AN IMPROVED METHOD OF QUALITY SERVICE DURING HANDOVER IN 3G WIRELESS NETWORKS

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ABSTRACT

The convergence of heterogeneous wireless access technologies has been envisioned to characterize the next generation wireless network. The heterogeneous co-existence of access technologies with largely different characteristics results in handoff asymmetry that differs from the traditional intra network handoff (horizontal handoff) problem. The main secret behind the network failure in vertical handoff and improvements to maintain a constant network standard is considered in this paper. Analytical framework to evaluate the coverage performance which was validated by computer simulation and how the proposed analytical model that was provided for guidelines for the characterization of vertical handoff in integrated wireless network is also presented.

Key words: Concepts in 3G cellular, Wireless network and vertical Handoff

Introduction

Wireless network is the major medium of communication between the people in today's tremendously growing world. The demand for this type of communication is increasing day by day this is why to handle this demand, more wireless networks have to be established in order to obtain the high data rate requirement. This also corrects to say that this type of communication is necessary in building human relations. For example when two persons knew but lives far apart they need some medium

to interchange their views. Because of the distance barriers some tools are required to communicate with each other. Scientist has land the first store in the field of communication using different tools regardless of distance invented first wired base telephony equipment. It was a solution for the voice communication for the people. After this, radio based communication for the people. After, this, radio based communication system era started which was an extension of wired based networks. In the beginning, it was developed for some special purpose like military and police usage, but within the passage of time, these systems emerged to allow common people to communicate with each other.

After this age faster communication capabilities of voice started and evolved into new telecommunication system (Stijn , 2003).

2.0 VERTICAL HANDOFF CONCEPT IN 3G

Wireless network; a mechanisms of by which an ongoing connection is transferred from one base station to another in the context of cellular network is known as handover. Figure 1 illustrates the concept of vertical handover. The base stations are the infrastructures that are deployed by the cellular operators to provide service in different geographical areas.

Fig.1

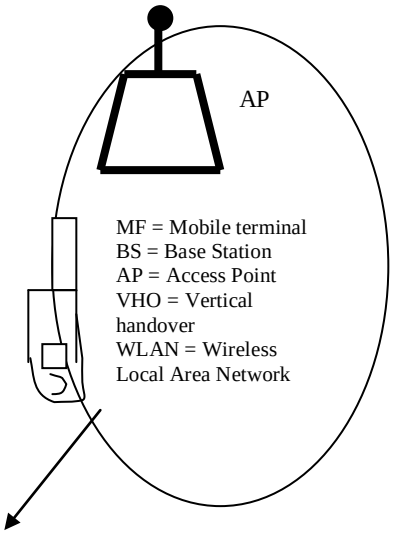

Fig. 2

In a vertical handoff, the users can move between different network access technologies in vertical handoff. The mobile node move access the different heterogeneous network and not only changes the internet protocol address but also changes the network interface, quality of services.

2.1 DOWNWARD VERTICAL AND UPWARD VERTICAL HANDOFF

In wireless overlay network low level provides the high bandwidth that cover small areas and high level provided the lower bandwidth that covers the larger area respectively when user moves from one network with lower cell size and usually lower bandwidth, downward vertical handoff occur. On the other hand, when users move from network with higher cell size and usually lower bandwidth upward-vertical handoff occurs. The wireless local area network (WLAN) system can be considered as

the small coverage network with high data rate while the 3G cellular system is the one with wider coverage and lower data rate. The trend in the literature has been to perform downward vertical handoff whenever possible. (hyosoon, 2006).

2.2 RECEIVED SIGNAL STRENGTH

The base station that has stronger signal strength is preferred to handover because the received signal strength (RSS) is measured over time in relative to other signal strengths. Handoff is requested when the received signal strength (RSS) of new base station is greater than the received signal strength of a new base station. Therefore, to reduce the network load, unnecessary handoff should be avoided by using handoff techniques. This is because the mobile terminal (MT) scans periodically the available networks and calculates their received signal strength using handoff algorithm with path loss channel propagation and shadow fading. The received signal strength is the transmitted power minus the constant power loss multiplied by the algorithm of the distance between mobile terminal and access point (AP) plus the standard deviation which is F (μ,σ) representing shadow fading and is modeled as Gaussian with mean μ=0.

$$RSS = pt - L - 10n\text{Log}(d) + \sigma \quad (2.1)$$

Where

n = path loss

σ = Standard deviation

d = distance between access point and mobile terminal

L = constant power loss

Pt = Transmitted power.

The life time metric EL(K)

is calculated.

By using received signal straight, the RCC changes rate(s) and application signal straight thredded (7) mobile terminal life fine within wireless. LAN, EL, [K] is calculated as;

EL [K] = (RSS-Y?)/S [K] - - - - - (2.2)

T = Application signal strength threghidd (ASST)

EL [K] = Delay Sensitivity level

RSS = Received signal strength

S [K] = Rate of Change of RSS.

P(o) (K) = K/θD - - - - - - (2.3)

D = ∑ [PD (K)/ (Kmo – Kstart+1] - - - (2.4)

K = time index

θD = liveshold value (constant)

Where

PD (K) = probability of delay packet

Kmo = mobile out

Kstart = mobile start

Putting the value of PD (k) into equation

2.3 THE VALUES OF AVERAGE PROBABILITY OF PACKET DELAY CAN BE CALCULATED.

To calculate the speed, the Doppler frequency, Fm = Doppler frequency = 1/(2*ts) - - - - - - - (2.5)

Where the speed can be calculated as

V = (C/Fc) *Fm - - - - - - (2.6)

Where v = speed

C = speed of light = 3x108 M/S

ts = time in seconds

fc = carrier frequency

Fm = Doppler frequency

3.0 RESULT AND ANALYSIS

In this paper, the result collected as well as the stimulated result is analyzed. According to equation 3 the vertical handoff parameters were stimulated

using mat lab. In this simulation, graphs different parameters were optimized to improve the quality of service (QOS) with best connection regardless of devices any time.

3.1 SYSTEM PARAMETERS

The various parameters which are directly related to model under consideration in this work are described in table 1 below, these parameters results in wireless local area network (WLAN) coverage of 100 meters approximately. The values shown in the table are used for performance evaluation only and have no effect on the handoff decision

Parameters	*Values*
Pt	*100mwatts*
D	*100m*
n	*2-4db*
σ	*6-12db*
L	*-120watts*
Y	*-90*
S(K)	*13-38dbm*
θD	*30ms*
Kmo	*10sec*
Kstart	*1sec*
L	3x108m/s
Fc	3GHZ-30GHZ
ts	0.0/S
Fm	50Hz

3.2 Simulation results analysis on the effect on received signal strength on vertical handoff. As the distance of mobile host (MH) increases from the access point of wireless LAN, the signal strength becomes weaker. Unnecessary number of handoff known as ping-pong effect may be demanded due to signal instability.

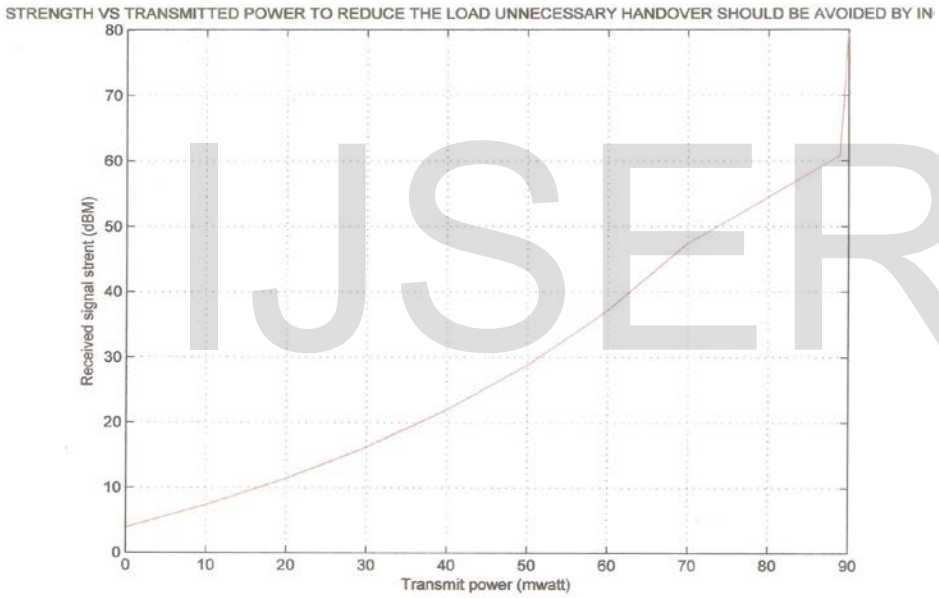

Fig. 3 received signal enReceived signal strength vs transmitted power to reduce the load unnecessary handover should be avoided by increasing received signal strength

Table 2: Shown that the simplest model to improve received signal strength is to increase the transmit power.

Path loss db	*Standard deviation*	*Transmit power mwatt*	*Distance*	*Dreceived signal strength dBM*
2.0	*6.0*	*0*	*100*	*3.8966*
2.2	*6.6*	*10*	*91*	*7.3611*
2.4	*7.2*	*20*	*82*	*11.4387*
2.6	*7.8*	*30*	*73*	*16.2481*
2.0	*8.4*	*40*	*64*	*21.9513*
3.0	*9.0*	*50*	*55*	*28.7800*
3.2	*9.6*	*60*	*46*	*37.0885*
3.4	*10.2*	*70*	*37*	*47.4288*
3.6	*10.8*	*89*	*28*	*60.8406*
3.8	*11.4*	*90*	*19*	*79.5113*

4.0 SUMMARY OF RESULTS

Table 2 shows that the simplest model to improve received signal strength is to increase the transmit power and as a result of this, as the distance of mobile host (MH) increases from the access point of wireless LAN, the signal strength becomes weaker. Therefore to ensure stability in the network system, the power of the desired signal must be chosen such that the resultant interference is manageable.

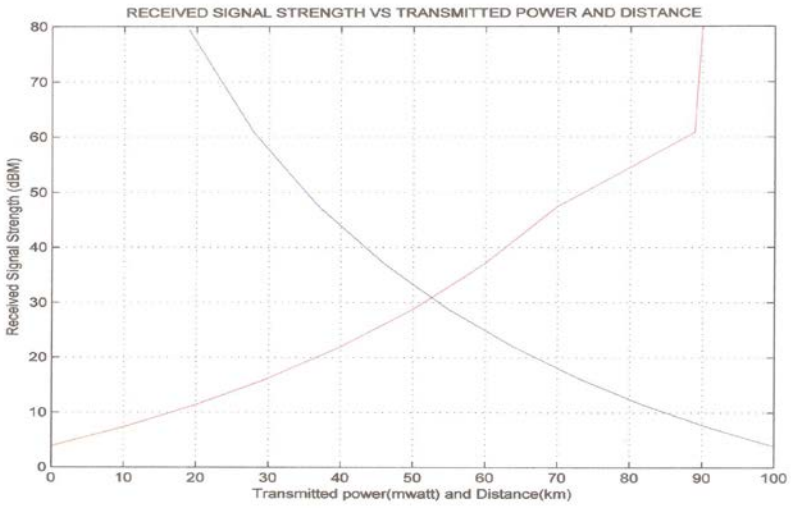

Fig. 3 received signal strength vs transmitted power distance

Increases from the access point of wireless LAN, the signal strength becomes weaker. Therefore to ensure stability in the network system, the power of the desired signal must be chosen such that the resultant interference is **manageable**

5.0 Conclusion

In conclusion, the receive signal strength (RSS) due to symmetric nature is not compatible with vertical handover.

When mobile terminal (MT) discovers the wireless LAN area, it starts the mobile in (mi) process because mobile in (mi) decision depends upon availability of preferred networks

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