International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN: 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)
doi : https://doi.org/10.32628/IJSRSET

Vertical Handoff Decision Process Algorithms for Heterogeneous Wireless Networks

Lalit A. Ramteke[1], Nagma Sheikh[2], Rahul Dhuture[3]

[1]M. Tech (Communication) Scholar, Department of Electronics and Telecommunication Engg. , TGPCET, Nagpur, Maharashtra, India

[,32]Department of Electronics and Communication Engineering TGPCET, Nagpur University Nagpur, Maharashtra, India

Article Info
Volume 7 Issue 5
Page Number: 70-75
Publication Issue :
September-October-2020

Article History
Accepted : 05 Sep 2020
Published : 10 Sep 2020

ABSTRACT

An HWN consists of different wireless networks. A heterogeneous network (HWN). Efficient handoff (HO) systems are needed to improve service quality (QoS) and provide a reliable environment in order to ensure seamless mobility across HWN. Optimum vertical handoff (VHO) in such an environment is a difficult problem. VHO decisions are based on the measurements of received signal strength (RSS). HO decisions are taken separately without taking other HO user (EU) equipment into account. This leads to higher block rates and higher mobile device consumption. The VHO decision requires lower speeds, and since a high speed user can cause an inutile handoff that will waste network resources and thus affect network QoS. User mobility is a very vital factor in the decision to use VHO. By examining EU speed when deciding on a HO, the transmission cost and transmission time can also be reduced. The VHO prediction approach based on the mathematical model uses well established objective functions that take into consideration RSS, EU speed, load and user bandwidth cost. By adjusting the weights in the defined objective function, the system performance can be improved according to user preferences. Because of the great bandwidth and ease of networking, we take Wi-Fi and Wimax into account.

Keywords: Heterogeneous wireless network, Vertical Handoff, VHO decision algorithm.

I. INTRODUCTION

NGWN versatile terminals (MT) are equipped with numerous interfaces and can get to a wide scope of uses gave by different wireless networks in an Always Best Connected (ABC) mode. To get to the correspondence administrations whenever, anyplace with the best Quality of Service (QoS) at an absolute minimum value, the most incredible arrangement is the heterogeneous wireless correspondence framework. Various wireless networks have been developed as of late. Each network has been created

for clear reason with various highlights to ensure that clients furnished with multimode portable terminals (MTs) in the next-generation wireless network (NGWN) condition will encounter an astounding consistent portability [3], appreciate great consistent correspondences and pervasive access to applications in an in every case best associated (ABC) model that uses the most effective mix of the current access frameworks. Consistent correspondence includes the capacity of the MT to successfully or at the same time connect to various purposes of connection in NGWN foundation.

Heterogeneous wireless networks have different access advancements, covering and inclusion, network design, conventions for transport, steering, portability the executives [6, 7]. Additionally, a unique administrator suggests diverse help requests from versatile clients (voice, video, interactive media, content, and so forth.) in the present market. As a result of these variations, when the portable client moves there is an unquestionable requirement to handover the correspondence channel starting with one network then onto the next by thinking about its client prerequisites. Channel handover between two assorted networks is achieved by vertical handoff.

Thinking about the heterogeneous networks, the fundamental and chief usefulness of handoff inception and choice stages are very extraordinary, however, in homogeneous networks, the functionalities of handoff commencement and choice stages are both pooled together into a solitary stage called handoff inception stage.

In the event of homogeneous networks, the handoff is in the midst of various cells of a similar wireless innovation, there is not something to be referenced as "choosing the best network". If there should be an occurrence of the homogeneous networks, it is commonly satisfactory for the gotten sign quality incentive to decay underneath an unmistakable edge an incentive to fast off a flat handoff. However, in heterogeneous networks, the handoff choice stage can't depend just on got signal quality, yet unique attributes of the network like data transmission, inclusion, inertness, control utilization, and cost and so forth. Ought to likewise be considered.

Relying on the client requests, the versatile terminal highlights, and the network conditions, the most brilliant network will be chosen for the vertical handoff process. During handover, there is a need to pick the best network. In this manner, Vertical Handoff Decision Making is a significant research issue to be accounted for. The vertical handoff process includes three principle stages: the framework revelation, the vertical handoff choice, and the vertical handoff execution. In the main stage, the framework disclosure stage, the versatile terminal (MT) chooses which networks could be utilized. These networks make a promotion on the bolstered information rates and the QoS parameters. As the clients are versatile, this stage may be summoned intermittently. During the vertical handoff choice stage, the MT chooses whether the associations should be kept utilizing the current chose network or be changed to another network. The choice may rely upon an assortment of parameters including, kind of the application, least transfer speed and postpone required by the application, get to cost, transmit control and the inclinations of end clients.

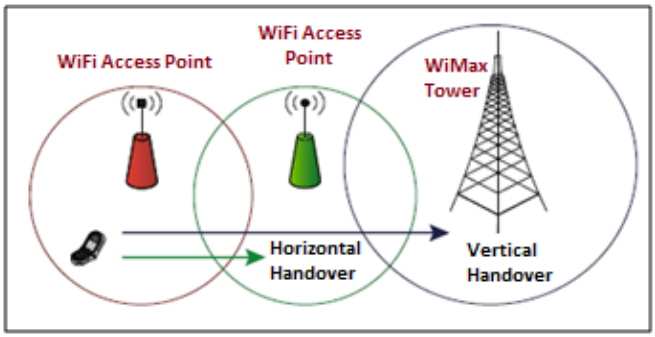

Figure 1: Horizontal and Vertical Handoff Strategy

During vertical handoff execution phase, connections in the MT are re-routed from the existing network to the fresh network in a seamless manner [8]. This phase also comprises the authentication,

authorization and transfer of user-context information. The illustration of vertical and horizontal handoff strategy is drafted in figure 1.

The organization of this document is as follows. In Section 2 Literature Review, I'll give detail of any modifications to equipment or equipment constructed specifically for the study and, if pertinent, provide illustrations of the modifications. In Section 3 Result and Discussion, present your research findings and your analysis of those findings. Discussed in Section 4 Conclusion a conclusion is the last part of something, its end or result.

II. LITERATURE REVIEW

In this paper [9] the creators center on the VHO testing issue. As indicated by them in a two-chain of importance cell network - included a focal macrocell under laid with shorter range femtocell, consistent vertical handoff (VHO) is a difficult issue.so to beat the issue creators build up another summed up vertical handoff plot comprising of handoff competitors picking and consolidated cost work advancement. In this plan, numerous useful imperatives identified with the handoff are considered, for example, speed, the Femto get to show. In perspective on cost work, the heap equalization and cost minimization are detailed as the joined streamlining objective. The exhibition results dependent on point by point recreations show that new VHO conspire performs obviously superior to the traditional ones. Our proposed VHO technique gives the network administrator that influence to effortlessly change the accentuation on various extra targets utilizing diverse weighted blends in among.

In this paper [10], a few improvements, for example, Prioritized Multi-Network Handoff, Collective Handoff are proposed for the execution of vertical handoff choice calculations, with the objective of augmenting the nature of administration experienced by every client. To begin with, the idea of strategy based handoffs is talked about. At that point, a cost capacity is characterized to pass judgment on target networks dependent on an assortment of the client and network-esteemed measurements. Additionally, they have done the advancements to fuse a network disposal include, and to decrease the postponement and preparing required in the assessment of the cost capacity, and toward the end, the multi-network enhancement is acquainted with improving throughput for versatile terminals with different dynamic sessions.

In this paper [11], the creators have investigated the issue of vertical handoff the board in heterogeneous wireless networks. As indicated by their examination the vertical handoff the boarding procedure contains three primary stages i.e System Discovery/Handoff Initiation, Handoff Decision, and handoff execution. The handoff choices depend on certain parameters called Handoff Decision properties which can be gathered into Network related characteristics, terminal/framework related traits, and client inclinations. The center of the handoff the executive's procedure in HWN network is handoff choice calculations that investigations the different choice components to play out a consistent handoff to a best accessible network, best case scenario time minute. This instructional exercise examination the diverse MADMs like SAW, MEW, TOPSIS, and GRA alongside the SAW with Elimination Factor strategy. The examination shows that the SAW with Elimination Factor technique brings about fewer vertical handoffs in contrast with MADM based strategies.

In this paper [12], to improve indoor inclusion and network limit, the creators utilize various levelled full scale/femtocell networks is viewed as the most encouraging methodology. They present an efficient handoff calculation to help the inbound portability from full-scale cells to femtocells under the thought of enormous asymmetry in the transmitted intensity of the cells. The numerical examination uncovers that

their proposed calculation yields a higher likelihood that the client will be accurately appointed to the femtocell while keeping up the number of handoffs at a similar level. For their work, another RSS-based handoff calculation that is appropriate for the progressive large scale/femtocell networks as for giving effective handoff from an m-BS to an f-BS is utilized. The proposed calculation reflects huge asymmetry in the transmitted intensity of the cells and its presentation is breaking down by utilizing the measurable properties of RSS.

In this paper [13], the creators propose the Vertical handover choice (VHD) calculations. VHD are basic parts of the design of the imminent Fourth Generation (4G) heterogeneous wireless networks. As per them, these calculations should be intended to give the necessary Quality of Service (QoS) to a wide scope of utilization while permitting consistent meandering among a large number of access network advances. In this paper, they present an exhaustive overview of the VHD calculations intended to fulfill these prerequisites. To offer an orderly correlation, we arrange the calculations into four gatherings dependent on the fundamental handover choice paradigm utilized. Additionally, to assess tradeoffs between their unpredictability of usage and effectiveness, we examine three delegate VHD calculations in each gathering.

III. SYSTEM ARCHITECTURE

A scenario where users within vehicular networks demands to access content from the Internet at high speeds while travelling, that is, switching among multiple access points with heterogeneous coverage areas, as well as with different Quality of Service (QoS) levels. [1] To maintain connectivity seamlessly in such dynamic conditions, a rapid vertical handover technique is required. Reflexive methodology, a vertical handover decision algorithm designed for dynamic environments where RSS and available bandwidth are compared to their threshold values and a rapid decision is taken in a dynamic situation. Vehicular environments, latency issues must be addressed in this algorithm.

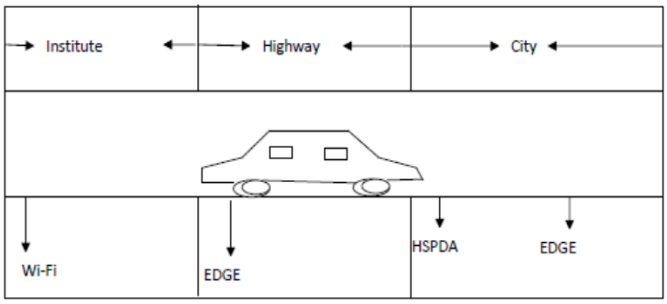

Figure 2. Scenario for Reflexive

Whenever the user moves with velocity greater than the threshold, the system makes sure to connect to the best available network considering the parameters as per the application used by user. It takes into consideration the number of handovers in order to connect to the best network for the in use application. This ensures efficiency and performance while maintaining convenience with connectivity.

This flowchart elucidates the state, when a handover is required and which handover needs to be performed. When the RSS drops and user moves with speed we need a rapid handover, thus we opt for reflexive handover. Whereas, when user is immobile or a new network with higher data rate comes into scenario an AHP is preferred.

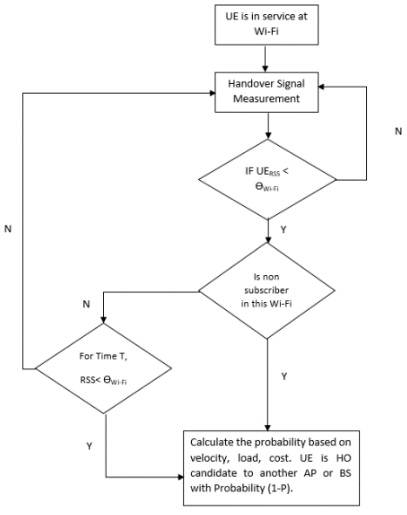

Figure 3. Handover Algorithm

IV. RESULTS AND DISCUSSION

A. Figures and Tables

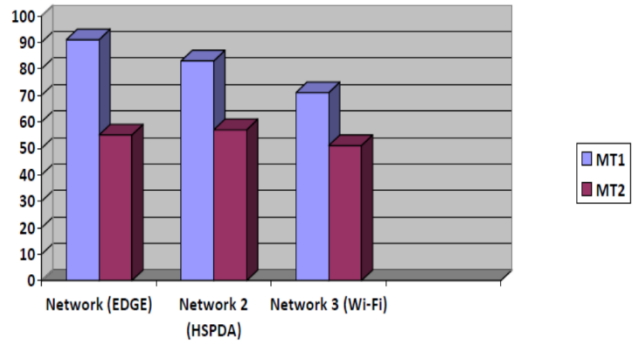

Figure 4: Monitored RSS for Networks

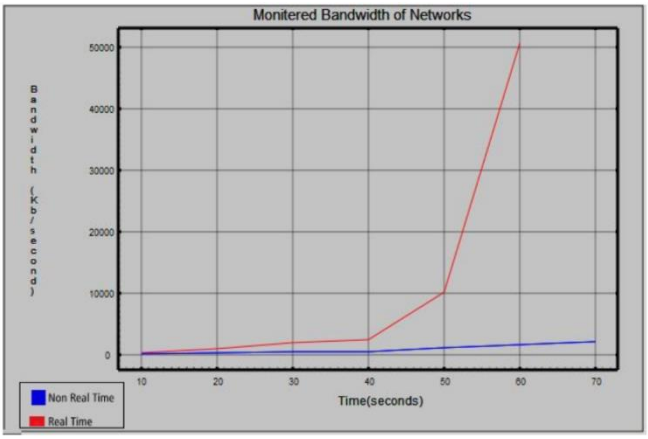

Figure 5 Monitored Bandwidth for Networks

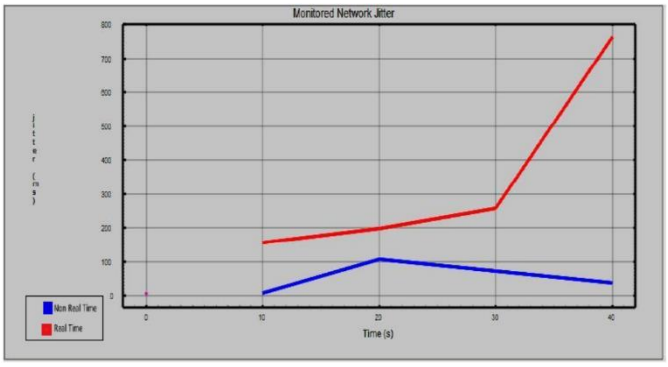

Figure 6. Monitored Jitter for Networks

V. CONCLUSION

Nowadays, users demand high service availability to access network infrastructure not only under the anywhere, anytime but also under the always best connected paradigm. This system brings up an intelligent handover which provides the user application, flexibility between active interfaces that best suit them based on application, user requirements and interface capabilities. Moreover, we have analysed VHO process from vehicular network (VN) perspective to evaluate solutions that conjunction of wireless technologies and VHO technologies and VHO techniques offers to satisfy the connectivity needs on road. Multiple-parameters-based algorithms must be used should be used to select information, in order to take most of context environment and further using the AHP method for handover-decision making.

When gathering information in VN we take into account velocity with which the user moves and RSS of networks. When AHP is implemented, it considers parameters as per the required application, monitoring the environment continuously for best suited network. With this improves the selection effectiveness in presence of highly dynamic channel conditions. Application based context model improves robustness and efficiency.

This system focuses on the action of handover from one heterogeneous network to another network as per the priority of context considered with respect to current running application. It classifies the applications as real and non-real applications only; this brings in a need for a handover that can suffice diversified applications, as every day a new application is launched. However, a handover should also minimize the battery consumption of MT, currently; battery consumption is more, which leads to a drop in the performance. The security aspect as per applications needs to be measured and considered. This system is cantered to android platform only, we propose that by adding a java coded MIDP patch, system can be made device independent. We propose this system with the proposed concept for the remote patient tele-monitoring service in the (mobile) m-health domain aiming to achieve a better perceived performance for healthcare professionals, while optimizing battery usage.

VI. REFERENCES

[1] Abubeker A Yussuf, Wan H Hassan, SinzobakwiraIssa," A review of VHD approaches in next generation wireless networks", IEEE 2012.

[2] Xiaohuan Yan A, Ahmet Sekercioglu A, Sathya Narayanan B," A survey of vertical handover decision algorithms in fourth generation heterogeneous wireless networks", Computer Networks, Science Direct, 2010.

[3] Mario Pink, Thomas Pietsch, Hartmut Koenig,"Towards a seamless mobility solution for the real world: handover decision", IEEE 2012.

[4] Dionysis Xenakis, Nikos Passas, Lazaros Merakos, Christos Verikoukis," Mobility management for femtocells in LTE-Advanced: key aspects and survey of handover decision algorithms", IEEE Communications Surveys and Tutorials, IEEE 2013.

[5] Sandra Brigit Johnson, Saranya Nath P, Velmurugan T," An optimized algorithm for vertical handoff in heterogeneous wireless networks", Conference on Information and Communication Technologies, IEEE 2013.

[6] Mariem Zekri, Badii Jouaber, Djamal Zeghlache," A review on mobility management and vertical handover solutions over heterogeneous wireless networks", Science Direct, Computer Communications, Volume 35, 2012.

[7] Farhan Siddiqui, SheraliZeadally," Mobility management across hybrid wireless networks: Trends and challenges", Science Direct-Computer Communications, Volume 29, 2006.

[8] Fei Shi, Keqiu Li, YanmingShen," Seamless handoff scheme in Wi-Fi and WiMAX heterogeneous networks", Science Direct-Future Generation Computer Systems, 2010.

[9] Shuhui Liu, Yongyu Chang, Guangde Wang, Dacheng Yang, "Vertical Handoff Scheme Concering Mobility in the Two-hierarchy Network," IEEE GLOBECOM 2011, pp.237-241,2011.

[10] Fang Zhu, McNair, J., "Optimizations for vertical handoff decision algorithms", IEEE WCNC 2004, vol.2, pp. 867-872, 2004.

[11] Pramod Goyal, D. K. Lobiyal, C. P. Katti, "Vertical Handoff in Heterogeneous Wireless Networks: A Tutorial", ICCA 2017.

[12] Jung-Min Moon, Dong-Ho Cho, "Efficient handoff algorithm for inbound mobility in hierarchical macro/femto cell networks," IEEE Communications Letters, vol.13, no.10, pp. 755-757, 2009.

[13] X. Yan, Y. A. S ¸ekercio ù glu, and S. Narayanan, "A survey of vertical handover decision algorithms in fourth generation heterogeneous wireless networks," Computer Networks, 54(11):1848-1863, August 2010.

[14] "Mobility Management Scheme for Context-Aware Transactions in Pervasive and Mobile Cyberspace", Muhammad Younas, Member, IEEE, and Irfan Awan, Member, IEEE.

[15] "Connectivity Support in Heterogeneous Wireless Networks", Anna Maria Vegni1 and Roberto Cusani, et.al, www.intechopen.com.

[16] "An overview of vertical handover techniques: Algorithm, protocols and tools", Johann Marque Barja, et.al, Computer Communication Journal, Elseveir.

[17] "Context Aware Handover on Smartphones" Qi Han, et.al, Institute of Engineering, University of Chinese academy, Beijing, IEEE, 2013.

[18] "A Survey on Handovers – Lessons for 60 GHz Based Wireless Systems", Bien Van Quang, et.al, IEEE communication survey & tutorial, VOL. 14, NO. 1, first quarter 2012.

[19] "Location based handover for multimode mobile terminals", Tansir Ahmedd, et.al

[20] "A survey of vertical handover decision algorithms in 4th generation heterogeneous wireless networks", Xiaohuan Yan, et.al, Computer Networks, Elseveir, 2012.