COMFORT APPLICATIONS IN VANETS: E-BUSINESS

Mohammad Shahverdy*

Maryam Asgari*

ABSTRACT —

Nowadays vehicular ad-hoc Networks (Vanets) are being popular so that this is the inseparable component of vehicles. Vanets consist of two applications: safety and comfort. In this paper we want concentrate on comfort applications.

Medical application, Game, Finding best path, Smart Parking and E-business are some instances of Vanetsapplications which will be investigated in this paper. Furthermore we will introduce the E-business in Vanet which is unknown as compare as other applications and we are going to show how it can improve the quality of life.

Keywords: *vehicularad-hoc network(vanet), comfort application, E-business*

* Computer Engineering Faculty, Islamic Azad University-Tafresh Branch, Iran

I. Introduction

Due to recent surge of interest to vehicular networks, it is expected that comfort application of vehicular ad hoc network becomes crucial in the near future. With Road Side Unit (RSU) such as 802.11 access point, vehicles can access data stored in the RSU or even access the Internet through these RSUs. The Federal Communications

Commission (FCC), realizing the problem of traffic fatalities in the US dedicated 75 MHz of the frequency spectrum in the range 5.850 to 5.925 GHz to be used for vehicle to vehicle and vehicle to roadside communication. The potential applications for the standard which is called Dedicated Short Range Communication (DSRC) includeSafety applications and comfort applications [1, 2, 3, 6 and 7].This paper studies a wide group of comfort applications which need vehicle-to roadside unit communications. In this case RSUs can act as buffer point between vehicles or act as a router for vehicles to access the internet.. The following instances are some example for RSU applications:

- Web Applications: The travelers can connect to the internet and use its services such as surfing on web checking Email or chatting.

- Real Time Traffic Report: Vehicles can report real time traffic seeing to RSUs. Then the traffic data transferred to a traffic control center for analyzing. The consequences of analyzed traffic data are returned to RSUs and they can be accessible to the vehicles.

- Digital Map Downloading: When vehicles driving to a new region, they may want to update map data locally for trip guidance such as altering unilateral and deadlock roads or adding new paths.

- Online TV or Radio: RSUs can broadcast internet TV or radio and vehicles can receive them.

- Informing important messages: safety or emergency data can be uploaded on RSU by police or other vehicles then RSU distributes the message to vehicles.

The rest of this paper is organized as follows. In section II we first introduce medical applications as a new application of vanets. In section III smart parking are discussed. In section IV we highlight the role of the RSU to finding the best path to a specific destination in large city. In section V we introduce e-business on Vanet which is novel in comparison with other applications. Finally we conclude the paper in Section VI.

II. MEDICAL APPLICATIONS

In some diseases such as epilepsy and heart attack it is necessary to control some vital signs periodically and get appropriate decision based on disease signs. Suppose that a heart attack occurs for a driver while he driving in a highway. It may make a catastrophe for driver and other passengers of car and even for vicinity vehicles. Majority of these diseasescan be predicted by vital signs. These vital parameters can sense by some body sensors then they transfer to emergency medical center. Emergency teamanalyzes the vital data and gets decision to send some solutionsvia vehicular ad hoc network ordispatch anambulance [5].
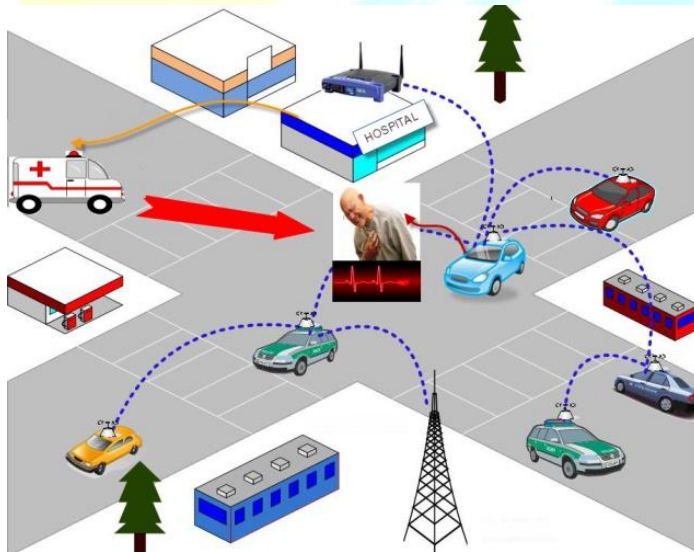

Fig1. Medical application

III. SMART PARKING

Finding parking space in crowded places is one of the fundamental concerns of drivers. Suppose that vehicles equipped to network interface and parking hasnumerous roadside units (RSU).RSUS can communicate with vehicles in parking and can find vacant places. When a new vehicle enters to parking then sends a request to RSU to finding a nearest empty parking space. RSU have all empty spaces of parking and update its dada via vehicular ad hoc network. It means that if a vehicle leaves the parking, its parking space in RSU databasewill be released.RSU reportsthis empty parking space to new vehicle [4].

Furthermore RSUs can protect the vehicle by intelligent anti-theft protection service. This service can aware car'sowner if the vehicle is accessed by another person without permission. This technology supports the vehicles against theft or crash especially in crowded places.

IV. Finding The Best Path To Destination In City

Finding the appropriate path to the specific destination is fundamental action for driverin large city because this reduces the traffic jam and saves time and price for them and it is very economical for government totally[1,2,3].

Vehicles can find the best path to the specific destination by use of vehicular ad hoc network. Assume that each cross-road in the city has a RSU which are connected to each other through a high speed backbone and all vehicles communicate with them (Fig2). RSUs know about number of vehicles in each street thus they know about traffic jam in each street and which streets are more quiet. Moreover vehicles can download latest map of each city and latest changes of them such as altering in streets, traffic lights or new highway.

Thevehicles send a request to RSU and ask for a best path to a specific destination. RSU servers cooperate together and find the nearest path which has lowest traffic. Information of RSUs is updated frequently thus the founded path is accurate and even it can be corrected on demand with changing destination or traffic jam.

V. E-Business on Vanet

Today electronic business is one of the best way witch manufacturers and shoppers can introduce and sell their products and customers can easily purchase them. With the growth of networks especially internet, E-Business has been popular in the world. Vehicular ad hoc network is a ubiquitous network which can be used as a ready structure to expand the E-Business. Shopping centers and factories can advertise their products via the Vanet. For example a store may upload the list of its outputs on the nearest RSU. Then RSU broadcast this propaganda to vehicles [1, 2].

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories
Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A.

International Journal of Engineering & Scientific Research
http://www.ijmra.us

93

Moreover a driver may need to buy anything from nearest store and even from a store with the lowest price. A message is produced by driver which contains the name of request and the position of vehicle that can estimate by GPS (Global Positioning System). This message will be sent to a RSU to find the best store. Then send a message to the vehicle which requestedforit. In this way, not only driver can find the best and nearest store but also it can prepare a structure which costumers compare different options without need to park and visit several stores. This novel type of E-Business simplifies the life, leading to vast improvement in traffic jam, reducing the air pollution and saving time and cost.

Fig2. Finding the best path todestination in city

VI.   Conclusion

In this paper we surveyed some applications of vehicular ad hoc network such as medical applications which can save the life of drivers, smart parking which helps drivers to find a free space for parking and a structure which can find the best path to a specific destination andnavigate the vehicles to it.

Moreover we proposed a structure for expanding E-Business on Vanet which prepare an area for sellers to advertise their product. Furthermore the request of drivers can be ready before drivers reach to store or even they don't need to take down from their cars.We showed that how this novel application can save price and time.

References

[1] M. Shahverdy, M. Fathy, S. Yousefi, "Scheduling Algorithm for Vehicle to Road-Side Data Distribution", ICHCC-ICTMF 2009, Berlin Heidelberg, CCIS 66, pp. 22–30, 2010.

[2] S. Yousefi, T. Chahed y, M. Moosavi, K. Zayer, "Comfort Applications in Vehicular Ad Hoc Networks Based on Fountain Coding"VTC2010-spring vehicular technology conference,Taipei, pp.1-5,2010

[3] S. Yousefi, M. S. Mousavi, M. Fathy, "Vehicular Ad Hoc Networks (VANETs): Challenges and Perspectives," IEEE Proceedings of 6th international con ference on ITS Telecommunications (ITST2006), China, pp. 761-766, 2006.

[4] R. Lu, X. Lin, H. Zhu, X. Shen, "SPARK: A New VANET-Based Smart Parking Scheme for Large Parking Lots", INFOCOM 2009, IEEE, Rio de Janeiro, pp. 1413 – 1421.2009

[5] H. Noshadi, E.Giordano, H. Hagopian, G. Pau, M. Gerla, M. Sarrafzadeh, "Remote Medical Monitoring Through Vehicular Ad Hoc Network", Vehicular Technology Conference. VTC 2008-Fall. IEEE 68th, pp. 1 – 5, 2008

[6] Y. Toor, P. Muhlethaler, A. Laouiti, "Vehicle Ad Hoc networks: applications and related technical issues", Communications Surveys & Tutorials, IEEE, pp. 74 – 88, 2008

[7] S. Yousefi, M. Fathy, "Metrics for performance evaluation of safety applications in vehicularad hoc networks", Transport, Vilnius: Technika 23(4), 291–298 (2008)

[8] C. Su, L. Tassiulas, "Broadcast scheduling for information distribution", In: Proceeding ofInfocom 1997 (1997)

[9] D. Aksoy, M. Franklin, "R*W: A scheduling approach for large-scale on-demand dataBroadcast", IEEE/ACM Transactions on Networking 7 ,1999

[10] S. Acharya, S. Muthukrishnan, "Scheduling on-demand broadcasts: New metrics and algorithms"In: Proceeding of MobiCom 1998

[11] Luo, Jun and Jean-Pierre Hubaux" A Survey of Inter-Vehicle Communication", Technical Report IC/2004/24, School of Computer and CommunicationSciences, Lausanne, Switzerland, March 2004.

[12] Y.Zhang, J.Zhao, G.Cao. On Scheduling Vehicle-Roadside Data Access. ACM September 2007

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories
Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A.
International Journal of Engineering & Scientific Research
http://www.ijmra.us

95