PERFORMANCE OF ROUTING PROTOCOLS IN VEHICULAR NETWORKS BY THE VERTICAL HANDOFF STRATEGIES

N.N.V.R.K.Dinesh[1], Suresh Nuthalapati[2]

[1]*Student, M.Tech-Communication Engineering, VIT-University (India)*

[2]*Assistant Professor, Instrumentation and Control Engineering, VIT-University (India)*

ABSTRACT

Wireless communication systems such as cellular networks, wireless local area networks (WLANs) and wireless broadband networks. Vehicular Heterogeneous Networks (VHNs) can be comprised of different wireless accessingtechnologies which may solely dedicated to vehicular communications or else are part of a wider public network, is a priority in the near future. The possibility to switch from one access technology to another based on performance, availability or economic reasons, while maintaining active connections, is called intertechnology or Vertical Hand off (VHO). Besides supporting extensive mobility of nodes, VHO would enable novel types of applications to be developed, especially in a vehicular network. The main objective is to minimize the transmission cost and transferring time of data for the routing protocols. We will consider heterogeneous networks which consist of the wide-area cellular networks interworking the WLAN. In this we will take the access points fixed positions, random positions, and also vehichle to vechile distance. In order to show that the performing of vertical handoff is at lower speeds it can be better for going to cellular networks at higher speeds. We further go studying the strategies in the different conditions. These can provide the instructions for performing the vertical handoff by considering the decision making which is based on the network characteristicsand also the user mobility.

Keywords: Vehicular Network, Vertical Handoff Strategies, Access Points

I. INTRODUCTION

The popularity of wireless communication systems can be seen almost everywhere in the form of cellular networks, WLANs, and WPANs. In addition, small portable devices have been increasingly equipped with multiple communication interfaces building a heterogeneous environment in terms of access technologies. The desired ubiquitous computing environment of the future has to exploit this multitude of connectivity alternatives resulting from diverse wireless communication systems and different access technologies to provide useful services with guaranteed quality to users. Many new applications require a ubiquitous computing environment capable of accessing information from different portable devices at any time and everywhere. This has motivated researchers to integrate various wireless platforms such as cellular networks, WLANs, and MANETs. Integration of different technologies with different capabilities and functionalities is an extremely complex task and involves issues at all layers of the protocol stack.

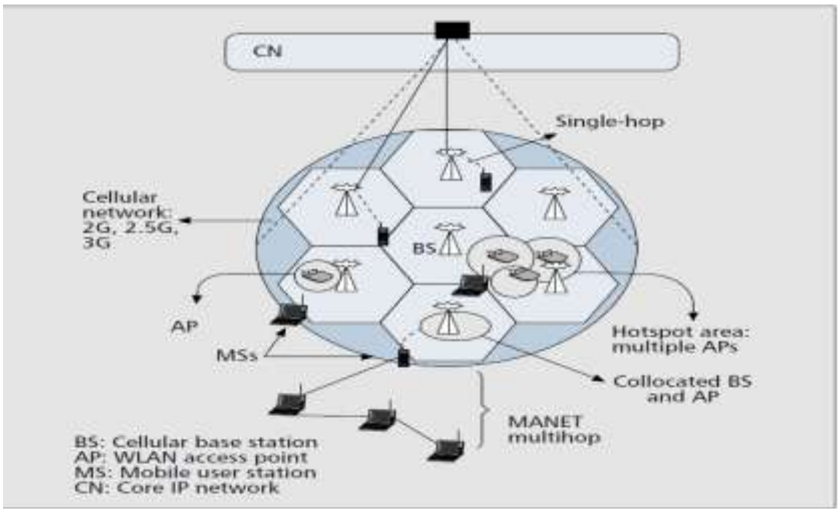

Fig. 1 Heterogeneous Network Architecture

The integration of cellular networks, WLANs, and MANETs is not straightforward due to various communication scenarios, different interface capabilities, and mobility patterns of MSs. Fixed network components, such as BSs and APs, can provide several services to MSs, including:

• Access to the Internet

• Interoperability of existing networks and future networks

• Support of handoff between different wireless access networks

• Resources control

• Routing discovery

• Security management

Both BSs and APs should have the capability of interoperability with each other, and also the possibility of integration with new emerging networks for supporting handoffs between them.APs and BSs also have the responsibility to manage and control radio resources for the MSs. In fact, frequency allocation becomes more complicated since different wireless technologies may possibly operate in the same frequency band, which makes coexistence mechanisms increasingly important. The high processing and power capacity of APs and BSs make them strategic components in selecting optimum routes between two MSs. Furthermore, the APs and BSs can implement load balance functionalities by switching connections from infrastructure mode to MANET mode, or diverting connections to a free neighboring BS or AP by multi-hop communication.

When it comes to VHNs, which have highly dynamic network topologies and highly variable environment conditions due to the inherent characteristics of high mobility vehicular communications, the VHO decision-making algorithms might be inefficient and ineffective. This inefficiency stems from the fact that in the design of the VHO decision making algorithms the mobility models of users including their movement trajectories and their velocities are often neglected. To emphasize the role of mobility pattern awareness, note that when traveling at high speeds, it is more likely that one user travels through several access technologies in a short span of time. Therefore, when legacy VHO decision making algorithms are being used, it is highly probable that handing off from a wide-coverage network to a newly emerged local-coverage network may be followed by another VHO back to the original network immediately afterwards resulting in too many VHOs. Since the procedure of a VHO involves a set of signaling functions and consequently imposes both VHO processing loads and signaling overhead to the network, unnecessary VHOs should be discouraged. Overloading the network with signaling traffic in turn causes additional costs and longer transfer times incurred by delays of reconnecting the user to the new network. Another aspect of the mobility models that has been neglected in most previous studies is the fact that the movements of vehicles are confined by roadways, so that the directions of movements are highly constrained and only the network coverage along these directions of movements is of interest.

In this paper, we are going to minimize the data transfer time and also transmission cost in each routing protocol of the particular nodes, event-activated, and thus continuous-time, VHO decision making algorithm, that are based on the mobility profiles of users which includes the velocities. As the most existing solutions, the proposed approach which has deterministic and fully distributed in sensing of the vehicular users which will make the VHO decisions than the core network entities. Here vertical handoff decision making is a comprehensive at set of system models, infrastructure-based access technologies which are also known as Vehicle-to- Infrastructure, or V2I communications as well as in this scenarios both of the V2I and ad hoc communications between vehicles that are also known as Vehicle-to-Vehicle, or V2Vcomm'sthat are feasible. Furthermore, we can also obtain the performance of VHO decision making that are planned in WLANs for vehicular communications which are existing in certain areas, the set of location of access points are known a priority by the vehicular users, and also which can be extendedto the analysis in case of an open WLAN access points those vewhicles are randomly located. To our knowledge, we contribute the first mutual study of VHO decision making, and also addressing an comprehensive set of scenarios.

II. EXISTING SYSTEM

Each user provides the network with up to ten different inputs to assist the network in making a VHO decision based on its specific preferences. Half of the input values are weights describing the importance of VHO decision-making parameters including cost, security, power, network conditions and network performance to the user. The rest of the inputs are threshold values specifying allowable range of the VHO decision parameters. The available access networks are first characterized as acceptable if they satisfy the minimum cut-off criteria, and unacceptable otherwise, by using a non-compensatory Multi-Attribute Decision Making (MADM) algorithm. Then a compensatory MADM algorithm is used to calculate the rankings of the acceptable networks based on their costs, available bandwidths, allowed bandwidths, utilizations, delays, jitters, and packet losses

2.1 Disadvantages

- The VHO decision-making algorithms will be inefficient and ineffective.
- The mobility models of users including their movement trajectories and their velocities are often neglected.
- To emphasize the role of mobility pattern awareness, note that when traveling at high speeds, it is more likely that one user travels through several access technologies in a short span of time.

III PROPOSED SYSTEM

A distributed VHO decision-making algorithm which removes the need for deploying a data-processing and decision-making center in the core network and the packet traffic between the center and nodes. In this the distributed setting for every vehicle is based on the information initially that are loaded in its database and the inputs repeatedly updated by the network, will make VHO decisions. In this we also use routing protocols in each and every moving mobile node by giving it in the data base of the system analysis.This also Provides that at the time instant in which the VHO decision is being made, data bits are required to be transmitted and given that both the WLAN and the cellular network are available to the vehicle, the VHO decision-making algorithm should decide which one to access depending on the user's preferences. These preferences can include minimization of the transmission cost or alternatively the transmission time. Note that even when the WLAN is prioritized over the cellular network, using the cellular network in areas that are not covered by the WLAN is inevitable.

3.1 Advantages

- VHO policies achieve time minimization and cost minimization.
- The speed of a communicating vehicle increases, the rate of VHOs increases.
- The vehicle spends less time in each WLAN coverage area transmitting less traffic to that AP.
- No VHO strategy applies only to a limited scenario of very high speed vehicles (around 35 m/s).

IV. ALGORITHM DESCRIPTION

4.1 VHO Decision-Making Algorithm with Fixed AP Inter-Distances

VHO decision-making algorithm which removes the need on deploying data-processing and decision-making center in core network and also packet traffic in between the center and nodes. In the distributed setting, each and every vehicle will be based on the information which is initially loaded in database and inputsare repeatedly updated by the network, which make VHO decisions.

4.1.1. Cost-Minimization Approach

Beginning with a set of simplify assumptions that can define the cost, but as we move forward, relaxes the assumptions and also can improve the function (1) which are accordingly can made the formulations more realistic (2). Assuming all the vehicles are equipped with both WLAN and cellular interfaces and also the allowable data rates which are announced by the WLAN and cellular at the time of decision-making. Further more, we also consider a highway vehicular communication scenario, where without a loss in the generality which can be confined our analysis in spatial domain to the moving vehicles direction.

$$c_1 - b * c_c \tag{1}$$

$$c_2 = N * \left(\frac{W}{v}\right) * r * c_W + \left(T - N * \left(\frac{W}{v}\right)\right) * r * c_c \tag{2}$$

4.1.2 Transmission-Time Minimization Approach

Under the circumstances, the vehicular user's that can be prefer which could be accessing the technology with the highest QoS metrics. Among the various QoS metrics, data rate can be considered of significant importance. The data rates can be offered by the WLAN and the cellular networs which are out of the user's control, which are choosing appropriate accessing network at any of the given points, the total transmission time of data bits can be minimized. Therefore, by using the same approach which are discussed in calculating costs(3), these vehicle can also calculate the transmission times which are needed for the transmission when the cellular network and WLAN plus cellular are used.

$$T_c = \frac{b_t}{r_c} \quad (3)$$

4.2 VHO Decision-Making Algorithm With Statistical AP Inter-Distances

IEEE 802.11-based WLANs will be extensively deployed in home and also in the offices around the world. The upstream accessing links of these networks are idle, they are used for providing service to vehicles. The possibility of using such an unplanned set of opening anWLANs in the terms of security and deployment which offer the services to an end users moving at vehicular speeds has already been studied. The open APs are independently deployed along on the roadsides and no vehicles have certain information about their placements, we can also assume the distances between all the consecutive APs which can follow negative exponential distribution. In other means, when the vehicle is moving with a fixed velocity, APs can show up its transmission range according to a Poisson arrival.

4.2.1. Cost-Minimization Approach

The objective is selecting the access network with the minimum cost (1) and (2), and the expected value which is used in decision-making.

4.2.2 Transmission-Time Minimization Approach

When the vehicle's preference is the access network resulting in the minimum transmission time, the decision making algorithm.Theperformance of the proposed technique of VHO decision-making algorithm in the case (3), an AP inter-distances are distributed with the fixed AP inter-distances case.

4.3 VHO Decision-Making with Enabled V2V Mode

The proposed VHO decision-making algorithm to include the scenarios where multi-hop V2V communications are also allowed between vehicles, in addition to V2I communications, in the architecture of the VHN. Using intermediate vehicles to relay data to APs via ad-hoc communications can alleviate the need for accessing the costlier cellular network when APs are out of range. Multi-hop ad hoc communication as a data transmission alternative in addition to cellular or WLAN plus cellular, the previous work employs ad hoc networking only as a means for forwarding data to the attachment points which have been pre-selected.

4.3.1 Calculation of Cost and Transmission Time

The computed ad hoc communication delayswhich can be satisfied application's delay requirement, the communication cost using only WLANs and also an ad-hoc communications, which areinterchangesd also called as WLAN plus ad hoc.

4.3.2 WLAN plus Cellular plus Ad Hoc

The inter-distances of APs in this they are not fixed and also they show up independently, the decision-making vehicle which cannot count on upcoming APs. Based on the distance to the other previousAP it also uses an ad-hoc communications for any smaller distances and cellular communications as for the longer distance.

V. FIGURES

Thefollowing figures are of simulation part and also the results of obtaining for the performing of an vehicular networks by considering the routing protocols which are of given for each and every moving mobile that can be used for getting the best performance of minimizing the transmit time and also the cost in which we can also measure many parameters by considering the vertical handoff strategies.

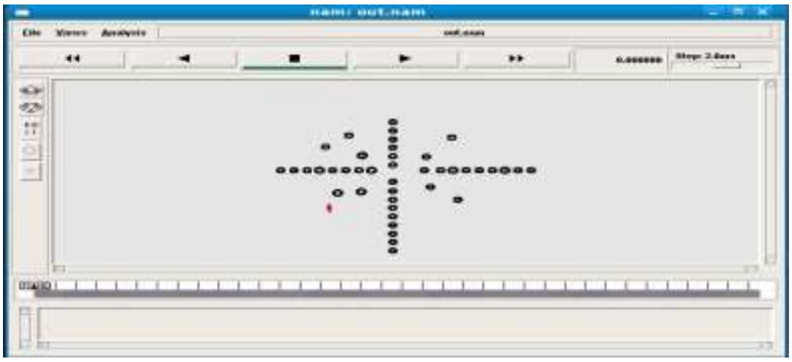

Figure.2 : This is the Created Structure In NS Tool Taking the Moving Nodes and Also AP's

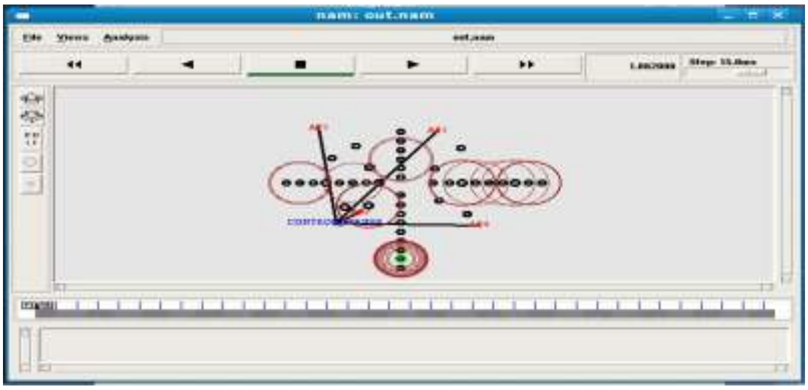

Figure.3: Movement of the Mobile Nodes and Accessing with the AP's

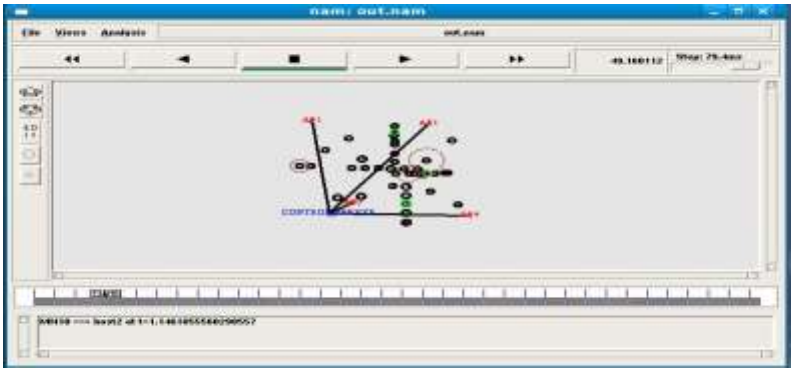

Figure.4 : The Mobile Nodes Hav Moved to the Different Location by Being in Contact with the AP's

Figure.5 The Graph of the Minimization of Communication Cost Considering the Routing Protocols (AODV And DSR)

Figure.6 the Graph of Minimizing the Transmission Time Considering the Routing Protocols (AODV And DSR)

VI. CONCLUSION

The vehicular networking in a heterogeneous wireless networks in an environment is the choice of accessing thetechnology. VHO decision in generally that can be depend on several factors such as the available capacity of each and every access technology, the cost of transmitting traffic in the network and the speed of the vehicle. In this paper we have considered a vehicular heterogeneous network and also for every each moving node we hav specified the routing protocol so that we can get the better performance among themin comprised of WLAN and cellular systems. The minimizing the cost of traffic and transmission time by considering the routing protocols in every node that can be having the better performance of any other networking strategies we have considered in terms of transmission times and transmission costs. The better performance will be given by the AODV protocol so it is best for using in the networks. Future work we can also implement this in the upcoming networks like LTE and 4G networks so that it can also minimizing the traffic of the data and transmission time.

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