INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) www.irjaet.com

ISSN (PRINT) : 2454-4744 | ISSN (ONLINE): 2454-4752

Vol. 1, Issue 4, pp.165 -170, October, 2015

Optimized Wireless traffic service for combined V2V and V2I communications

P.Mahalakshmi
Asst.Prof/EEE, Ganadipathy Tulsi's Jain Engineering college

R.Geetha
Associate Prof/EEE, Ganadipathy Tulsi's Jain Engineering college

ARTICLE INFO

Article History:

Received 1st Nov, 2015
Received in revised form 3rd Nov 15
Accepted 5th Nov, 2015
Published online 5th Nov, 2015

Keywords:

Bilateral communication, GPRS, Pilot system

ABSTRACT

In this paper we focus on bilateral communication between vehicle to vehicle and infrastructure consists lots of industrial communication, Here we detect accident traffic Jam and new services updation instant news using GPRS tracking device. We are going to support vehicle and infrastructure to communicate each other. In this platform we specify some set of services. Example weather report, Accident warning alert etc,. Here it is supported by GPRS base station and GPRS device. The ultimate goal was to enhance traffic safety and smoothness, but also to generate a completely new communication entity, allowing new types of applications, services, and business opportunities. The platform simulations, field tests, and analysis show that the platform operability and efficiency are suitable for a large-scale traffic system, to be verified in the pilot system deployment.

INTRODUCTION

The vehicle-to-vehicle (V2V) communication platform is currently a popular research topic, with several different approaches. Many approaches exist, each with a slightly different focus. Traffic safety enhancement is the driving factor in many approaches, typically leading to a solution where sensor data from vehicles and roadside units is used for providing accident and/or weather warnings to roadside units and vehicles. Similarly, observations of and information on traffic are used to increase efficiency of road network usage. Also, the capability for continuous communication is an important goal; however, bringing together the competing goals of instant data delivery required by safety applications and bidirectional data access with relatively high capacity has not gained much attention.

In this project the aim was to build more comprehensive solution for V2V and V2I communication were to tackle the communication between fast and independently moving, efficient and fast delivery of critical data regardless of the location or presence of other vehicles, and generation of services that not only enhance traffic safety and efficiency, but also thoroughly exploit our platform capabilities. We have also considered the special cases of commercial platform deployment phase and operation in rural areas where there is no high density base station network in use, but we should still be able to provide an (almost) equal level of services.

The ultimate goal of this concept is to allow V2I and V2V communication. By aiming at an architecture for a commercial platform, we can- not expect any company to deploy a high-density network throughout the operating area instantly, but instead need to provide a solution that can provide a decent level of operability with minor installations (coarse base station network) and expand it based on commercial success. For this purpose we have employed hybrid communication of General Packet Radio Service (GPRS) and wireless networking. Wireless networking stands for the ultimate communication platform, while GPRS's primary purpose is to provide an alternate communication solution for cases of system failures or out-of-range locations. Especially in the platform deployment phase and rural areas, GPRS plays an important role

RELATED ACTIVITY

V2V communication is the Car-to-Car Communication Consortium (C2C-CC) driven by major car manufacturers, aiming to generate decentralized floating car data (FCD) communication capabilities between cars [3]. The objective in C2C-CC is to provide mainly broadcast services, such as broadcasting accident warnings from car to car and roadside information from the traffic infra- structure to cars. In the field of telecommunications the aim is to support the standardization activities driven by IEEE (WAVE — IEEE 802.11p, IEEE 802.11 a/b/g, IEEE 1609) [3–5]. In this project compatibility between WAVE standards and C2C-CC work has always been an essential issue.

In the United States the Department of Transportation is coordinating the Vehicle Infra- structure Integration (VII) program, closely related to C2C-CC except that it is government supported and coordinated. VII supports V2I and V2V communications in the federally allocated 5.9 GHz bandwidth, also allocated by the European Union. The communication between vehicles and infrastructure is operated via dedicated short-range communication (DSRC) as defined in IEEE 1609. Primary applications and targets are advisory (usually safety-related) messaging from infrastructure to vehicles, probing anonymous data from vehicles to infrastructure and other vehicles in a secure manner [6, 7]. In this project the VII has been seen as a parallel and mainly mutually compatible approach with C2C-CC work; therefore, compatibility with VII is maintained as high as possible.

The European CVIS project generates an open standards-based communication, positioning, and networking platform for both V2V and V2I communication. Services provided are mainly related to traffic safety and control. The communication architecture is based on the CALM standard, bringing together different communication methods (IEEE 802.11p networking, second/third generation [2G/3G] Global System for Mobile Communications [GSM]-based communication, and infrared [IR] communication) into a single architecture. The ultimate goal of parallel solutions is to provide an "always connected" system [8]. In Japan a similar kind of traffic service communication platform is called VICS. VICS is a slightly older system, the main architecture concentrating only on communication between vehicles and infrastructure. However, the deployment rate of the solution is much higher than solutions in the United States and Europe [8, 9]. The European COOPERS project is also developing a communication system for traffic environments, mainly to generate services relying on V2I communication (although V2V communication is also supported). The goal is to provide continuous wireless communication via DSRC technology, for services like accident and weather warnings and traffic management. The COOPERS solution uses multiple wireless technologies like CALM-based IR Wi-Fi communications and GSM/GPRS [10].

While the CVIS and COOPERS projects are mainly focused on increasing the efficiency of the road network in Europe, the e-Safety initiative [10] of the European Union and the EU's COMeSafety project are tightly focused on road safety enhancement. While COMeSafety is acting merely as a coordinating forum for related research, the SAFESPOT project represents a technical approach. SAFESPOT combines the sensor information gathered from both vehicles and roadside units into traffic incident and accident warnings [12]. A comparison of CVIS, SAFESPOT, and COOPERS is presented in [13]. CVIS is seen as the core cooperative technology (with concept proof of the CALM standard), SAFESPOT as cooperative systems to process highly critical (vehicular) tasks, and COOPERS as a road operator interface to cooperative vehicular networking. The Carlink project combines these elements in its own approach.

A similar approach of cars distributing accident warning data V2V and even forwarding warnings car by car is presented in [14]. The LIWAS traffic warning system [15] is designed to provide early warnings to vehicles about adverse road conditions like slippery road surfaces. Other approaches also exist, the most important ones being PREVENT (aiming to control vehicles directly for, e.g., braking without driver command to avoid an accident), GST, NOW, and Sevecom. Most of the European activities in this area are more or less related to the C2C-CC work.

Compared to the related work, the Carlink approach has many similarities and even common elements with all of the related approaches. The main advantages of Carlink are the open platform solution, the flexibility and scalability of the plat- form into different types of services and capacity/communication requirements, and operation reliability based on dual radio communications

WIRELESS PLATFORM AND SERVICES

The platform itself is the key element, but the services created for the platform also have crucial roles. On one hand, they generate different ways to use and exploit the platform, proving its efficiency. But on the other hand, the services are the platform's showcase toward consumers; in order to interest consumers in purchasing the platform (and furthermore the vehicle industry in integrating platform equipment in vehicles), we had to have some key services interesting enough for consumers. We did not build up an extensive package of services, but just a couple of key services to prove the applicability, usefulness, and necessity of the platform. The (hybrid) platform, even with a low deployment rate is in our vision a so-called killer application, raising public interest and therefore commercial success, leading to large-scale deployment and generation of a wide spectrum of independent services.

The Wireless Traffic Service Platform is divided into three parts: the traffic service central unit (TSCU), the base station network with traffic ser- vice base stations (TSBSs), and mobile end users (MEUs) with ad hoc connectivity and (non-continuous) backbone network connectivity the platform is presented in Fig. 1. The plat- form consists of MEU units embedded in vehicles (the lowest part of the figure), TSBSs beside the road (the middle of figure), and the host sys- tem TSCU beyond the BS network (near the top of the figure). The MEUs form a wireless network. They do not have continuous connectivity but operate in an ad hoc manner with each other whenever possible, typically when two cars pass each other. Always when a vehicle with a MEU passes a TSBS, it will get up-to-date traffic platform information stored in the TSBS. The TSBS receives regular updates to the traffic platform information from the TSCU, located in the fixed network beyond the TSBS. The TSBS acts as an interface between the fixed and wireless networks. The MEU also transmits data to/from the TSCU over the lower-capacity (GPRS) alternative connection when critical weather, warning, or accident information emerges.

We have defined the set of services for the platform with specified pilot service applications, listed in Table 1. The incident and emergency warning service uses vehicle data to generate warnings considering exceptional traffic conditions or accidents. The local road weather service (RWS) collects observed weather data from vehicles and TSBSs, and together with weather information from other sources it is used to generate comprehensive precise local road weather analysis and forecasts to be forwarded back to cars. The remaining services listed deliver commercial-like traffic congestion data for public authorities and travel data to users on the move. In this article we concentrate on the local RWS and incident/emergency warning services, since together they exploit most widely the capabilities of the Carlink platform, and based on our expectations form the killer application of our platform.

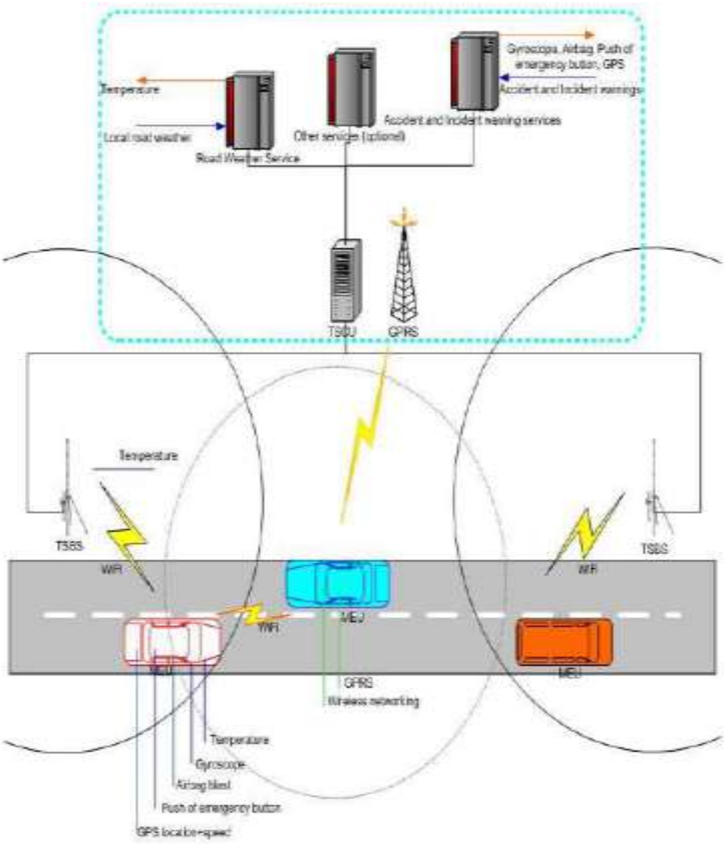

Fig 1 Car link platform

Services	**System specific service**	**Description**
Accident warning	Emergency Button (or) Airbag burst	Button (or) Airbag pushed in vehicle, accident location distributed throughout the platform
Incident warning	Vehicle throwing	When vehicle gyroscope registers lateral movement, incident location distributed throughout the platform
	Sudden break	When vehicle gyroscope registers rapid decrease of speed, incident location distributed throughout the platform
Local Road Weather	Current local road weather information	Weather data from TSBS and exceptional weather data from vehicles distributed throughout the platform

Fig 2 Platform services

The operation in the local RWS and warning services is uniformly constructed of the procedure presented in Fig. 2. The service operation proceeds in the figure downwards from the top. The TSCU maintains up-to-date RWS information, forwarded regularly to the TSBSs in the area of interest. Each TSBS therefore has up-to-date local RWS information, which is delivered to every MEU passing by. The MEU receives and applies the weather data; in exchange, it forwards the collection of its own weather and traffic related measurements. This data is delivered back to the TSCU and is used to update the RWS data and generate potential additional warnings.

PLATFORM SERVERS

In this fig-1 the platform constructed a pilot deployment of key parts of the system to validate the operability and performance. The control unit is on the top with connections to the underlying service cores, the local traffic weather service, the accident warning and incident warning services it take care of user management , the TSCU of system maintains the performance of platform elements , It gather and stores the data and forward the appropriate data for the needed vehicles, The accident and incident warning services parameters are an airbag blast, a push of the emergency button in the car, gyroscope status (indicating possible swinging, sliding or sudden stopping of vehicle), all of them including the GPS location of the observed issue. The RWS core includes a weather forecast model generating local road weather outlook based on FMI's operational measurements. This model is supplemented with car measurements (temperature and GPS-location of observations) to complement the weather information. The resulting local road weather information is delivered to the TSCU, responsible for forwarding this data to the vehicles through the platform. Similarly, the accident and incident warning services collect vehicle data to build up warnings for exact locations, returned to the TSCU. Depending on the significance of the warning the TSCU selects the appropriate path for the warning data distribution. The most critical warnings (e.g. accident location) are delivered through the GPRS connection as rapidly as possible, while the more informative-like warnings can be distributed through the base stations.

The network of TSBSs below the TSCU (Fig. 1), mainly act as a data transmitter from the TSCU to the MEUs and vice versa. The TSBS is also collecting weather data itself and delivering it to the TSCU. The MEUs in vehicles are the users of the Carlink platform, gathering data along the roads they are driving, delivering it up to the TSCU and the underlying services and, finally, consuming the weather and warning information (partially) derived from the vehicle based data. The parameters gathered from the vehicle are: temperature, car gyroscope information, airbag blast notification, push of emergency button notification and the GPS location for each data source. The gyroscope and the GPS-system each have their own interfaces, while the push of the emergency button will be gathered from the drivers user interface. The remaining parameters (temperature, airbag blast notification) are coming from the vehicle CAN-bus gateway. The Wi-Fi and the GPRS interfaces are used for the communication with the TSBSs and the TSCU

APPLICATIONS

We can implement this project for vehicle tracking using GPRS, Accident alert, traffic jam, Incident warning, Local Road Weather for the society and to serve public

- Goods Carrier Companies
- BPO vehicles
- Radio Taxis
- Schools, Commercial Buses and City Transportation

- Car Rental and Leasing Companies
- Refrigerated Vehicles
- Oil Tankers
- Infrastructure and Construction Companies
- Company Owned Vehicles

CONCLUSIONS

We have presented the Carlink concept of a hybrid wireless traffic service platform between cars, and a safety-oriented pilot system deployment. The ultimate goal has been to create a safety-enhanced intelligent communication platform for vehicles where they can deliver their own observations of traffic and weather conditions to the platform core. This information is delivered back to the vehicles as analyzed (and forecasted) information about road weather conditions and as immediate accident and incident warnings. Compared to competitive solutions presented in the related work section, the Carlink solution has successfully showcased a true bidirectional communication entity for variety of traffic

and safety services. The solution has been presented at a concept level with support of a true pilot deployment, and the performance is evaluated with supporting field measurements. Although the focus has been on the vehicular networking, the platform solution is also adaptable to conventional networking.

REFERENCES

[1] "Vehicular Networking Pilot System for Vehicle-to- Infrastructure and Vehicle-to-Vehicle Communications" Timo Sukuvaara1 and Carlos Pomalaza-Ráez2 Vol. 1, No. 3, December 2009

[2] T. Sukuvaara, D. Stepanova, P. Nurmi, P. Eloranta, E.Suutari and K. Ylisiurunen; (2007) " Wireless Traffic Service Communication Platform for Cars", 2nd IEEE Workshop on Automotive Networking and Applications (AutoNet 2007) Co-located with IEEE GLOBECOM 2007 November 30, 2007 – Washington, DC, USA

[3] T. Sukuvaara, P. Nurmi, P. Eloranta and E. Suutari, "Advanced Wireless Vehicle Networking Platform for Real-Time Incident and Weather Information", 15TH World Congress on ITS, November 16-20, 2008 – New York, USA

[4] H. Hartenstein and K. Laberteaux, "A tutorial survey on vehicular ad hoc networks", IEEE Communications Magazine, Vol. 46, No. 6, June