Pq3 queue is assigned to to drop If to drop is null, The packet at the tail of Pq2 queue is assigned to to drop. If to drop is null too, the received packet Pe will be dropped.The procedure to put packets with priority 2 into Pq2 queue are similar to the above process. Put the packet into Pq2 queue first And if the buffer is full, the tail packet in Pq3 queue is assigned to to drop . To the packets with priority 3, if the queue is not full, the packet is pushed into Pq3 queue .Otherwise Pe will be dropped

Pq1

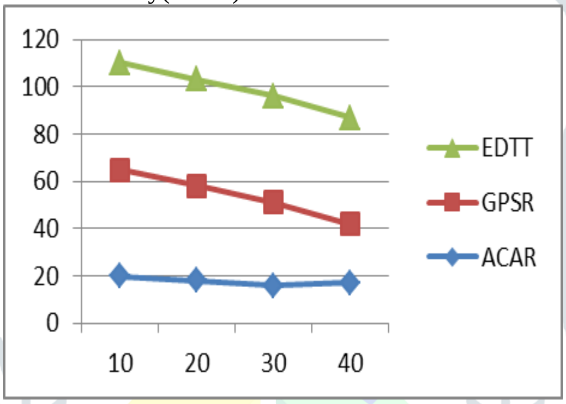


VI RESULT ANALYSIS

Average Transmission Delay (ATD): The performance of ATD of each protocol for all packets is evaluated with different PGS . It can be seen that the ATD of four protocols increases when PGS increases. EDTT has the least ATD when compared to the other three protocols because we select the routing path according to the least time delay resulting in significant reduction of ATD. The below graph shows packet generation rate (X axis)Vs Average Transmission delay(Yaxis)



Packet Delivery Ratio (PDR): PDR with different PGS of emergency packets Pq1 and all packets. Considering media access conflicts and channel fading, especially taking into account the influence of obstacle on signal decay, packets may be sent out, but may not be successfully received. Fig. 9 shows the correspondence between PDR of all data packets and PGS. The PDR of all four protocols decreases as PGS increases. This is because when the PGS increases, the probability of packet loss increases due to channel failure, buffer overflow, or expired packets. The overall performance of EDTT is best, both in low network load and high network load. This is because the source vehicle sends request-opath and destination vehicle sends response-opath to confirm that the path is available. Data packets are transmitted on reception of confirmed-spiders by the source vehicle. Besides, we predict the location of the vehicles so that the link failures due to vehicle movement have been effectively reduced.The below graph depicts packet generation rate (X axis)Vs Traffic Node Density(Yaxis)



VII CONCLUSION

To fulfil the real-time constraints of emergency data, we proposed EDTT, a novel orthogonal road connecting model provide transmission mechanism for emergency data. We create a orthogonal model to restrict the searching area. Source vehicles send out request opath and destination vehicles send respone-opath in this restricted area to establish efficient transmission paths. EDTT can reduce the data transmission delay of emergency messages by using the dynamic multi-priority queue management method to process packets. In this method, the high-priority emergency messages are processed first and the deadlines of the packets are also considered. When forwarding data packets, we use restricted greedy forwarding strategy to choose the next hop.

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