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RESEARCH ARTICLE

ADAPTIVE APPROACH FOR TRANSMISSION STRATEGIEONHIGH CAPACITY OVER HETEROGENEOUS WIRELESS NETWORKS

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ABSTRACT

To provide support for both data and voice is essential requirement of present mobile networks both LTE and UMTS networks. In this work, we studied the heterogeneous wireless communication, as a joint collaborative orientation of different Radio Access Technology through which network produce can fulfill as possible as a large variety of user service difficulties in a more efficacious modality by) UMTS/LTE) is also increasing. The Proposed Model assumes that (HWN) based on two different (RATs) these technologies coexist, namely [UMTS, LTE]. Evaluate the performance of a heterogeneous network after applying the proposed load balance algorithm. Study the effect of load balance on each network during the change in height of the transmitter antenna and receiver antenna and change the location of the user from the network and the effect of these shows through the loss of output in each network. Furthermore, *appraised changing Mobile Station (MS) antenna height, transmitter-receiver (T-R) separation distance and Base Station (BS) antenna height, seeing the system to work at* applied for both LTE and UMTS network. This enhancement accompanied through the decrease of intervention and enhancement in excellence of service obtainable to the end user and find out the causes for the blocking phenomena.

INTRODUCTION

In order to meet the increased demand of bypassing, the fourth generation (4G), and mobile communication systems provides data rates obligation of up to 100 MB/s for higher mobility user and up to 1 Gb/s for lesser mobility users (Tu *et al.,* 2013). Radio wave propagation has been for a long time an important field of research and outgrowth. In fact, a simple, accurate, and fast mode is required by engineer to predict transmitter coverage and interference, delimit service area, and optimize network performances. Many path loss prediction models exist in literature. Traditionally, they are classified into three main categories: empirical, semi empirical and deterministic models. Principles of deterministic models are derived fromthe laws of physics, such as ray tracing (Ayadi *et al.,* 2017; Sarkar *et al.,* 2003), uniform theory of diffraction (Brien *et al.,* 2000), Maxwell equations (Gorce *et al.,* 2007), andradiosity (Montiel, *et al.,* 2003), which are complex to implement and computationally expensive. The quality of predicted results depends on the accuracy and resolution of available digital maps (building high) and the topographical database [Digital Terrain Model (DTM) and land use (LU)]. Sometimes, despite the availability of the full and accurate database, a fine tuning of the model is needed to improve the model accuracy As the demand for spectrum within the context of mobile wireless networks continues to grow, low-power base stations, also knownas femtocell access points, have become an important means ofincreasing spectrum efficiency. They have been shown to improveindoor coverage and capacity, such as inside a residential house, ina shopping mall, in an airport and in a train station. Thedeployment of co-channel femtocells over a microcell networkimposes interference to the macro cell users. With appreciation thisinterference and to consequently ensure optimum network designand operation, a suitable propagation model is needed (Ben Allen and Shyam Mahato, 2017; Zhang and de la Roche,, 2009). In (Xiaokang Ye *et al.,* 2016; Yin *et al.,* 2015) the behaviors ofthe large- and small-scale channel parameters obtained through measurements in an operating UMTS network with 3.84 MHz bandwidth have been scrutinized, and a novel Geometry based Random-Cluster Model (GRCM) was instituted for the HST channels. The time-evolving behaviors of the clusters of multipath components are characterized by geometrical parameters in the proposed GRCM in (Xiaokang Ye *et al.,* 2016; Yin *et al.,* 2015). Nowadays, LTE-A plays a more significant role in the fourth generation wireless communication. Compared to the UMTS, LTE-A systems have a higher bandwidth up to 20 MHz, and as a result, detailed channel characteristics can be explored. Channel models based on the passive measurements on LTE- A networks on HST can

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provide realistic references of the wideband channel characteristics for performance improvement of in-service networks in high-speed mobile scenarios.

Related work

In (Kyösti *et al.,* 2007), the WINNER II project studied the propagation conduct under diversified screenplay in a university setting. The measurements performed in the frequency range of 2–6 GHz and do not extend down to 900 MHz The antennas were 2 and 2.5 m above the ground and residential settings were not considered-(free apace). Linares (Xiaokang Ye *et al.,* 2016) sophisticated an empirical path loss model for Femto-to-use equipment (UE) links for evaluation of Femto-to-macro interference scenarios at 2.4 GHz, where only a single frequency of2.4 GHz was considered in the reference. In (Linares and Sanchez, 2011), an analytical expression for the supplementary losses from the indoor–outdoor the moderator was sophisticated based on the statistics extracted from raytracing simulations, and it had not been legitimized against the measurements. Further, the model does not use the SVD methodology that is used in this paper. Another model that is described in (Ofcom, 2007) uses an amalgamation of ray tracing and finite difference time domain techniques to compute the indoor–outdoor path loss. Whilst this work focuses on 3.5 GHz, it could, in principle, be exercised at a range of other frequencies and operating climate provided the necessary data are available, which is also the case.

SIMULATION RESULTS

In this section, numerical simulations are shown based on the proposed model assumes that there are TWO different radio access technologies (RATs), UMTS and LTE. Applying free space propagation model will be done for operative transmitted power levels. The MRRM algorithm which taken for Load balance and Single service class is assumed Figure 1.

Table 1. Some of These parameters are in consistent with the previously published work in These parameters are in consistence with the previously published work in (Leijia et al., 2010; Amitava Mukherjee and Debashis Saha, 2004 and Hesham M EIBadawy, 2011)

Parameters	UMTS	LTE
BTS Antenna height	33m	33m
Mobile station Antenna height	1.5m	1.5m
Transmitted Antenna Gain	18dBi	18dBi
Receiver Antenna Gain	2dBi	2dBi
Gain Frequency	2000 MHZ	3000MHZ
Available Radio Resources	480 Channel	1200Channel
P_r threshold	-90dBm	-100 dBm
P_t	0,9~7dBm	0,9~7 dBm

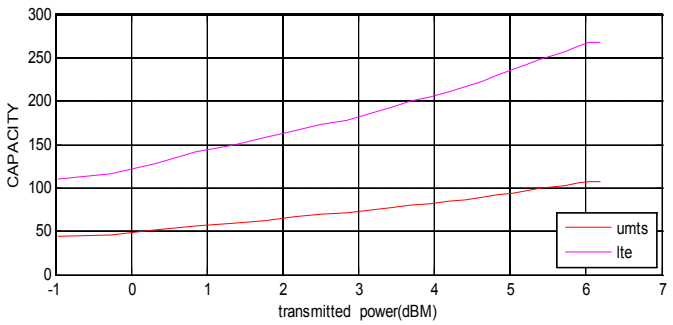

Fig.1. The Relationship between transmitted power and the capacity for each network (UMTS&LTE)

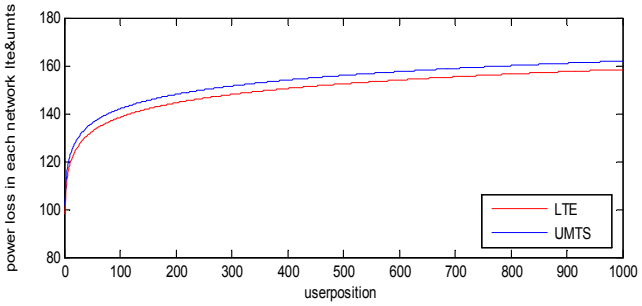

Fig. 2. The Relationship between path loss and user position

The values of parameters used in the curve of figure are shown in Table 2

Table 2. System parameters

33m	BTS/Node B antenna height (ht)
1.5 m	MS antenna height (hr)
18 dbi	BTS/Node B antenna Gain (Gt)
2 dbi	MS antenna Gain (Gr)
3000&2000MHz	central frequency (fc)
1m to 1 Km2	Service Area

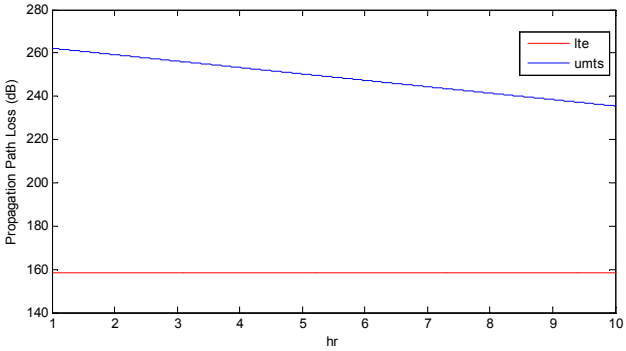

Fig. 3. The Relationship between Path loss and hr (MS)

The values of parameters used in simulation of figure 3 are shown in Table 3

Table 3. System parameters

33m	BTS/Node B antenna height (ht)
1 mto10m	MS antenna height (hr)
18 dbi	BTS/Node B antenna Gain (Gt)
2 dbi	MS antenna Gain (Gr)
3000&2000MHz	central frequency (fc)
1 Km2	Service Area

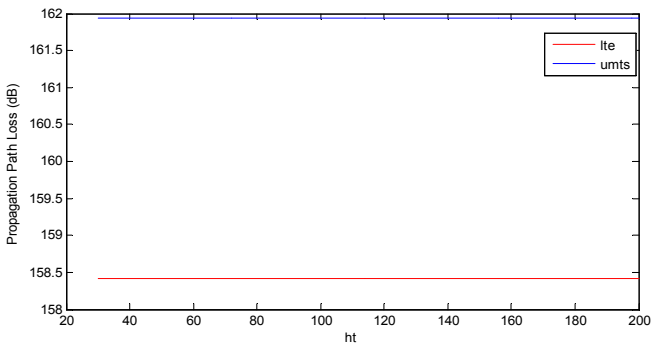

Fig. 4. The Relationship between path loss and ht (BTS)

The values of parameters used in simulation of figure 4 are shown in Table 4.

Table 4.

30 mto200m	BTS/Node B antenna height (ht)
1.5m	MS antenna height (hr)
18 dbi	BTS/Node B antenna Gain (Gt)
2 dbi	MS antenna Gain (Gr)
3000&2000MHz	central frequency (fc)
1 Km2	Service Area

It can see by applying the load balancing algorithm for the TWO radio access technology (UMTS, and LTE) it Improve the whole capacity of the costumers and 4G (LTE) support high capacity even with the low transmitted power it served a high number of data and voice and UMTs their fullness at the same transmitted power is nearly. Achieve minimal number of unserved customers. And Reduces network congestion and Figure 2 show the difference of the behavior between LTE and UMTS after applying the load balance algorithm to find out the causes for the blocking phenomena also to describe relationship between power loss and user position in free space case we consider free space path loss model which is most commonly., the relation between path loss and the change in distance between (T-R) from1m to 1000m when (BTS) ht=33m and (MS) hr=1.5 m is shown in figure 3. The relation between path loss and the change in (MS) hr from 1m to 10m when (BTS) ht=33mand distance between (T-R) =1000m is shown in figure 4 Demonstrates the relationship between path loss and the change in (BTS) ht from30m to 200m when (MS) hr=1.5m and distance between (T-R) =1000m is shown in figure 4

Conclusion

It is found that LTE (Of priority) will try to render the nearest clients in order to have to the best received Signal strength (RSS). This will leave the far clients which might satisfy the received Signal strength conditions for UMTS, so these clients will be blocked for LTE still have available (unused) radio resource. This may be evaluated via the calculation of wasted Resource percentage & the Usage ratio. In addition, UMTS network UMTS have the highest priority due to it is limitation radio resources in comparison to LTE network and huge amount of path loss than LTE. The result of this analysis will help the network designers to overcome the blocking phenomenon.

REFERENCES

A UHF Path Loss Model Using LearningMachine for Heterogeneous NetworksM. Ayadi, A. Ben Zineb, and S. Tabbane IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, VOL. 65, NO. 7, JULY 2017 3GPP. [Online]. Available: http://www.3gpp.org.

Amitava Mukherjee, DebashisSaha 2004. "Approaches for radio resource management in mobile wireless networks: current status and future issues" UNSW computer science and engineering technical reports, 1448-420X; UNSW-CSE-0404, 2004.

De la Roche, G., Filipo, P., Lai, Z., *et al*. 2010. 'Implementation and validation of anew combined model for outdoor to indoor radio coverage predictions',EURASIP J. Wirel. Commun. Netw, 16, doi: 10.1155/2010.

Geometry-based Path Loss Model forHigh-speed-train Environments in LTE-A NetworksXiaokang Ye1, Xuesong Cai1, Yu Shen2, Xuefeng Yin1, and Xiang Cheng3 978-1-4673-2016 IEEE

GorceJ. M., K. Jaffres-Runser, and G. D. L. Roche, 2007. "Deterministicapproach for fast simulations of indoor radio wave propagation," *IEEETrans. Antennas Propag.*, vol. 55, no. 3, pp. 938–948.

Hesham M ElBadawy, 2011. "Optimal RAT Selection Algorithm through Common Radio Resource Management in Heterogeneous Wireless Networks" 28th NATIONAL RADIO SCIENCE CONFERENCE Vol. NRSC 2011, pp.26-28, 2011

Indoor-to-outdoor empirical path lossmodelling for femtocell networks at 0.9, 2, 2.5and 3.5 GHz using singular valuedecompositionBen Allen1 , Shyam Mahato2, Yuteng, -The Institution of Engineering and Technology 2017., 2017, Vol. 11 Iss. 9, pp. 1203-1211.

Kyösti, P., Meinila, J., Hentila, L., *et al*. 2007. 'WINNER II channel models part radio channel measurement and analysis results'. WINNER II Public Deliverables.

Leijia Wu, Sabbagh, A., Sandrasegaran, K., Elkashlan, M., Cheng-Chung Lin, 2010. "Performance Evaluation on Common Radio Resource Management Algorithms", Advanced Information Networking and Applications Workshops (WAINA), 2010 IEEE 24th International Conference, pp. 491 -495.

Linares, L.A., Sanchez, J.G. 2011. 'Empirical modeling of femtocell path loss in afemto-to-macro indoor-to-outdoor interference scenario'. Master thesis,University of Aalborg, Aalborg, Denmark.

MontielE., A. S. Aguado, and F. X. Sillion, 2003. "A radiance model forpredicting radio wave propagation in irregular dense urban areas," *IEEETrans. Antennas Propag.*, vol. 51, no. 11, pp. 3097–3108.

O'BrienW. M., E. M. Kenny, and P. J. Cullen, 2000. "An efficient implementationof a three-dimensional microcell propagation tool for indoor andoutdoor urban environments," *IEEE Trans. Veh. Technol.*, vol. 49, no. 2,pp. 622–630.

Ofcom: 'Predicting coverage and interference involving the indoor-outdoorinterface'. OFCOM, Ofcom Project SES-2005-08 Final Report v.1.0, January2007.

SarkarT. K., Z. Ji, K. Kim, A. Medouri, and M. Salazar-Palma, 2003. "A survey of various propagation models for mobile communications,"*IEEE Antennas Propag. Mag.*, vol. 45, no. 3, pp. 51–82.

TuG. H., C. Peng, H. Wang, C. Y. Li and S. Lu, 2013. " How voice calls affect data in operational LTE networks," 9th annual international conference on Mobile computing & networking, pp 87-98.

UMTS and LTE Interfaces Utilization Improvement with QoS in Mobile Communication SystemsIEEE International Conference on Recent Advances and Innovations in Engineering (ICRAIE-2016), December 23-25, 2016.

YinX., X. Cai, X. Cheng, J. Chen, and M. Tian, 2015. "Empirical geometrybasedrandom-cluster model for high-speed-train channels in UMTSnetworks," ITS, IEEE trans on, vol. PP, no. 99, pp. 1–12.

Zhang, J., de la Roche, G. 2009. 'Femtocell: technologies and deployment' (JohnWilley& Sons, 2009, 1st edn.), ISBN 978-0470742983.

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