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Distributed Load Balanced Coherent Information Access for Vehicles

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ABSTRACT: Break down the essential qualities of WiFi-based availability between base stations and vehicles in urban settings. The interim between a vehicle coming into and leaving scope of a base station is regularly defaced by irregular times of exceptionally poor connectivity. A plot, called SWIMMING, is proposed to help consistent and effective WiFi-based Internet access for moving vehicles. Introduce SWIMMING, an on request, client driven structure intended for vehicles which have discontinuous fast access to roadside WiFi get to focuses (AP). A novel strategy called area based conveyance (LBD) is proposed, which joins SMS and GPS, is proposed, and further, a reasonable framework to perform exact area following is created. LBD chiefly applies the accompanying two proposed strategies Location expectation and dynamic edge. Area expectation is performed by utilizing the present area, moving velocity, and direction of the objective to anticipate its next area. At the point when the separation between the anticipated area and the real area surpasses a specific limit, the objective transmits a short message to the tracker to refresh its present area. The dynamic edge keeps up the area following precision and number of short messages on the premise of the moving velocity of the objective. Analysis comes about demonstrate that LBD without a doubt beats different techniques since it sends minimal number of short messages and furthermore keeps up the tasteful area precision

KEYWORDS: WiFi, VANET, SAW, vehicle, Ack detection function

I. INTRODUCTION

Cellular networks provide the internet access with the expensive cost. An increasing number of passengers prefer accessing the internet using their mobile phone and tablet computers while travelling such as browsing the web, playing the games, watching the video programs. Cellular networks are suffering from the overloading problem due to the explosive growth of subscribers. Mobile voice communication is established throughout world and had a very rapid increase in the number of users to the various cellular networks. An extension of this technology is the ability to transmit and receive the data across the cellular network. Diversity In telecommunications refers to a method for improving thereliability of message signal by using two or more channels. In the time diversity is used to transmit the same signal at different time. Access point is a radio transmitter or receiver .That is most widely used to bridge wireless and wired network. Access point only provides an interface or portal for wireless clients to connect existing system. Switch is a device that filters and towards packet between LAN segments. Switches operate at the data link layer and network layer of the OSI reference model. Uplink communication is ground to satellite communication. The information is transferred from groundstation to satellite. Downlink communication is satellite to ground communication.The growth in the improved number of vehicles are furnished with wireless transceivers to communicate with one another to form a particular class of wireless networks known as SWIM. Due to the explosive growth of the subscriber number and the mobile data, cellular networks are suffering burden, and the user experiences quality degradation. Compared with cellular networks, WiFi has obvious advantages less in cost and high throughput.

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Thus Wi-Fi is considered as a suitable solution for cellular traffic offloading. It is difficult to provide Wi-Fi based internet access to users in moving vehicles.

Generally wireless ad hoc networks do not trust on fixed infrastructure for communication and spreading of information. SWIM follows the same principle and apply it to the dynamic environment of surface transportation. The architecture of SWIM falls within three categories. pure cellular/WLAN, pure ad hoc, and hybrid. SWIM may use fixed cellular gateways and WLAN/Wi Max access points at traffic intersections to connect to the Internet, gather traffic information, or for routing purposes. The network architecture in this scenario is a pure cellular or WLAN structure. SWIM can combine both WLAN and cellular network to form the networks so that a WLAN is used where an access point is available and a 3G connection otherwise [3].

In our proposed SWIMMING, the AP diversity is achieved by categorizing the work into three categories. The main classification is the upgraded transfer directing, in which information are transferred among sensors. Other than transferring, some different elements, for example, stack adjust, plan example and information repetition, are additionally considered. The second class sorts out sensors into bunches and permit group heads to assume the liability for sending information to the bunch member. Bunching is especially helpful for applications with adaptability prerequisite and is exceptionally powerful in neighbourhood information collection since it can lessen the crashes and adjust stack among sensors. The third category is to make use of mobile collectors to take the burden of data routing from vehicles. Although these works provide effective solutions to data collection in VANETs, their inefficiencies have been noticed.

II. RELATED WORK

The mobile access router provides the efficient data performance for wireless data users. MAR is a wireless multi homed device. This device is used for the high speed data access in a car. This mobile access router is fixed in the moving vehicles like a bus or train. It is a cellular based solution, cost is very expensive [1]. Wi-fi connectivity is used to reduced the pressure on 3G spectrum when possible for transferring the data. Wi-fi loss rates are higher than the 3G loss rates and Wi-Fi throughput is lower than the 3G throughput. Then design a system called wiffler, to augments mobile 3G capacity. wiffler device is used to predict the wifconnectivity [2]. Omni voice is an 802.11 compliant solution that supports mobility for VoIP traffic without any modifications of the client. Non VoIP background traffic contains the handoff delays and inferences then the Omni voice is used to reduce the inferences and delays in the traffic [3].

The dynamic optimal random access algorithm (DORA) provides the internet connectivity to the mobile users. Vehicles getting the temporary internet access from the road side access points. VANET enable the data exchange between the vehicles and the road side access points. Then it supports the vehicle to vehicle communications. Unreliable and unstable connections are unavoidable [4]. The Drive-thru scenario is based on mobility of the hosts sporadically attach to network on the road. The usability of the system is providing the network connectivity and internet access to the mobile users in vehicles. It contains the poor intermittent connectivity [5]. The measurements are calculated from VANLAN to understand connectivity between moving vehicles and base stations. The data rate of 802.11a is 54 mbps. The intermittent period occur when the vehicle entering and leaving from the network. Because of the speed, loss rates and distance from the base stations the 'gray periods' are hard to predict [6]. Wi-Fi provides the cheap connectivity to the common applications like VoIP and web browsing. In the vehicular communications the user can communicate with the base station at a time, during this time many disturbances are occurred. If the client can communicate with multiple base stations simultaneously lot of interferences occur. To avoid this kind of situations the vifi protocol is used. Delays are occurred due to transferring of data from the base stations and improper maintenance in the connections [7]. 802.11 wireless access points are used to delivering the data from one vehicle to another vehicle through the cabernet system.

To improve the performance of the data delivering, two new components are introduced. They are quick wifi and CTP (cabernet transport protocol) protocols. The capacity of cabernet is much higher than the cellular network. It suffers from high packet loss and low throughput. Delays are occurred [9]. Mob torrent contains the Meta data, Meta data reconciliation and the replication level. Scheduling algorithm is used in a framework for mobile internet access from

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vehicles. It has limited coverage range [8]. The internet from open wireless bas station is now commonly possible in urban and rural areas.

III. SWIM ARCHITECTURE

In SWIM, vehicles are communicate with each other via V2V communication in Ad hoc fashion, and V2I communication through road-side-units (RSU). Traditional services include vehicle and road safety services, traffic ability and management services. Vehicle and road security services areplanned to reduce the road side accidents and safeguard the life of vehicle holders. Traffic proficiency and management services aim to improve traffic flow, traffic coordination, and to provide local and map information. These services aims to provide information and entertainment such as multimedia data transfer and global Internet access. Nodes in the vehicular environment are much more energetic because most cars usually are at a very high speed and change their position constantly. The high agility also leads to a dynamic network topology, while the links between nodes connect and disconnect are often. Besides, SWIM have a possibly large scale which can include many applicants and extend over the entire road network

AP diversity is the group of AP's in the access area that help user to get continuous connectivity of the service. In the network during service access by user, request signal send from all AP's in AP diversity to all users who are in the range of AP, after that when users received the request signal they send an ACK signal back to all AP's of AP diversity whose request is received by the user. So, to avoid the collision of ACK signal ACK detection function is used on the basis of arrival time and link quality of ACK signal. In ACK detection function compare the all ACK signals and strong link quality and low arrival time ACK signal is accepted by the AP and that AP provide service to the user. Here used the prefetching technique, if user is in the range of AP then all information related to the user is stored in related AP but when it enters into another AP range that time, previous stored information at previous AP is deleted and stored in another AP this helps to reduce the memory consumption. As in AP diversity all AP's configured by same MAC and IP address hence MAC and IP layer handoff is reduced in the horizontal handoff process. This helps to avoid horizontal handover delay. Vertical handoff decision SAW (Simple Additive Weighting) algorithm used to provide smooth vertical handoff between networks. Simple Additive Weighting (SAW) which is also defined a weighted linear combination or scoring method.it is a very simple, easy and mostly used multiple attribute decision making technique. This method is based on the weighted average of multiple parameter and here take a weighted average of delay, jitter, energy, packet delivery ratio and network throughput all these parameters of transmitting signal which is stored in prefetching technique. Depending on weighted average decide the vertical handoff while users are moving in heterogeneous network access this help to identify the best network for users while moving. In addition to SAW algorithm used the one control channel for only handoff signal in that first proceed strong handoff signal and after that other handoff signal, this is called a low handoff latency concept for high speed moving vehicles. In this way the above system provides the seamless and efficient service to moving vehicle users by using AP diversity concepts and Vertical handoff decision SAW algorithm. Vertical handoff decision SAW algorithm is used to avoid the vertical handoff delay as SAW is multi-attribute decision algorithm here consider the multiple parameter while deciding the handoff, such as network throughput, delay, jitter, energy and packet delivery ratio, andcalculate the weighted average after that decide the handoff hence it has more accuracy, easy and high packet delivery ratio as compared to TOPSIS, MEW etc.

IV. PROPOSED MODEL

In the uplink correspondence, when the customer transmits a bundle to the virtual AP, really numerous AP's inside its transmission run can get it. These issues conquer following ways a) ack discovery conspire b) transmission excess. on the off chance that different AP's get a bundle, each of them will transmit an ack after a time of short between outline space (sifs). These different duplicates of acks may crash at the customer. consequently, another plan is intended to deal with such impacts. in the new plan, the ackunraveling is upgraded with ack recognition. in this scheme the strength of one signal is considerably higherthan the strength of the other one. Under the condition, theweak signalis dropped by the filter of receiver, and only the strong signal is retained to be decoded.A packet canbe received bymultiple APs. If all copies of the same packet are forwarded to the gateway, extra overhead is introduced to the backhaul. In order to minimize TRR, a redundancy removal mechanism is used. It simply drops the duplicated packet, if an intermediate

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node in the backhaul network receives a packet. To determine whether a packet has been delivered before, the packets are checked. In a LAN backhaul, the APs are interconnected by cables, switches and hubs. When a node transmits a packet to upper-layer node, other nodes in the same subnet can overhear the packet. These nodes are able to directly avoid redundant transmissions AP. AP diversity is the group of all AP which are present in the network. All AP in AP diversity configured by same MAC and IP address hence MAC and IP layer handoff is eliminated. This concept helps to reduce the horizontal handoff latency very well that help moving user to get faster service as all AP configured with the same address.

Cluster Formation

This section describes about cluster formation. A network area $G(N, Z)$ divided into multiple zones Z with a maximum coverage range. A cluster is formed with fixed radius by choosing (next hop candidates of nodes or with highest cooperating neighbor density within range of 2 hop distance) a node as center and randomly small distance as radius and along with cost. Center of the new circle is calculated as mean of the points within the circle whereas the radius is increased by the distance of two successive centers. The nodes then reply back and in this way clusters are formed which is shown in Fig (1).

It consist of the following parameters:

- A set of node B
- A matrix of node (n_i and n_j)
- Random length r

The formation of cluster is explained as below:

Step 1: First select a node b_i which is 2 hop distance apart from other participating node with a random length r_1 .

Step 2: Perform the cluster formation technique

Do

$B = b_i, r = r_1;$

Draw a circle with b_i as center and r as radius

Compute new radius $r_1 = r + |b_i - b_j|$

While $b_i \neq b_j$ Cluster-1 is formed with all cooperating nodes lying within the circles.

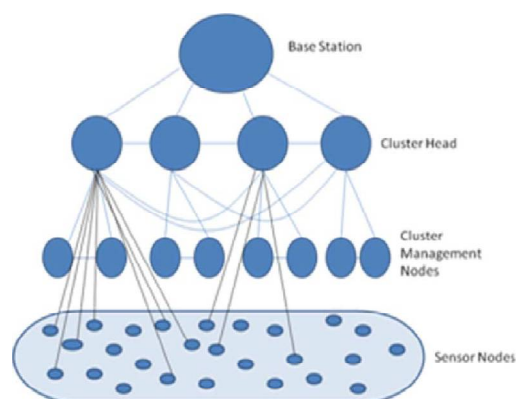


Fig 1: Cluster formation in WSN

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V. SIMULATION RESULTS

We use Network Simulator Version-2 (NS2) to simulate our proposed algorithm. In our simulation, the channel capacity of mobile hosts is set to the same value: 2 Mbps. We use the distributed coordination function (DCF) of IEEE 802.11 for wireless LANs as the MAC layer protocol.

In our simulation, mobile nodes move in a 1000 meter x 1000 meter region for 10 seconds simulation time. All nodes have the same transmission range of 250 meters. The mimicked activity is Constant Bit Rate (CBR). Our reenactment settings and parameters are outlined below

- a. No. of Nodes 15
- b. Region Size 1000 X 1000
- c. Macintosh 802.11
- d. Radio Range 250m
- e. Recreation Time 10 sec
- f. Activity Source CBR
- g. Bundle Size 512
- h. Accepting Power 0.395
- i. Sending power 0.660
- j. Sit without moving Power 0.035
- k. Starting Energy 10.3 J
- l. Rate 40 Kbps

Execution Metrics

We assess primarily the execution as indicated by the accompanying measurements.

Parcel Delivery Ratio: It is the proportion of the number .of bundles got effectively and the aggregate number of bundles transmitted.

Deferral: It is the time taken by the parcels to achieve the recipient.

Throughput: It is the speed at which the information is exchanged from one hub to other hub

Energy Consumption: It is the amount of energy consumed by the nodes for the data transmission.

VI. CONCLUSION

Earlier, various techniques are used for seamless service in VANET, all these have its own some advantage as well as disadvantages. In this paper the concept of AP diversity with ACK detection function and vertical decision handoff SAW algorithm with low handoff latency concept provide the continuous service access to the moving user in VANET. As an AP diversity concept configured the same MAC and IP layer hence reduced the MAC and IP layer handoff during homogeneous handoff, and provide less delay in internetwork handoff this is the main advantage of system, not only homogeneous but also heterogeneous handoff delay is reduced and for that used SAW algorithm with low latency in handoff and increase the efficiency of handoff done in heterogeneous network as compare to other vertical handoff algorithm and network lifetime. From above simulation, it is clear that it provides high PDR, less delay and jitter, same energy consumption and high throughput means a large number of handoff done, hence the possibility of call drop is reduced and provides seamless service in a heterogeneous network. This concept is used for internet access as well as for mobile communication in fast moving users.

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