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A Survey on A Weighted Method Based Technique for Vertical Handover Decision in Multi Network Wireless Environment

Sandeep Kumar¹, Sandeep Goyal²

¹M. Tech. Scholar, Dept. of ECE, Manav Institute of Technology and Management, Jevra, Hisar, Haryana, India

²Assistant Professor, Dept. of ECE, Manav Institute of Technology and Management, Jevra, Hisar, Haryana, India

ABSTRACT: With the development of wireless communication technology, different wireless networks have been deployed. Next generation wireless network with different wireless access technologies providing the user enhanced connection anywhere any time to improve the systems resource utilization. In such converged systems, co-existence of heterogeneous access technologies with largely different characteristics like data rate, quality of service, security etc results in handoff asymmetry. In such networks, providing efficient handoff by selecting the best network from many ones is necessary. In this thesis, a handoff decision scheme is proposed that will help to choose the best network and fuzzy logic is applied to deal with the imprecise information of some criteria and user preference.

I. INTRODUCTION

Handoff is one of the key operations in cellular mobile communication systems. It is the means through which the continuity of a call is maintained when Mobile Terminal (MT) coverage moves from one cell area to another. Handoff can be defined as the process of transferring a mobile station from one base station or channel to another. The channel change due to handoff occurs through a change in time slot, frequency band, codeword, or a combination of these. In time division multiple accesses (TDMA) it occurs through a change in time slot. Where as in case of frequency division multiple accesses (FDMA) and code division multiple accesses (CDMA) it is achieved by frequency change and code change respectively. It is necessary to ensure that handoff should be performed reliably and without disruption to any calls. Failing which, leads to dropped calls and customer dissatisfaction. Thus it is necessary to revive the handoff issues in cellular mobile systems. The process of handoff can be divided into three stages: decision stage, planning stage and execution stage.

The work reported here focuses on the decision stage of handoff process. Many of the existing handoff algorithms do not exploit the advantage of fuzzy logic, which can provide better performance than other decision algorithms. This is due to the flexible and complementary nature of handoff criteria. A fuzzy logic based handoff algorithm is proposed as a solution to handoff decision.

II. CLASSIFICATION OF HANDOFF

Handoffs are broadly classified into two categories-

A] Hard Handoff- Hard handoff (HHO) is 'break before make,' meaning that the connection to the old BS is broken before a connection to the candidate BS is made. HHO occurs when handoff is made between disjointed radio systems, different frequency assignments or different air interface characteristics or technologies. Usually, the hard handoff can be further divided into two different types—intracellular and intercellular handoffs. A handoff made within the currently serving cell (e.g., by changing the frequency) is called an intracellular handoff. A handoff made from one cell to another is referred to as an intercellular handoff.

B] Soft Handoff- Soft Handoff (SHO) is 'make before break,' meaning that the connection to the old BS is not broken until a connection to the new BS is made. In fact, more than one BS is normally connected simultaneously to the MS. There are different types of SHO. When sectors of the same BS are involved in communication with the MS, the handoff is called softer handoff. When one sector from each BS is involved, the handoff is called soft handoff.



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When multiple sectors of one BS and one or more sectors of another BS communicate with the MS, the resulting SHO is called softer-soft handoff. Mobility in network is managed by two different handoff strategies, namely Horizontal Handoff and Vertical Handoff. In case of Horizontal Handoff, handoff is between two network access points or base stations that use the same wireless network access technology. The handoff is purely due to mobility of the mobile station. In case of Vertical Handoff, handoff is between two network access points or base stations that use the different wireless network access technology..

III. FEATURES OF HANDOFF

An efficient handoff algorithm can achieve many desirable features by trading different operating characteristics. A list of desirable features of handoff algorithms are described below

- Handoff should be fast so that the user does not experience service degradation or interruption. Service degradation may be due to a continuous reduction in signal strength or an increase in CCI adds to the network delay at the Mobile Switching. Service interruption may be due to a "break before make" approach of HHO. Note that the delay in the execution of a handoff algorithm Centre (MSC) or Mobile Telephone Switching Office (MTSO). Fast handoff also reduces CCI since it prevents the MS from going too far into the new cell.
- Handoff should be reliable. This means that the call should have good quality after handoff. SIR and RSS help determine the potential service quality of the candidate BS.
- Handoff should be successful; a free channel should be available at the candidate BS. Efficient channel allocation algorithms and some traffic balancing can maximize the probability of a successful handoff.
- The effect of handoff on the quality of service (QoS) should be minimal. The quality of service may be poor just before handoff due to a continuous reduction in RSS, SIR, etc.

IV. LITERATURE REVIEW

Manoj Sharma and Dr. R.K. Khola: Vertical handoff is the basic requirement of the convergence of different access technologies. It is also the key characteristic and technology of overlay wireless network with appropriate network interfaces. The integration of diverse but complementary cellular and wireless technologies in the next generation wireless networks requires the design of intelligent vertical handoff decision algorithms to enable mobile users equipped with contemporary multi-interfaced mobile terminals to seamlessly switch network access and experience uninterrupted service continuity anywhere and anytime. Most existing vertical handoff decision strategies are designed to meet individual needs that may not achieve a good system performance. In this paper an intelligent approach is used for vertical handover decision. The intelligence is based on the fuzzy logic approach. So here, fuzzy logic is used for network selection and decision making for vertical handover.

Venkata Koti Reddy.G, Prof. V. Krishna: In this paper, we present an analytical framework to evaluate VHO algorithms. This framework can be used to provide guidelines for the optimization of handoff in heterogeneous wireless networks. Subsequently, we extend the traditional hysteresis-based and dwelling-timer-based algorithms to support both VHO and HHO decisions and apply them to complex heterogeneous wireless environments. We refer to these enhanced algorithms as E-HY and E-DW, respectively. Based on the proposed analytical model, we provide a formalization definition of the handoff conditions in E-HY and E-DW and analyze their performance. Subsequently, we propose a novel general handoff decision algorithm GHO to trigger HHO and VHO in heterogeneous wireless networks at the appropriate time. Analysis shows that GHO can achieve better performance than E-HY and E-DW. Simulations validate the analytical results and verify that GHO outperforms traditional algorithms in terms of the matching ratio, TCP throughput, and UDP throughput.

Mandeep Kaur Gondara and Dr. Sanjay Kadam: The importance of wireless communication is increasing day by day throughout the world due to cellular and broadband technologies. Everyone around the world would like to be connected seamlessly anytime anywhere through the best network. The 4G wireless system must have the capability to provide high data transfer rates, quality of services and seamless mobility. In 4G, there are a large variety of heterogeneous networks. The users for variety of applications would like to utilize heterogeneous networks on the basis of their preferences such as real time, high availability and high bandwidth. When connections have to switch between



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heterogeneous networks for performance and high availability reasons, seamless vertical handoff is necessary. The requirements like capability of the network, handoff latency, network cost, network conditions, power consumption and user's preferences must be taken into consideration during vertical handoff. In this paper, we have extracted the requirements of a vertical handoff from the literature surveyed. The evaluation of the existing work is also being done on the basis of required parameters for vertical handoff. A sophisticated, adaptive and intelligent approach is required to implement the vertical handoff mechanism in 4G wireless networks to produce an effective service for the user by considering dynamic and non-dynamic parameters.

Ravindra C. Sanap, S.S.Sambare: In this paper, we investigate the issue of vertical handoffs in heterogeneous wireless networks. The very importance of wireless communication is increasing day by day throughout the world because of cellular and broadband technologies. Everyone in the world would like to be connected seamlessly anytime anywhere through the best network. An Enhanced QoS-based vertical handoff scheme for WLAN and WiMAX interworking networks is proposed with aim to provide always best service to the users. This paper include efficient method to estimate the available bandwidth, Service Cost of network, Security and Power saving module in WLAN and WiMAX networks to evaluate the real-time status of the overlay networks and make a handoff decision based on the information. A VHO initiated to provide the user with better performance (e.g., more bandwidth or lower access cost) is considered to be an alternative VHO. By this proposal, a handoff will take place only when network cannot meet QoS requirement.

V. RESEARCH METHODOLOGY

In this thesis we use the fuzzy logic. In fuzzy logic we used defuzzification to converts a fuzzy set into a crisp output. Defuzzification is a process to get a non-fuzzy value that best represents the possibility distribution of an inferred fuzzy control action.

Defuzzification means the process of conversion of a fuzzy quantity to a precise (crisp) quantity. The process of defuzzification in fuzzy logic control systems is not standardized.

There are several methods in use

- Min-Max operation (AND—OR operation)
- Center of Gravity method
- Weighted Average method
- Max. Membership Principle

VI. CONCLUSION

Here a vertical handover algorithm in heterogeneous wireless networks is presented. The proposed vertical handover algorithm considers some network parameters including BW, RSS and QOS. The handover decision is based on the weight vector for each of the input parameter and membership function of each parameter.

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