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Vertical Handover Decision Modelling in Heterogeneous Wireless Network

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Abstract: ***In essence, handover refers to a function within cellular networks and related communication systems, where it involves the transition of active data or services from one channel to another. The identical form soft handover procedure can take place in both cellular networks and satellite communication systems to guarantee uninterrupted transmission of data or services. Handover management has been the topic of research for the past decade which is now more prominent issues due to the growth of generation in wireless communication standards. The current generation of wireless communication belongs to emerging wireless platform which are referred has heterogeneous networks. This heterogeneity exists in all aspect so communication stating from the access technologies used, frequency of operation, applications supported, operating systems, multimode handheld devices etc. This heterogeneity puts forth challenges in providing seamless connectivity to the user due to the complementary characteristics of the access technologies and networks used in overlay scenario. One ofthe prominent issues isproviding good mobility management isthe basis for seam less communication. To provide an on-disruptive communication the management has to be taken care more. As this work deals with heterogeneous networks, the issue of vertical handover is of prime importance in order to achieve service continuity.***

The handoff parameter is controlled by ANFIS Techniques. The entire distance is monitored by RSS parameter. On the basis of RSS parameters, Channel capacity, throughput & jitter parameter is calculated. The handoff via ANFIS performed better throughput & Jitter values. For 4G Base Station, 2100MHz, 2300MHz and 2500 MHz is calculated for previous technique is calculated at 1118 meter, 1169 meter and 1215 meters respectively.

Forthe proposed technique, in4G Base Station for 2100 MHz, Handover is calculated at 951 meter. Similarly, 4G Base Station for 2100 MHz, 2500 MHz, and Handover is calculated at 983 meter and 1016 meters. The proposed throughput obtained from the algorithm for frequency 2100 , 2300 and 2500 Hertz frequency is 70 % , 84 % , 92 % respectively as compared to existing throughput are 60 % , 80 % and 90 % respectively. The proposed throughput obtained from the algorithm for frequency2100 , 2300 and 2500 Hertz frequency is0.028 , 0.08, 0.003 secrespectively as compared to existing throughput are0.03, 0.01 and 0.005 respectively.

I. INTRODUCTION

Major challenges exist between LTE and 3G. LTE uses OFDMA as its radio interface. LTE enables to operate with the flexibility in the spectrum usage and data rate. As the LTE is the technology that supports 4G wireless data communication the supporting mobility speed is almost in multiples of hundreds of kilometers per hour. So the probability of handover occurrence will be high which requires a proper and effective handover algorithm that could provide seamless connectivity and improvise the system performance in terms of throughput by reducing handover delay andpacket loss. The handover procedure in LTE networks are the key function which are required to decrease the call connection interruption period when compared with the 2G networks which uses circuit switched type of handover. LTE technology provides two types of handover. One isthe homogeneous handover which hhappens between the cells of the same type of network and the other is heterogeneous handover which support handover between various types of networks.

When a handover performed within an E-UTRAN it is refereed as inter eNodeB handover. The handover also depends whether the UE is entering or leaving the cell.If the UEis entering a new cell,itis referred as targets in tere Node B hand over. If the UE is leaving a cell and entering a new cell which is handled by another eNB,such handover is referred as source NB handover. If a hand over is between E- UTRAN to a different radio access technology, it is referred as inter RAT handover. When a handover is performed from one sector to another sector which is controlled by the sameeNB it isreferredas intraeNB handover. Whenhandover occurs between eNodeB, it is done using S1 interface in which MME and SGW are involved.

Figure gives a complete integrated architecture of UMTS and LTE systems .All the communication is supported by the SGSN of the UMTS network to LTE and through the GGSN to the other packet data networks.

A. *Handover Mechanism*

In this section we discuss the background of proposed scheme and essential fundamentals involved for the Vertical Handover (VHO) in the heterogeneouswireless network.

Fundamentally, handover is linked to cellular networks and their related communication frameworks, and it refers to the method of shifting active data or services from one transmission channel to another [1][2]. Comparable types of handover procedures can occur in both cellular networks and satellite communication systems [3][4], aiming to maintain a continuous and smooth flow of data or services. In Figure1.3, It is observed that various types of access points are linked to the core network. These access points may be either homogeneous or heterogeneous in nature.

B. *Importance of Handover Mechanism*

A third key advantage of the handover mechanism is its ability to withstand interference from disruptive channels, particularly in non-CDMA (Code Division Multiple Access) networks. Typically, there is a significant likelihood that a communication channel may experience substantial interference when it is simultaneously used by multiple mobile users across different cells but operating on the same frequency channel. In such condition, the call is transferred to a different channel that could be present on different cellular region or either within the same cellular region itself [8]. A fourth significant benefit of the handover mechanism lies in the efficient allocation of frequency resources to accommodate the dynamic movementofmobileusers,particularlyinnon-CDMAnetworks.Insuchnetworks,it

II. RESULT ANALYSIS

A. *MATLAB*

MATLAB is a interactive system who uses arrays which does not have any dimensioning and can be specified byusers itself. This permits the user to solve many computational problems, especially those problems which are in form of matrix and have vector formulation form. In this we can write a program in an non interactive language like C or FORTAN which takes a little time to write the programs.

MATLAB 2016b has evaluated over a long periods time with the various inputs and being successfully implemented.

MATLAB 2016b also have a feature which is application specific and it is" toolbox" this tool box have various kind of tools which have their own specification according to the software .Tool box contains the comprehensive functions that extend the capability of MATLAB to solve the various problems. Some field where we use tool boxes are: -

1) Image processing
2) Bioinformatics
3) Fuzzy logic
4) Control systems
5) Signal processing
6) Control systems
7) Wavelets

Most of the MATLAB toolbox contains M- files as demonstrated above, which arethe MATLAB 2016b statements that are used to implement the special image processing algorithms. Bythe help of image toolboxwe caneasilyread the, write and modify various functions of an image.

The MATLAB consists of five main parts:

a) The MAT LAB language: MAT LAB is a interactive system who uses arrays which does not have any dimensioning and can be specified by users itself. This permits the user to solve many computationa lproblems, especially those
b) problems which are inform of matrix and have vector formulation form. In this we can write a program in an non interactive language like C or FORTAN which takes a little time to write the programs.
c) The MATLAB working environment: this contains the set oftools and facilities by which you work as a MATLAB user and thus it can said to be an interface or other function by the help of which you can work on a high level language. This function contains managing the specified variables according to your system structure and to input and output of the software system data.
d) Handle Graphics: it is MATLAB graphics system. Means there we can control and modify the graphics of our MATLAB this contains a 2-D and 3-D visualization. We can use the low level command to modify our graphics like to maximize minimize or various other image processing functions.

e) The MATLAB mathematical function library: MATLAB function library contains a large range ofa, addition, subtraction, cosine sine, log to the more complex computational problems like matrix, inverse matrix etc.

f) The MATLAB Application Program Interface (API): application program interface is the part where the user can interface with the MATLAB by the user friendly language which may be C or FORTAN and these can be easily written program language which a user can use to write it software program. It also contains various facilities from MATLAB.

III. PROPOSED METHODOLOGY

A. *Network Design & Calculations*

Under the different propagation conditions, the coverage area ofthe cellular systemis evaluated with a no.of handover points. It resolves the different channel faced by the cellular network. In this section, two basestationsi.e3G&4Gbasestationsareplaced in a particular manner as shown in fig 4.1.

The proposed two base station BS1 & BS2 are operated at 900 MHz & 1800 MHz respectively. The co-ordinate calculations analysis is given in fig4.2. As shown in fig 4.1, Point A indicating BS1 & Point B indicating BS2 respectively. It is assumed that user is moved out from BS1 to BS2 & make a trajectory along this straight line & represented by AB line

IV. CONCLUSION & FUTURE SCOPE

A. *Conclusion*

Handover management has been the topic of research for the past decade which isnow more prominent issues due to the growth of generation in wireless communication standards. The present era of wireless communication is part of the next-generation wireless systems, commonly known as heterogeneous networks. This heterogeneity exists in all aspects of communication stating from the access technologies used, frequency of operation, applications supported, operating systems, multi mode hand held device sets. This heterogeneity puts forth challenges in providing seam less connectivity to the user due to the complementary characteristics of the access technologies and networks used in overlay scenario. One of the prominent issues is providing good mobility management is the basis for seamless communication. To provide a non-disruptive communication the management has to be taken care more. As this work deals with heterogeneous networks, the issue of vertical handover is of prime importance in order to achieve service continuity.

For 4G Base Station, 2100 MHz, 2300 MHz and 2500 MHz iscalculated for previous technique is calculated at 1118 meter, 1169 meter and 1215 meters respectively. For the proposed technique, in 4G Base Station for 2100 MHz, Handover is calculated at 951 meter. Similarly, 4G Base Station for 2100 MHz, 2500 MHz, and Handover is calculated at 983 meter and 1016 meters.

B. *Future Scope*

Mobility management plays a vital role in providing continuous communication in an environment of het nets. The challenges depend on the availability and capability of various types of handheld devices which possess innumerable issues to be addressed while working in a heterogeneous environment. The work can be further extended in the waybymaking use ofmultiple attributes bothinthe decision making and network selection process in order to execute the handover by using the soft computing techniques.

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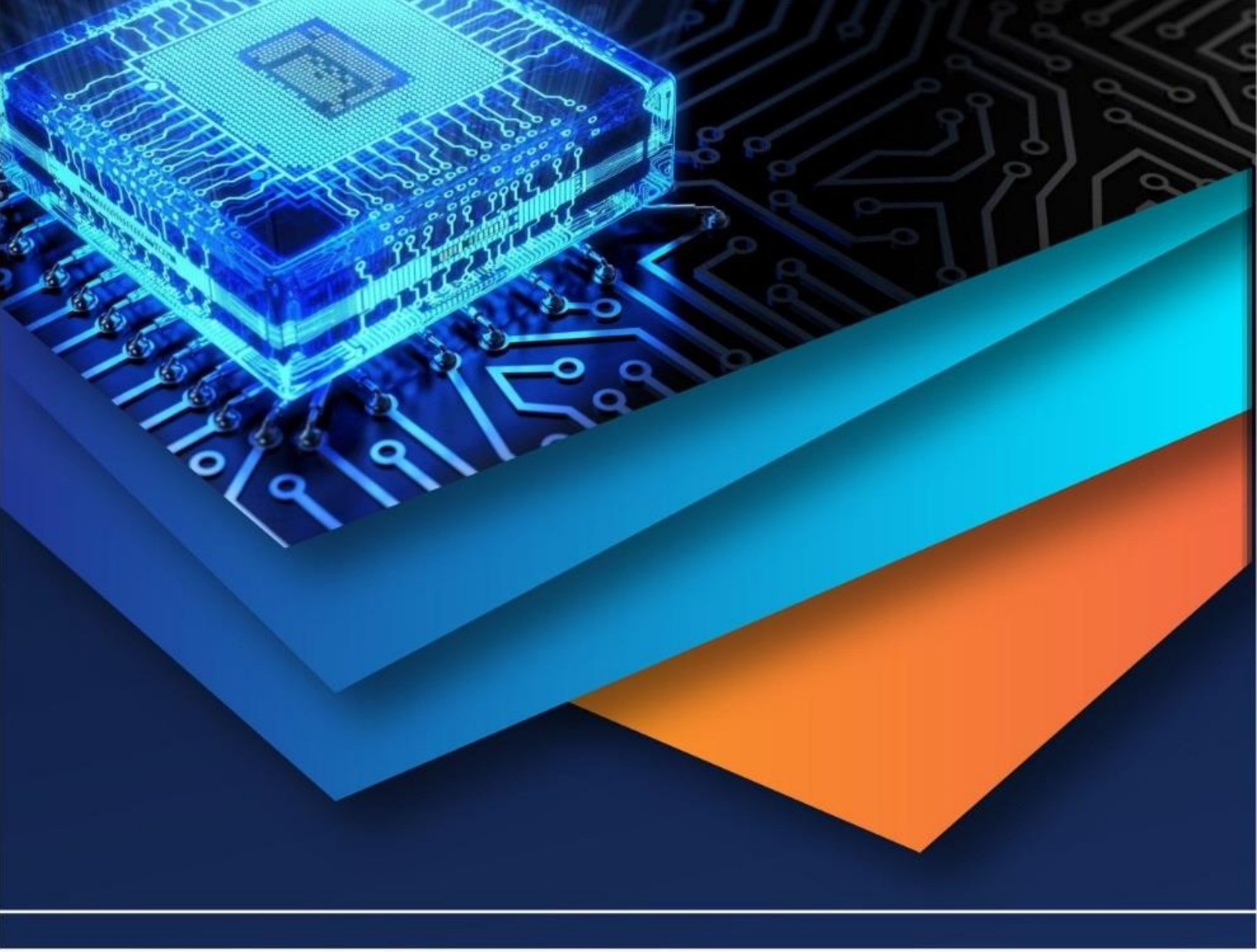

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