Reliable Packet Delivery Schemes Using Distributed Cooperative Access Points

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Abstract- *Mobile Computing and Networking: Mobile Computing is a technology that allows transmission of data via computer or any other wireless device without fixed physical link. In Wireless sensor networks [WSN], when data packets (unit of data) are transmitted from source to destination, hackers try to attack the data packets transmitted. To improve the capacity of wireless network (wifi type), distributed cooperative access point (DCAP) is used. This paper presents Distributed Cooperative Access Points (DCAP) system that can simultaneously serve multiple clients using cooperative beamforming (signal)to increase the capacity of WiFi-type wireless networks. We are using random user selection algorithm to improve the capacity of wifi network. Kalman phase tracking algorithm is used to overcome the time delay while sending the packet from source to destination so power consumption is reduced. Zigbee has connected with in the range of 10-100m.*

The system which has been design is mainly used in traffic monitoring system. Zigbee devices are installed in vehicles that is connected with the access points for transfer of alert information and reduce traffic in real time. Mobile networks costs high when compared to zigbee devices, so the data transfer can be done in an efficient way.

Keywords- Distributed Cooperative Access Point, Random user selection algorithm, Kalman phase tracking algorithm, ZigBee.

I. INTRODUCTION

The main aim of this paper is to improve the capacity of the wireless network with the help of Distributed Cooperative Access Point (DCAP) which has the capability of handling multiple clients at thesame time. It also has the capability of handling the data packet without losing them. With the help of Random user selection algorithm the system itself selects a user and transmits them with the traffic details via router. To reduce the time delay in transferring the data packets Kalman phase tracking algorithm is implemented. The data related to the traffic will be transmitted to the ZigBee through router which selects the vehicles that are in the nearby Access Point. The ZigBee will be selected using the Random user selection algorithm which selects the nearby device. From it the data will be forwarded to the other nearby devices. This prevents the user from getting struck in the traffic.

Somewhat less common methods of achieving wireless communications include the use of other electromagnetic wireless technologies, such as light, magnetic, or electric fields or the use of sound. The term wireless has been used twice in communications history, with slightly different meaning. It was initially used from about 1890 for the first radio transmitting and receiving technology, as in wireless telegraphy, until the new word radio replaced it around 1920. The term was revived in the 1980s and 1990s mainly to distinguish digital devices that communicate without wires, such as the examples listed in the previous paragraph, from those that require wires or cables. This became its primary usage in the 2000s, due to the advent of technologies such as LTE, LTE-Advanced, Wi-Fi and Bluetooth.

II. ZIGBEE

Zigbee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Hence, Zigbee is a low-power, low data rate, and close proximity (i.e., personal area) wireless ad hoc network.

The technology defined by the Zigbee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or more general wireless networking such as Wi-Fi. Applications include wireless light switches, home energy monitors, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer.

Its low power consumption limits transmission distances to 10–100 meters line-of-sight, depending on power

output and environmental characteristics.Zigbee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. Zigbee is typically used in low data rate applications that require long battery life and secure networking (Zigbee networks are secured by 128 bit symmetric encryption keys.) Zigbee has a defined rate of 250 kbit/s, best suited for intermittent data transmissions from a sensor or input device.

III. PROBLEM DEFINITION

Wi-Fi APs may have only a few antennas due to the limitation of cost and physical size. As more users are added to a shared network or as applications requiring more data are added, performance deteriorates. This is because all users on a shared network may collide with each other. The energy consumption by the Wi-Fi decides its lifetime. In the existing system the energy consumption is high and it reduces its lifetime. To overcome these problems we have designed a system which reduces the energy consumption and the data loss.

IV. ARCHITECTURE DIAGRAM

The data related to the traffic will be transmitted to the ZigBee through router which selects the vehicles that are in the nearby Access Point. The ZigBee will be selected using the Random user selection algorithm which selects the nearby device. From it the data will be forwarded to the other nearby devices. This prevents the user from getting struck in the traffic.

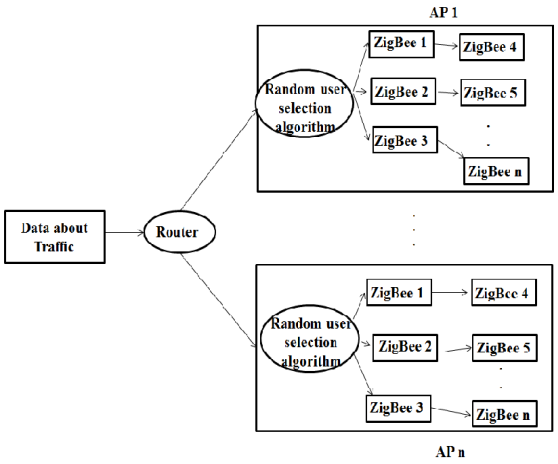

Fig.1 System Architecture

V. MODULES DESCRIPTION

A. Cooperative Download of Alert Information

The client chooses an IP address and selects the file for transferring. Then it starts transferring to that particular IP address through the router. This transfer will be shown in the form simulation after the file was received.

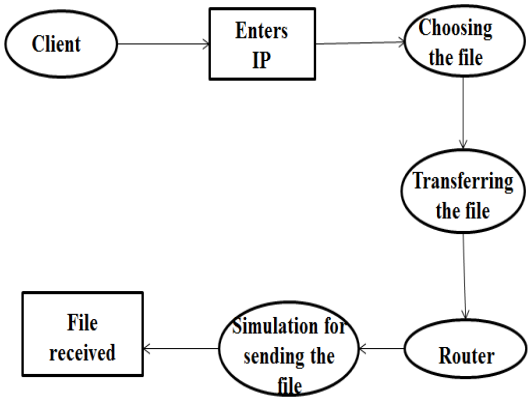

Fig.2 Downloading the alert information

B. Scheduling of chunks to reduce packet loss

The chunks are the data files. They are classified in to three types based on the type of data. They are classified as Global, Hybrid and Local. If it is a normal scheduling data then it is placed in the Global category, if it is to avoid overlapping of data then it comes under Hybrid type and if the data should not be send by two Aps simultaneously then it is a Local data.

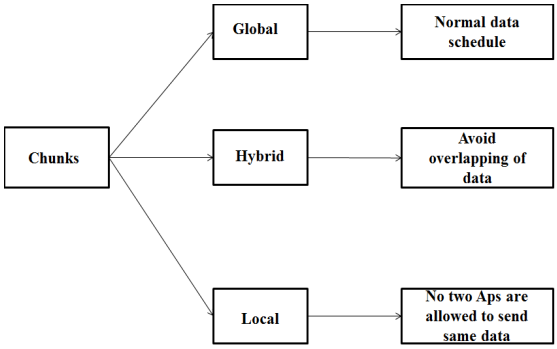

Fig.3 Scheduling chunks

C.Organizing the Access Point

The AP receives the data from the control room. After the reception of the data it transmits the received data to the vehicles that come under the AP's coverage.

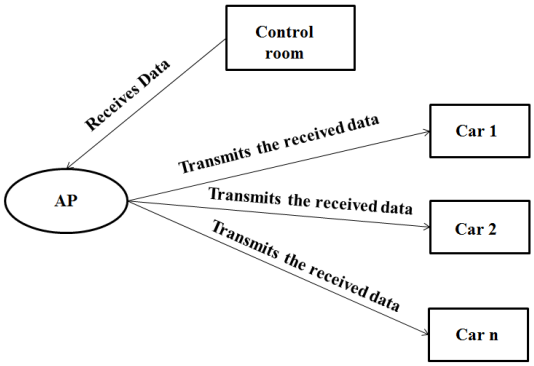

Fig.4 Organizing the access point

D.Rectification of Time Delay

The AP will transmit the message to any one of the nearby vehicle in its coverage. The vehicle after receiving the message it transfers it to the other vehicle and this transfer continues to the other entire vehicle in that area. This prevents time delay since the AP does not transfer the message to all the vehicles in that area. The vehicle by them transfers the message after reception of the message by any one of the vehicle from an AP.

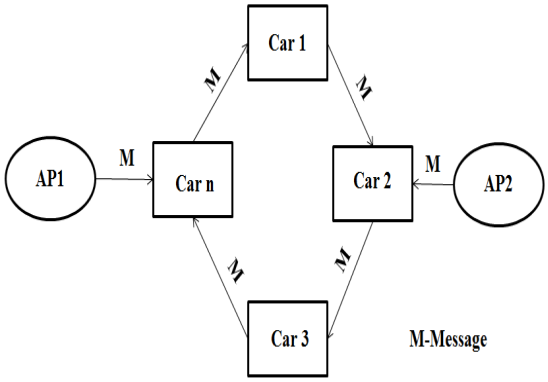

Fig.5 Rectification of time delay

E.Rectification of Road Topology

The traffic details will be transferred to the control room if the number of car in that area exceeds the count n.

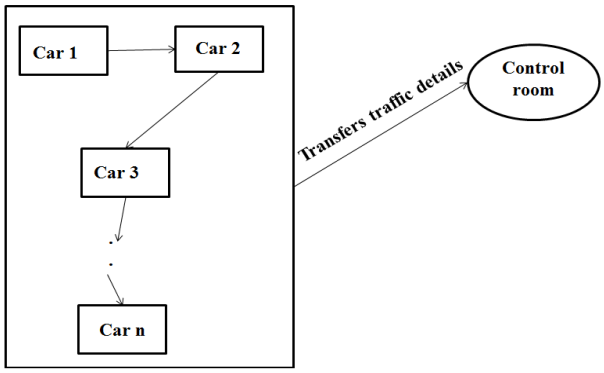

Fig.6 Rectification of road topology

VI.CONCLUSION

The possibility of exploiting opportunistic encounters among mobile nodes was investigated so that it augments the transfer rate experienced by vehicular downloader's. To that end, we devised solutions for the selection of carriers and data chunks at the APs, and evaluate them in real-world road topologies, under different AP deployment strategies. Through extensive simulations, we showed that carry & forward transfers can significantly increase the download rate of vehicular users in urban/suburban environments, and that such a result holds throughout diverse mobility scenarios, AP placements and network loads. We are using reducing the packet loss and lower power consumption. Future work for we are using low power and fast packet delivery schemes.

Further the above work can be proceeded as follows to achieve the future enhancements: ZigBee may be used to develop more application for more automation in existing systems or develop new system using different parameters and standards of ZigBee.Hybrid topology may improve the performance in terms of delay, throughput, packet delivery ratio etc. so that ZigBee Network can become more popular in different applications.

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