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VERTICAL HANDOFF BASED ON QOS PARAMETERS IN HETEROGENEOUS NETWORK

[1]SHELEJ KHERA, [2]DR. S.V.A.V. PRASAD
[1]RESEARCH SCHOLAR, [2]PROFESSOR
[1,2]LINGAYA'S UNIVERSITY, FARIDABAD
SHELEJ@BRCM.EDU.IN

ABSTRACT: THIS PAPER IS ABOUT THE STUDY OF VERTICAL HANDOFF ALGORITHM AND THE DIFFERENT PARAMETERS OF NETWORK BASED ON WHICH THE DECISION WILL BE CONSIDERED. THE METHOD HAS BEEN PROPOSED FOR REDUCE THE NUMBER OF HANDOFF AND THE EFFICIENT DECISION MAKING FOR SWITCHING TO OTHER NETWORK. THE HANDOFF APPROACH CAN HANDLE THE OPTIMIZATION PROBLEMS OF VERTICAL HANDOFF IN HETEROGENEOUS WIRELESS NETWORK. HANDOFF IS DONE FAST AND ITS DELAY IS AS LESS AS POSSIBLE. NUMBER OF HANDOFF CAN BE MINIMIZED BY PROPOSED APPROACH WHICH AVOIDS DEGRADATION IN SIGNAL QUALITY AND ADDITIONAL LOADS OF THE NETWORK AS WELL AS HANDOFF LATENCY DURING HANDOFF WILL BE MINIMIZED. HANDOFF ALGORITHM IS SIMPLE AND HAS LESS COMPUTATIONAL COMPLEXITY IN TERMS OF TIME. THE NUMBER OF NODES IS PRESENT IN THE MOBILE COMMUNICATION. INITIALLY, THE NUMBER OF NETWORK PARAMETERS HAS BEEN CONSIDERED AND DECISION WILL DEPEND ON QOS PARAMETERS SUCH AS NETWORK BANDWIDTH, RSS, THRESHOLD BANDWIDTH, POWER DISSIPATION, POWER CONSUMPTION, NETWORK CONDITION. THIS PAPER PROVIDES THE NEW WAY OF HANDOFF DECISION METHOD.

KEYWORDS: VERTICAL HANDOFF, DECISION, NODES, QOS, RSS.

I. INTRODUCTION

Wireless networking is becoming an increasingly important and popular way of providing global information access to users on the move. Current technologies vary widely in terms of bandwidths, latencies, frequencies, and media access methods. Despite this heterogeneity, most existing wireless network technologies can be divided into two categories: those that provide a low-bandwidth service over a wide geographic area and those that provide a high bandwidth service over a narrow geographic area. While it would be desirable to provide a high-bandwidth service to mobile users at all times, this is unlikely. Wireless local area networks only provide limited coverage, and a mobile host equipped only with a wide-area network interface cannot exploit existing high-bandwidth infrastructure, such as in-building wireless local area networks or wired networks. No single wireless network technology simultaneously provides a low-latency, high-bandwidth, wide-area data service to a large number of mobile users. Our solution is to use a combination of wireless networks to provide the best possible coverage over a range of geographic areas. A mobile device with multiple wireless network interfaces has many ways of accessing the wired infrastructure through alternative wireless subnets.

For example, a typical user may move from her office, where her personal digital assistant (PDA) or laptop is connected via an in-room infrared network, to elsewhere in the building, where it is connected via a building-wide radio frequency (RF) network. The same user may then move outside, where her connectivity is via a wide-area data network, and then into another building which is connected via a different building-wide RF network. This combination of wireless network interfaces, spanning in-room, in-building, campus, metropolitan, and regional cell sizes, fits into a hierarchy of network interfaces which called a wireless overlay network structure. In this scenario, the handoff process need to be initiated.

The handover or handoff is the process of transferring an ongoing call or data session from one channel connected to another channel and these channels are connected to the core network. It is often initiated either by crossing a cell boundary or by a weakening in quality of the signal in the current channel. The handoff is required for provide the high availability of services to the users. The handoff mechanism includes the frequency, time slot, spreading code, or combination of these in channels associated with the current connection. While the call is in progress, the connection should not be broken, so there are different techniques for managing the handoff in mobile communication.

As the generation changes, the wireless technology and networks try to find the new approaches for the purpose of offer the bet and efficient services to the users. It has been estimated that mobile devices can contain the different kind of interfaces by which they can obtain the service from the different network. The family of IEEE802.11 standards is the most popular technology which support Wireless LANs (WLAN), which have been widely deployed for the broadband wireless access due to their low cost and high capacity and along with this, the another family of standards IEEE 802.16 gives the proper explanation on new wireless access techniques. There are number of different kind of network on which the user can switch during the users travelling. In this scenario, the handoff process will be initiated and it is of two types, Horizontal handoff (HO) and Vertical Handoff (VO). There are number of reasons due to which the handoff scheme has been implemented.

a. The person is on call is traveling and moving away from the area covered by one cell and catching the range of second area cell, the call should not disconnect while switching to the another cell.
b. Each and every cell has its own capacity and when the capacity for connecting new calls of a given cell is used up and an existing or new call from a phone, which is located in an area overlapped by another cell, is transferred to that cell in order to free-up some capacity in the first cell for other users, who can only be connected to that cell;
c. The problem arises of the interferences of same channel's phone and another phone in different cell of same channel, and then the call is transferred to the channel within same cell.

d. The management of the fast and slow travelling users according to their requirement for avoids the potential interference to the other users in cells.
e. For reduce the interference to a smaller neighbouring cell due to the "near-far" effect even when the phone still has an excellent connection to its current cell.

II. HANDOVER PROCEDURE

The process by which a Mobile Handoff that is in the WLAN service area leaves out from the area and connects to the CDMA in vertical Handoff system and in same service for horizontal handoff. Its signal flow is shown in Figure. As the MH leaves the WLAN AP (Access Point), the strength of the beacon signal that is received from the AP periodically weakens. If its strength decreases below the threshold value, then the CDMA Cellular card is activated and starts to synchronize with the system to prepare the handoff.

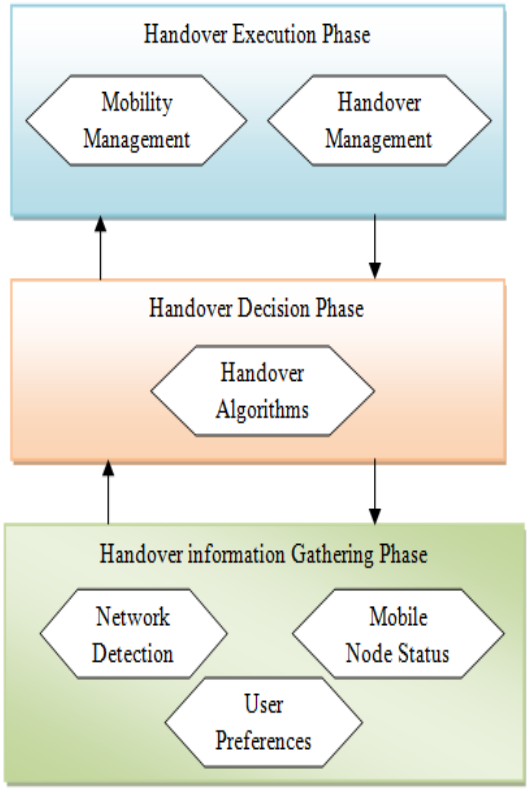

Fig 2 Handover Steps

III. LITERATURE REVIEW

Handoff scheme for management the data loss in mobile communication has been proposed. The author has performed number of studies dealt with handoff management in mobile communication systems and some of these studies presented handoff schemes to manage this important process in cellular network. The existing schemes use relative signal strength (RSS) measurements. In author's Work, a new proposed handoff scheme had been presented depending not only on the RSS measurements but also used the threshold distance and neighbouring BSS power margins in order to improve the handoff management process [1].

The author explained the handoff mechanism in terms of cost effectiveness and handoff should be feasible means it should be implemented on proper time during call in mobile communication. They explained that Heterogeneous networks with different wireless technologies increase the availability of Internet services (i.e., cloud services). They presented a feasible handoff management solution (CSH-MU) with embedded vertical handoff decision algorithm (VHDA) based on RSS and power consumption for mobile phones with restricted system resources (e.g., limited access to decision metrics, battery life) [2].

The author has been assimilated the knowledge about Vertical handoff and different distance based schemes for improvement in vertical handoff. They explained the core concept to implement the data transfer rate vertical handoff in 4G wireless heterogeneous networks. They explained that the Wireless Heterogeneous Networks are integrated within fourth generation recently. The 4G wireless communication system should assure a few of QoS related facilities such as offering high data rates, seamless mobility, strong RSS. When accomplishment and requisite of a user is acknowledged the system gets succeed in handoff and seamless connectivity [3].

Vertical handover can be implemented by taking the techniques used in Wi-Fi (Wireless Fidelity) & WiMAX (Worldwide Interoperability for Microwave Access). They explained that if a mobile station velocity is high and its movement pattern is irregular, unnecessary handovers likely occur more frequently, and then a seamless handover algorithm between heterogeneous wireless networks is required [4]. The author has explained the vertical handoff in mobile networks having different networks and implemented in VANET. They explained that In Vehicular ad hoc network (VANET), vehicular users (VUs) are capable of connecting to different access networks for interacting both safety related information and user application related information. In the overlapped area of heterogeneous networks, VUs are allowed to perform vertical handoff between various access networks. As the performance of vertical handoff plays an important role in guaranteeing user quality of service (QoS) and achieving system performance enhancement, it should be examined and evaluated thoroughly [5].

IV. OBJECTIVES

The primary technical objectives and Challenges in realizing these objectives include in the design of a seamless vertical handoff system are:

a. Selection of optimal target network using efficient decision making algorithm.
b. Perform the necessary handoffs in Vertical Communication.
c. Power Savings: minimize the power drain by keeping vertical handoff decision simple.
d. Bandwidth Overhead: minimize the amount of additional network traffic used to implement handoffs by achieving optimal network.
e. An Extended vertical handoff decision function is developed to measure the improvement gained by handing off to a particular network.

V. PROPOSED METHODOLOGY

In heterogeneous wireless network, providing a seamless connectivity is a crucial process. This connectivity can be ensured by QoS parameters such as congestion, handoff delay, Number of required handoff, RSS, amount of data loss, recovery time, failure rate, latency and bandwidth, etc. In this Paper, the unnecessary handoff Improvement is proposed and numerous parameters employs for vertical handoff decision in such a network but RSS plays an imperative role since it achieves better results and avoids unnecessary handoff. The methods have been used to improve the unnecessary handoffs in vertical communication.

1. Study the Vertical Handoff Concept and Process.
2. Analyse the Factors Considered in the Vertical Handoff Decision.
3. Study the Improvement factor for improves the unnecessary Handoffs.
4. Generate Flow Chart and Algorithm.
5. Implement the Handoff Process in Matlab.
6. Analyse the Results.

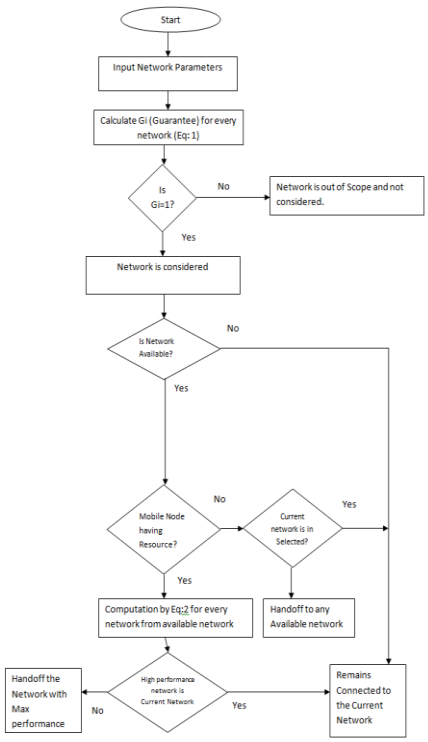

Fig 2 Proposed Flow Chart

VI. FUTURE WORK

In this research, we have presented a vertical handoff scheme mobile communication environment. The number of nodes is present in the mobile communication. The existing system was performed the unnecessary handoffs and we have improved the number of required handoff. Initially, the number of network parameters has been considered. The main importance of the research work presented in this research is to develop an efficient vertical handover mechanism for wireless networks to reduce the unnecessary handoffs. The proposed handoff approach can handle the optimization problems of vertical handoff in heterogeneous wireless network.

The implementation part will be covered in the next paper, which will demonstrate the real working of proposed algorithm.

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