



Improving Vehicular Safety Message and Minimise Loss & Delay with Prediction Based Clustering Approach and CRCN: A Review

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Abstract- VANET'S is vehicular Ad-hoc network which is used for intelligent transport system for the drivers the ad-hoc network is used to transmit various types of message over the network. Safety message has to transmit for the security reasons on the vehicle and road transportation various routing protocols have been utilized for the purpose of message transmission. GPRS, AODV, DSR, PUMA these are various routing protocol utilizes for message transmission VANET'S'S scenario is used for mainly V2V and V2R purposes. The main issue of road density is due to high load on road message communication get overhead due to less amount of network bandwidth to overcome this issue cognitive radio bandwidth can be utilize for data transmission by channel sensing and message can be transmit through cognitive radio channels.

Keywords: VANET, GPRS, AODV, DSR, PUMA.

I. INTRODUCTION

A. VANET

A VANET utilizes autos as versatile hubs as a part of a MANET to make a portable system. A VANET transforms transform partaking auto into a remote switch or hub which permitting autos 100 to 300 meters of one another to interface and make a system with a wide range. As autos drop out of the sign range and drop out of the system, different autos can join in, joining vehicles to each other so that a versatile system is made. It is evaluated that the first frameworks that will be this innovation are police and fire vehicles to speak with one another with the end goal of security. The integration is done among one vehicle to other vehicle and vehicle to street side framework and vehicle or street side bases to the focal power in charge of the system support [1].

The essential apparatus for message exchange is the short range radios that are being introduced in any of the hubs. The short transmission hub is utilized by vehicular hub. RSU's are spread sporadically or frequently relying upon the organization of the system in any specific locale. Truly spread sporadically. They go about as a mediator hub between the Central Authority (CA) and Vehicular Node (VN). VANET-Vehicular Ad-Hoc Network is the system in which correspondence has been done between street side units to autos, auto to auto in a short scope of 100 to 300 m [2].

B. CRV

The CR innovation is an empowering innovation for sharp range use, which straightforwardly advantages different types of vehicular correspondence. In such a system, each CRV actualizes range administration functionalities to 1) distinguish range opportunities over advanced (TV) recurrence groups in the ultrahigh recurrence (UHF) range, 2) choose the channel to utilize in light of the QOS solicitations of the applications, 3) transmit on it, yet without bringing about any hurtful obstruction to the authorized proprietors of the range We imagine CRV systems to fall under three wide classes demonstrated. In the first case, such systems could be shaped between vehicles just that depend on collaboration for expanding precision. The worthless manages intermittent associations in the middle of vehicles and roadside BSs, where the last goes about as an archive of information that is in this way utilized by passing vehicles. At long last, a totally incorporated system is conceivable, in which the BS independently chooses the channels to be utilized by the CRVs, without depending on data from the vehicles. The accompanying area portrays the conceivable uses of CRV systems, which will without a doubt bring about larger amounts of reception and across the board utilization of this innovation [3].

C. Applications of CRVs

The particular choice of transmission frequency, the bandwidth available for transmissions, and the interference caused in that range are important factors influencing the applications. In the following, we describe how CRVs will change existing and emerging vehicular applications.

1) In Vehicle-to-Vehicle (V2V) Communication: In high movement zones, postponements are brought about by mischances, street blockages, and street repairs, and moderate activity can be dodged by conveying normal speed, quickening, and brake status, all of which oblige occasional trade of information with neighboring vehicles. These frameworks for the most part work in the 5.9-GHz band. Pragmatic frameworks made by Honda and Volkswagen-drove consortium have their transmission reaches constrained to a couple dozen meters, which likewise affects the separation at which a restorative activity is embraced. There is, henceforth, an inspiration to utilize lower frequencies in the sub-gigahertz extend as the sign spreads much further, expanding the adequacy of the reaction altogether [4].

2) In Entertainment and Information Systems: In-auto spilling feature stimulation choices, and also driver help through ongoing bolsters on movement, climate, and visual inputs from outer cameras are discovering expanding business acknowledgement. These applications have strict data transmission and QOS prerequisites. While late work has drawn nearer both hypothetical and down to earth parts of mixed media conveyance in vehicles, there are intrinsic versatility confinements of utilizing settled reach or unlicensed groups alone, further inspiring the utilization of CR innovation [5].

3) In Public Safety Communication: The breakdown of people in general security correspondences framework has happened more than once in substantial scale characteristic calamities, for example, the late tropical storm Katrina, wherein open wellbeing work force needs to depend on non electronic method for correspondence. CRVs will permit circulated range access in the uncongested authorized frequencies, which is particularly helpful for versatile open security faculty that works in the field amid such blackouts, furthermore those past the span of the settled base establishments.

D. Future Prediction based Clustering: The generation of future position of vehicles is based on the relative position prediction of each vehicle, which is represented in terms of the four categories as discussed earlier and its 2-value. The proposed model derives probabilistic prediction of a vehicle's mobility by using the variation from the computed value of its historically predicted mobility pattern. The repeated computation of 2 for relatively smaller time intervals helps to improve the accuracy of prediction by generating a more realistic value of variation coefficient to be used for predicting the future positions for each vehicle. These values can then be used in predicting the future positions of vehicles for the time instant at which predictive re-clustering is being done.

II. RELATED WORK

Ali J. Ghandour a et al "Improving vehicular safety message delivery through the implementation of a cognitive vehicular network" The Wireless Access in Vehicular Environments (WAVE) protocol stack has been recently defined to enable vehicular communication on the Dedicated Short Range Communication (DSRC) frequencies. Some recent studies have demonstrated that the WAVE technology might not provide sufficient spectrum for reliable exchange of safety information over congested urban scenarios. In this paper, we address this issue and present novel cognitive network architecture in order to dynamically extend the Control Channel (CCH) used by vehicles to transmit safety-related information. To this aim, we propose a cooperative spectrum sensing scheme, through which vehicles can detect available spectrum resources on the 5.8 GHz ISM band along their path, and forward the data to a fixed infrastructure known as Road Side Units (RSUs). We design a novel Fuzzy-Logic based spectrum allocation algorithm, through which the RSUs infer the actual CCH contention conditions, and dynamically extend the CCH bandwidth in network congestion scenarios, by using the vacant frequencies detected by the sensing module[1].

Srikanth Pagadarai et al "Characterization of Vacant UHF TV Channels for Vehicular Dynamic Spectrum Access", in this paper, Author present quantitative and qualitative results obtained as a result of a TV spectrum measurement campaign. We used these measurements to characterize vacant TV channels a along major interstate highway (I-90) in the state of Massachusetts, USA. By characterizing the availability of vacant TV channels in the 470-806 MHz frequency range, we show the trends in the availability of vacant channels from a vehicular dynamic spectrum access perspective. We also describe the design constraints imposed on a point-to-multipoint communications based architecture in such a setting. Specifically, we described a general geo-location database approach to create a spectral map of available channels in a given geographical area. We presented the results obtained by applying such a technique in the state of MA over several locations on I-90[2].

Marco Di Felice et al "Cooperative Spectrum Management in Cognitive" Vehicular Ad Hoc Networks", In this paper, Cognitive Radio (CR) technology has received significant attention from the research community as it enables on-demand spectrum utilization, based on the requests of the end-users. An interesting application area of CR technology is Vehicular Ad Hoc Networks (VANETs). In such networks, several innovative services and applications based on inter-vehicular communication have strict requirements in terms of bandwidth and delay, which might not be guaranteed by a fixed spectrum allocation paradigm. In this paper, we propose two key contributions pertaining to CR-VANETs: (i) an experimental study of the spectrum availability and sensing accuracy in a moving vehicle and (ii) a collaborative spectrum management framework (called Cog-V2V), which allows the vehicles to share spectrum information, and to detect spectrum opportunities in the licensed band[3].

Alexander W. et al "Impact of Mobility on Spectrum Sensing in Cognitive Radio Networks", in cognitive radio networks (CRNs), spectrum sensing is key to opportunistic spectrum access while preventing any unacceptable interference to primary users' communications. Although cognitive radios function as spectrum sensors and move around, most, if not all, of existing approaches assume stationary spectrum sensors, thus providing in accurate sensing results. As part of our effort to solve/alleviate this problem, we consider the impact of sensor mobility on spectrum sensing performance in a joint optimization framework for sensor cooperation and sensing scheduling. We show that sensor mobility increases spatiotemporal diversity in received primary signal strengths, and thus, improves the sensing performance. This is intuitively plausible, but has not been tested previously[4].

Wooseong Kim et al "Co-Route: A New Cognitive Anypath Vehicular Routing Protocol" Author want to say that Vehicular ad hoc networks (VANETs) have attracted attention in the support of safe driving, intelligent navigation, and emergency and entertainment applications. Dedicated short range communication (DSRC) has been standardized and exploited in vehicular test beds, but it has only limited number of channels and it is basically reserved to safety purposes. Thus, VANETs must use Wi-Fi for non safety applications. Unfortunately, Wi-Fi channels suffer from scarcity of

available spectrum due to heavy interference from residential users, as well as various wireless devices in the ISM bands (e.g. 2.4GHz or 5GHz). Cognitive Radios, proposed by J. Mitola, are one of the solutions for spectrum scarcity in wireless networks[5].

The pros and cons of related papers are summarized in Table 1.

Table 1 Pros And Cons Of Related Papers

Author Name	Paper Name	Year of Publication	Pros	Cons
Ali J. Ghandour	Improving Vehicular Safety message delivery through the implementation of a cognitive vehicular network	2013	It extends the CCH bandwidth in network congestion scenarios by using the vacant frequencies detected by the sensing module.	This does not provide sufficient spectrum for reliable exchange of safety information over congested urban scenarios
Srikanth Pagadarai	Characterization of Vacant UHF TV Channels for Vehicular Dynamic Spectrum Access	2009	It is use for the measurements to characterize vacant TV channels a along major interstate highway.	This is very consuming process.
Marco Di Felicia	Cooperative Spectrum Management in Cognitive	2011	It has strict requirements in terms of bandwidth and delay, which allows the vehicles to share spectrum information, and to detect spectrum opportunities in the licensed band.	This is very costly process.
Alexander W	Impact of Mobility on Spectrum Sensing in Cognitive Radio Networks	2009	It provides accurate sensing results & it improves the sensing performance	It reduces the security.
Wooseong Kim	Co Route: A New Cognitive Any path Vehicular Routing Protocol	2011	It supports of safe driving, intelligent navigation, and emergency and entertainment applications.	In this channels suffer from scarcity of available spectrum due to heavy interference from residential users, as well as various wireless devices in the ISM bands.

III. APPROACHES USED

GPSR: Greedy Perimeter Stateless Routing, GPSR, is a responsive and efficient routing protocol for mobile, wireless networks. Unlike established routing algorithms before it, which use graph-theoretic notions of shortest paths and transitive reach ability to find routes, GPSR exploits the correspondence between *geographic position* and connectivity in a wireless network, by using the positions of nodes to make packet forwarding decisions. GPSR uses *greedy forwarding* to forward packets to nodes that are always progressively closer to the destination. In regions of the network where such a greedy path does not exist (*i.e.*, the only path requires that one move temporarily farther away from the destination) [8].

AODV: The AODV (Ad-Hoc On-Demand Distance Vector) routing protocol is a reactive routing protocol that uses some characteristics of proactive routing protocols. Routes are established on-demand, as they are needed. However, once established a route is maintained as long as it is needed. Reactive (or on-demand) routing protocols find a path between the source and the destination only when the path is needed (*i.e.*, if there are data to be exchanged between the source and the destination). An advantage of this approach is that the routing overhead is greatly reduced. A disadvantage is a possible large delay from the moment the route is needed (a packet is ready to be sent) until the time the route is actually acquired. In AODV, the **network** is silent until a connection is needed. At that point the network node that needs a connection **broadcasts** a request for connection. Other AODV nodes forward this message, and record the node that they heard it from, creating an explosion of temporary routes back to the needy node [10].

DSR: Dynamic Source Routing (DSR) is a routing protocol for wireless mesh networks. It is similar to AODV in that it forms a route on-demand when a transmitting node requests one. However, it uses source routing instead of relying on the routing table at each intermediate device. Determining source routes requires accumulating the address of each device between the source and destination during route discovery. The accumulated path information is coached by nodes processing the route discovery packets. The learned paths are used to route packets. To accomplish source routing, the routed packets contain the address of each device the packet will traverse [9].

DSDV: Destination-Sequenced Distance-Vector Routing (DSDV) is a table-driven routing scheme for ad hoc mobile networks based on the Bellman–Ford algorithm. It was developed by C. Perkins and P.Bhagwat in 1994. The main contribution of the algorithm was to solve the routing loop problem. Each entry in the routing table contains a sequence number, the sequence numbers are generally even if a link is present; else, an odd number is used. The number is generated by the destination, and the emitter needs to send out the next update with this number. Routing information is distributed between nodes by sending *full dumps* infrequently and smaller incremental updates more frequently [11].

Table 2 Simulation parameters & their values

Parameter	Value
802.11p data rate	3-6 mbps
Packet generation rate	512 bps
Packet size	32-1024
Transmission range	250 m
Communication method	broadcast
Radio model	Two-ray ground
Number of lanes	2 per direction
Number of cars/lane/km	50-200

IV. CONCLUSION

A cognitive radio is an intelligent radio that can be programmed and configured dynamically. Its transceiver is designed to use the best wireless channels in its vicinity. Safety message has to transmit for the security reasons on the vehicle and road transportation various routing protocols have been utilized for the purpose of message transmission. In various scenarios message transmission is done according to vehicle density available on the road. Based on the real time road density vehicle establish reliable route for the communication on packet delivery. The main issue of road density is due to high load on road message communication get overhead due to less amount of network bandwidth to overcome this issue cognitive radio bandwidth can be utilize for data transmission by channel sensing and message can be transmit through cognitive radio channels. We got various types of parameters & on the basis of these parameters we conclude that our system gives us better results.

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