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Seamless Vertical Handoff Using Modified Weed Optimization Algorithm for Heterogeneous Wireless Networks

T. Velmurugan[1*], Sibaram Khara[2], S. Nandakumar[1***], and D. Sumathi[1****]**

[1] *VIT University, Vellore, India*
[2] *Galgotias University, Noida, India*
**e-mail: tvelmurugan@vit.ac.in*
***e-mail: sianba@rediffmail.com*
****e-mail: snandakumar@vit.ac.in*
*****e-mail: dsumathi@vit.ac.in*

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Abstract—In the global scenario, a variety of wireless access networks are available. Different types of applications such as real time, nonreal time, and high bandwidth availability are used for heterogeneous wireless networks. Therefore, it is necessary for a service provider to make an appropriate connection support. For better performance, connections are to be exchanged among the different networks using seamless vertical handoff (VHO). The proposed algorithm shows the effect of optimization technique, which involves handoff decision process using vertical handoff triggering and selection of the network. The handoff triggering is initiated by using the received signal strength (RSS). In traditional method, handoff triggering is initiated by using RSS only. This method, modified weed optimization (M-WO) algorithm, reduces the unnecessary handoff by considering both RSS and velocity of the mobile node in handoff triggering. The parameters such as battery lifetime, handoff call dropping rate, load, dynamic weights adaptation and so on are to be considered individually or combined to make an effective network selection process. This paper highlights a novel effect of M-WO algorithm for decision making during the VHO. Our effort is to essentially optimize the system load, so that it reduces the handoff call dropping rate and the battery power consumption of the mobile node (MN). Weight of each QoS metrics is adjusted along with the networks changing conditions to trace the M-WO. Therefore, the novel VHO decision-making algorithm is superior to the existing SSF and OPTG methods. The simulation results show that the performance of M-WO algorithm is far better than SSF and OPTG methods in terms of load, handoff call dropping rate and battery lifetime of MN.

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1. INTRODUCTION

In recent years, there has been tremendous growth in mobile communication technologies, such as cellular and WLAN systems. Cellular technologies, namely GSM, UMTS and WiMAX provide high-speed mobility, large coverage area with low data rate. In contrast, WLAN system supports high data rate, the pedestrian mobility and small coverage area. Owing to complementary advantages, WLAN systems are located in hotspots which provide data services with higher data rates and better connectivity in heterogeneous wireless networks [1].

Heterogeneous wireless network is an integration of two different dissimilar networks such as cellular and WLAN [2]. Handoff is a process in which a mobile node (MN) is to move from one base station to another. There are two types of handoff: vertical handoff (VHO) and horizontal handoff (HHO). In VHO, a MN is moving from cellular to WLAN and from WLAN to cellular. In HHO, a MN is moving from cellular to cellular or from WLAN to WLAN [1].

This paper considers the VHO decision depending on handoff triggering and selection of the network. The existing methods employ the handoff triggering process based only on receiver signal strength (RSS) and signal-to-interference and noise ratio (SINR). We find that traditional handoff triggering is not suitable for heterogeneous wireless networks.

By considering only the RSS and SINR methods, each MN selects APs/BSs (access points/base stations), which provide the maximum RSS. In a similar situation, many MN try to initiate a handoff on the same

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