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WARNING MESSAGE DISSEMINATION SCHEME USING ADVANCED TRAFFIC ASSISTANCE SYSTEM

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Abstract

This novel concept of advanced traffic assistance systems (ATAS) with the assistance of automated traffic profile warning messages that was controlled by this proposed system. It includes the device that is not only already in abundance but portable enough as well to be one of the most effective multipurpose devices that are able to analyze and advise on safety conditions. Mobile smart phones today are equipped with numerous sensors that can help to aid in safety enhancements for drivers on the road.This model presents an adaptive algorithm ATAS designed to improve the warning message dissemination process. With respect to previous proposals, this proposed scheme uses a mapping technique based on adapting the dissemination strategy according to the characteristics of the street area where the vehicles are moving. It includes the reported a noticeable improvement in the performance of alert dissemination processes in simulated scenarios based on real city maps.

Index terms:Vehicular ad hoc networks, road maps, data uplink, downlink.

Introduction

Vehicular ad hoc networks (VANETs) are wireless networksthat do not require any fixed infrastructure. These networks are considered essential for cooperative driving among cars on the road. VANETs are characterized by: (a) a constrained but highly variable network topology, (b) a great number of nodes with very specific speed patterns, (c) variable communication conditions (e.g., signal transmissions can be blocked by buildings), (d) road-constrained mobility patterns, and (d) no significant power constraints. Such features make standardnetworking protocols inefficient or unusable in VANETs; hence, there is a growing effort in the development of specific communication protocols and methodologies for vehicular networks. The development of VANETs is backed by strong economical interests since vehicle-to-vehicle (V2V) communication allows the sharing of wireless channels for mobile applications, thereby increasing the passengers' comfort, improving route planning, controlling traffic congestion, and improving traffic safety.In this work we focus on efficient warning message dissemination to be used in traffic safety applications. The main goal is to reduce the latency and to increase the accuracy of the information received by nearby vehicles when a dangerous situation occurs.In a VANET, any vehicle detecting an abnormal situation (i.e. accident, slippery road, etc.) should notify the anomaly to nearby vehicles that could face this problem in a short period.

Characteristics Of Vehicular Adhoc Network

Vehicular Ad Hoc Network (VANET) is a Dynamic Ad Hoc network containing set of vehicles communicating between each other in ad hoc mode using the wirelessmedium. The vehicles move on a predefined path due to road topology and at the same time have high speeds. The kind of communication between vehicles is called "Inter-Vehicular Communications". In addition to communicatin gamong themselves, the vehicles also communicate with fixedunits on the road also known as Road Side Units (RSUs).Recently, Inter-Vehicular

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Communications (IVCs) [1] are highlighted as a way to increase the road safety by utilizing the information exchanged among vehicles utilizing VANET concepts and technologies, in particular, Active Safety which aims at applications like Driver Assistance/Information orDecentralized Floating Car Data for improving traffic flows.IVCs are regarded suitable for active safety applications because of their nature to be available anywhere, to require the strict latencies and to cover localized communications.However, ITS can also deal with solutions for better comfortand/or entertainment for drivers and passengers, like(video-) chatting, Internet connection or driving information.

Advanced Driver Assistance System

With more than 10 million car accidents reported in the United States each year, car manufacturers have shifted their focus of a passive approach, e.g., airbags, seat belts, and antilock brakes, to more active by adding features associated with advanced driver-assistance systems (ADASs) e.g., lane departure warning system and collision avoidance systems. However, vehicles manufactured with these sensors are hard to find in lower priced economical vehicles as ADAS packages are not cheap add onspreceding test crashes. After analysis, crash scenarios are stored and analyzed with real-time driving data to potentially recognize a future crash and actually prevent it.With more than 10 million car accidents reported in the United States each year, car manufacturers have shifted their focus of a passive approach, e.g., airbags, seat belts, and antilock brakes, to more active by adding features associated with advanced driver-assistance systems (ADASs) e.g., lane departure warning system and collision avoidance systems.

Related work

Broadcast Storm mitigation [1] discussed that the Last One (TLO) scheme, tries to reduce the broadcast storm problem by finding the most distant vehicle from the warning message sender; this vehicle will be the only allowed to retransmit the message. Although it brings a better performance than simplebroadcast, this scheme is only effective in highway scenarios because it does not take into account the effect of obstacles (e.g. buildings) in radio signal propagation. The TLO approach was extended using a protocol which utilizes adaptive wait-windows andadaptive probability to transmit, named Adaptive ProbabilityAlertProtocol . Most of the existing work is inspired by recent findings that highlight the strong correlation between geographic location and network performance. Global Internet maps such as illustrate that the statistical properties of wired Internet bandwidth vary as a function of geographical region (e.g., country and continent). Residential broadband ISPs often provide coverage maps that indicate the expected service data rate depending on the customer's street address.

Broadcast Storm problem [2] the Counter-based scheme uses a counter to keep track of the number of times the broadcast message is received, inhibiting rebroadcast when it exceeds a threshold. TheDistance-based scheme calculates the distance between the sender and the receiver and only allows retransmission when the additional coverage area is large enough. The Location basedscheme is similar to the previous one, though requiring more precise locations for the broadcasting vehicles to achieve an accurate geometrical estimation (with convex polygons) of the additional coverage of a warning message.

Forwarding m,echanism for data dissemination [6] that the adaptive mechanism which uses a dynamic backfirealgorithm, we have even better PDR, becausethe mechanism adjusts the area within which the forwardershave to be refrained from sending a particular message based on the density of neighborsIn the proposed adaptive mechanismsince the refraining percentage becomes more for highdensity scenarios, higher number of nodes are refrainedfrom transmitting the same message and thus the number of messages that are put into the packet decreasesFor active safety applications, freshness of the messages are considered as an important performance parameter. For eg., in our scenario, any location based routing protocol will need to have a fresher location information of a node in order to perform a more accurate location based routing.

Advanced drver assistance sysem [10] discussed that detecting the driving environment is necessary to make an in-car information system adapt to its surrounding and perform some tasks for the driver.For example, the rain or light sensor can turn on the windscreen wipers or headlights automatically. These new systems have one goal: help the driver drive, by lowering thenumber of tasks they have to perform. Indeed, in the past years numerous studies have described the problem of driver overload and driver distraction.The workload is not only created by information the driver receives, but also by the tasks

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they perform. Driving, for example, is a demanding task.The attention must be focused on the road, the instrumentation and the environment. With the development of advanced driving assistance systems, in-vehicle communication and information systems, there are situations where the driver becomes overloaded by information, creating potentially dangerous conditions..

Sensor network for road monitoring [15] discussed that, it uses multiple external sensors such as a microphone, GPS, accelerometer, and Global System for Mobile communications radio for traffic localization conditions using GPS and an external accelerometer. The system was deployed for testing in taxis using a convenient method to identify fatigued surfaces of a road. Tracking and analyzing driving behavior is an ongoing ITS study.It describe an infrastructure that can be used to distribute driver and vehicle information utilizing popular characteristics associated with cloud computing. Skill level was formed as a basic low, medium, or expert level, or a simple 1-to-10 number scale. Using a high-end vehicle simulator, they compare driver behavior such as steering control, lane changes, and traffic levels with an expert driver to help with category resolution.

Cloud computing enabled vehicular network[16] discussed that an infrastructure that can be used to distribute driver and vehicle information utilizing popular characteristics associated with cloud computing. Skill level was formed as a basic low, medium, or expert level, or a simple 1-to-10 number scale. Using a high-end vehicle simulator, they compare driver behavior such as steering control, lane changes, and traffic levels with an expert driver to help with category resolution. Learning and classification algorithms are then used to predict the driver's overall skill level derived from these conditions.

Patternrecognition approach for driving[17] discussed thatpresented a pattern recognition approach to characterize drivers based on their skill level .Skill level was formed as a basic low, medium, or expert level, or a simple 1-to-10 number scale. Using a high-end vehicle simulator, they compare driver behavior such as steering control, lane changes, and traffic levels with an expert driver to help with category resolution. Learning and classification algorithms are then used to predict the driver's overall skill level derived from these conditions.The maps are freely available online, which provide an unbiased comparison of different network carriers and aid consumers in selecting carriers. In this paper, we are interested in personalized bandwidth maps, which store historical bandwidth measurements of individual mobile users that are relevant to their mobility patterns. It seeks to capitalize on the bandwidth information provided by such maps for improving the QoS experienced by mobile Internet applications that are run from moving vehicles. Several empirical studies have investigated the WWAN bandwidth performance in a vehicular scenario.

Proposed System

This model presents an adaptive algorithm ATAS designed to improve the warning message dissemination process. With respect to previous proposals, this proposed scheme uses a mapping technique based on adapting the dissemination strategy according to the characteristics of the street area where the vehicles are moving. It includes the reported a noticeable improvement in the performance of alert dissemination processes in simulated scenarios based on real city maps.

To enhance the performance of the alert dissemination, this proposed system to tune the warning dissemination system using the information provided by the on board automated system (with integrated street maps from the city that is being evaluated) to determine the profile of the city and select the most effective parameters to achieve a proper warning message dissemination. Previously proposed schemes use a fixed set of parameter values, or they only consider the vehicle density to adapt the system. Instead, this algorithm can obtain a preliminary estimation of the parameters to use just by checking the map of the area where the vehicle is located in. It is also beneficial to use a more restrictive dissemination scheme when the vehicle density is high to avoid broadcast storm problems. Hence, it is helpful to estimate the vehicle density in the surrounding area to maximize the effectiveness of the dissemination scheme.

The past bandwidth observations at a particular drivers behavior is a better indicator of the actual bandwidth experienced at that location, as compared to the bandwidth at the previous location along the route. It analysis of the bandwidth traces

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overwhelmingly confirms the existence of the PTMTP property. This finding implies that the past bandwidth knowledge may help mobile applications to foresee the impending bandwidth fluctuations during a vehicular trip and take proactive action.It also finds that the time of day influences mobile bandwidth, but location is the most dominant factor. Hence, exclusively focus on the correlation between bandwidth and location in this research and store past driver behavior patterns performance data in the form of bandwidth maps, by mapping the average value of historical network bandwidth observations to the existing road network. The bandwidth samples are collected by repetitive measuremen

Proposed Method

Adaptive Mobile Network Setup

This module carry out the process of setup the entire simulation mobile network setup by developed a simple client-server measurement system using off-the-shelf hardware. It is developed a lightweight packet-train program to measure the WWAN bandwidth, which achieves fast convergence and generates minimal network traffic for further details about the program and validations and collected one bandwidth sample for approximately every 200 m section of the route (by adjusting the sampling interval according to the vehicle speed as reported by the GPS). The samples are tagged with location coordinates and time, and stored in a repository. On occasions, some packets in the train were lost, leading to some missing samples. To deal with these missing samples, we used 500 m as the smallest location granularity (note that, no two successive samples were missing in our data). Thus, the bandwidth for a segment is represented by the average of all samples collected within system.

Driver Behaviour Pattern

The main objective of this module is perform the search operations of mid network node data necessary to complete a request is too large to store at the history of drivers behavior patterns. In Mobile Augmented Reality applications, it is infeasible to store even part of the large database required. In the applications consider that the request must be transmitted uplink to an Application Server to detect the nearby bandwidth with the help of localized map application. it is to determine if historical bandwidth measurements can be helpful for future trips.

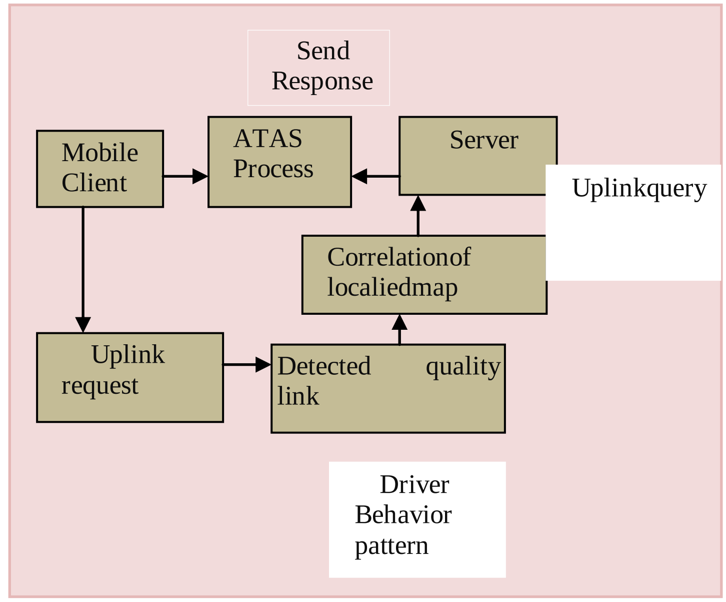

Figure 1 System Architechture

Conclusion

This proposed design for ATAS using mobile smart phone have demonstrated with some innovative applications that are integrated inside an automobile to evaluate a vehicle's condition, such as gear shifts and overall road conditions, including bumps, potholes, rough road, uneven road, and smooth road. The road classification system resulted in high accuracy, making it possible to conclude on the state of a particular road. Along with these findings, an analysis of a driver behavior for safe and sudden maneuvers, such as vehicle accelerations and lane changes, has been identified, which can advise drivers who are unaware of the risks they are potentially creating for themselves and neighboring vehicles. The direction of lane change, as well as safe acceleration, compared with sudden acceleration, was easily distinguishable.In future the model ATAS will be further improved with the ready to use compact kit that can be installed in the any type of cars that support the different mobile os(windows,Simbiyan,android,ioS) etc. Being fueled by demand, future advancements in embedded hardware will yield the smart phone and its sensors to be more powerful devices in terms of processing, sensitivity, and accuracy, paving the way for many more innovative applications. Unlocking its potential in intelligent transportation systems seems only logical as there are conceivably numerous of

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applications that can help reduce safety concerns on the road.

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