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Vertical Handoff Decision Criteria with LTE Network

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Abstract

A handover decision scheme in LTE networks either based on single or multiple criteria. The number of criteria is directly depending on the total handover time. A vertical handover decision algorithm based on the fuzzy control theory. The algorithm takes into consider the factors of Power Level, Cost and Bandwidth. After establishing the membership functions, membership degrees of corresponding factors can be determined, which are processed by the Weight Vector. Finally, the Fuzzy Vertical Handoff Decision Vector is derived and vertical handover decision can be made. It is shown through simulation that the algorithm realizes the optimized vertical handover by evaluating and analyzing various input parameters.

Keywords:Vertical Handover; Fuzzy Control Theory; Power Level; Cost; Bandwidth

INTRODUCTION

The development of wireless communication technology, the service of wireless communication networks is upgrading extremely fast. Currently, there are many kinds of wireless networks available to satisfy different needs and requirements of mobile users. When users are roaming among various wireless networks, such as Wireless LANs and 3G, the interconnection of these different networks has become a problem. While a mobile terminal (MT) crosses the coverage boundary of two different systems, its ongoing connection must be seamlessly

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switched to a new network with a guaranteed QoS. Such a cross-system transfer of an ongoing connection is usually referred to asinter-system, or vertical handover. The vertical handover decision algorithm presented in the paper is based on fuzzy control theory. It takes into account 3 common metrics as input parameters.

The determination of the membership functions for these 3 input parameters is detailed in Section 2. In section 3, we calculate the membership degrees of the input parameters for each BS. We also determine the weigh vector for the 3 input parameters. Therefore, vertical handover decision value (FVHD Value) of each BS can be achieved. Based on the FVHD Values, final vertical handover decision can

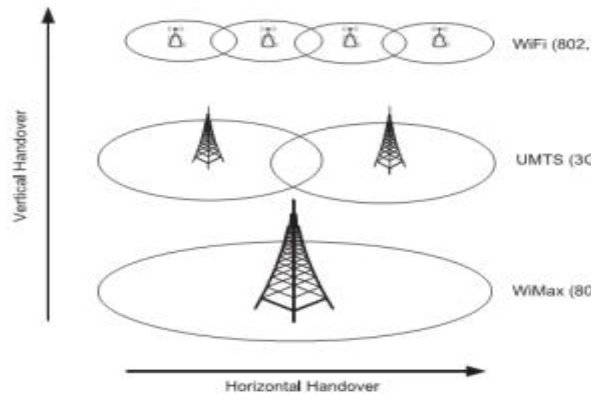

Fig.1.horizontal and vertical handovers.

Horizontal handover

The horizontal transfer is the transfer process triggered during a change of the access point within the same technology.It is generally carried out

homogeneous cellular networks when a mobile moves between two cells of the same access technology. This process is normally required because of the mobility and the impossibility to maintain connection. Figure 2 shows the change of access point. For example UMTS to UMTS, WLAN to WLAN.

Vertical handover

The vertical handover is the transfer process between two networks of different technologies .For example, the mobile terminal may want to connect to another network for a better quality of connection even if the connection to the old network is still possible.Vertical handover management is a central issue as it is intended to ensure seamless roaming of users from one wireless access technology to another. It requires mobility decision mechanisms and mobility protocols. Mobility decisions are based on vertical handover decision criteria and algorithms aiming to ensure automated, quick and right decisions for network selection. Mobility protocols tackle addressing and routing procedures including the support of multi-homing allowing users to be simultaneously connected to multiple wireless networks. Mobility decisions and protocols are included in the VHO

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management process that consists in three steps, namely, system discovery, handover decision, and handover execution. During the system discovery phase, the information required to identify the need for vertical handover is collected. Both Mobile Terminals (MT) and networks participate to gather these data. This information is then used during the handover decision phase to evaluate the available networks and determine the most suitable one for each ongoing app
during the handover execution step, a new connection is established and old resources are released. Once the new access network is selected, the communication sessions have to be transferred from the old radio interface to the new one. A new routing path is then established.

Proposed work

Background estimation

There are various methods proposed for background estimation :-

1.PL: The power levels received from candidate BSs. **C**: The costs of operation networks which thecandidate BSs belong to.

2. **BW**: The amounts of unused bandwidth of candidateBSs.

vertical handover decision algorithm which takes into consider not only power level, but also the factors of cost and bandwidth. It can realize the interconnection of different operation networks.

Conclusion and Future scope

Using the reactive handovers for all handover procedures can significantly reduce the number of handovers in an urban LTE Network environment but for different users of variable velocities it will result in a much greater call drop probability as the delay in handover might be too long for the call to continue with decreasing signal to interference and noise ratio (SINR). On the other hand, use of all proactive handovers to reduce the call drop probability will significantly increase the number of handovers. So an optimization algorithm needs to be devised using the proactive, reactive and normal handovers which has been proposed later in the paper using the velocities of the users and their respective dwell times in the past cells.

In this work the innovative concept of Fuzzy Based handover decision for LTE Networks broadband cellular networks was proposed. We Selected Three Different Acess Points namely AP 1, AP 2 and WIFI. The FIS Handover system was built on MAMDANI FIS System. The Inference

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System was able to Successfully Find Appropriate Access point for incoming Traffic ,especially between Different Traffic Types.

It is crucial for LTE Networks becoming autonomous and self-organized and able to the office without person intervention. The disturbance in realistic wireless settings is paid down by way of Fuzzy Learning techniques, which enable the LTE Networks to understand online and distribute the appropriate Handover decision policy by continuous interactions with the environment. However, Fuzzy Handover Mechanism is based on discrete representation of state and activity spaces, which makes the proposed approach independent of the environment and designer criterion, since it needs a significant human intervention in this is of the state and action spaces. For Evaluation of the Fuzzy Model we have presented the state of art modeling of Femto cell systems using MAMDANI Fuzzy Logic. Due to the lack of a common framework it remains often difficult to compare the different Femto cell based models conceptually and evaluate their performance comparatively.Combined Impact of angle of arrival (AoA) and speed on wireless channel. channel statistics is affected drastically by AoA and speed. In order to better identify and estimate the channel parameters such as lineofsight (LOS), the combined impact ofAoA and speed can be investigated. Furthermore, a new way of looking at the mobility concept in wireless community, which is called motion intensity, can be incorporated into the analyzes of identifying and estimating several other wireless channel parameters. Traffic type awareness. Especially in multiaccess wireless communications systems, traffic type awareness becomes more critical. Being aware of traffic type helps schedulers better adapt themselves to changing interference conditions. Considering the vast variety of traffic types to be carried out such as data, multimedia, gaming, and voice, understanding the statistics of each type of traffic constitutes one of the most challenging research items in this manner. Furthermore, investigation of the statistics of mixture of all these traffic types is a followup research item in the frame of interference awareness

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