بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ (1) خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ (2)اقْرَأْ وَرَبُّكَ الْأَكْرَمُ (3) الَّذِي عَلَّمَ بِالْقَلَمِ (4) عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ (5)كَلَّا إِنَّ الْإِنْسَانَ لَيَطْغَىٰ (6) أَنْ رَآهُ اسْتَغْنَىٰ (7) إِنَّ إِلَىٰ رَبِّكَ الرُّجْعَىٰ (8) أَرَأَيْتَ الَّذِي يَنْهَىٰ (9) عَبْدًا إِذَا صَلَّىٰ (10) أَرَأَيْتَ إِنْ كَانَ عَلَى الْهُدَىٰ (11) أَوْ أَمَرَ بِالتَّقْوَىٰ(12) أَرَأَيْتَ إِنْ كَذَّبَ وَتَوَلَّىٰ (13) أَلَمْ يَعْلَمْ بِأَنَّ اللَّهَ يَرَىٰ (14) كَلَّا لَئِنْ لَمْ يَنْتَهِ لَنَسْفَعًا بِالنَّاصِيَةِ (15) نَاصِيَةٍ كَاذِبَةٍ خَاطِئَةٍ (16) فَلْيَدْعُ نَادِيَهُ (17) سَنَدْعُ الزَّبَانِيَةَ (18)كَلَّا لَا تُطِعْهُ وَاسْجُدْ وَاقْتَرِبْ ۩ (19)

سورة العلق الآيات 1-19

DEDICATION

To my parents, to my family, to all greater who worked hard providing knowledge for me, to all persons whom did their best to made happiness and to plant smiles on people faces around them.

ACKNOWLEDGMENT

Firstly I thank my God for his blessing me in particular with the opportunity to pursue a master. I thank him for supporting me in the face of challenges with His mercy and guidance, and for facilitating the completion of this thesis.

The completion of my research work would not have been possible without the support of several people who supported me in one way or other. I express my sincere appreciation to you all, for your help and guidance during my research course time.

I am extremely grateful to my primary supervisor Dr. FATH ELRAHMAN ISMAEL for all his support and valuable guidance. Also I thank my parents who always supported me to take up research studies and encouraged me at every stage of my academic and personal life.

Last but not least, I thank my God for giving me strength, health, power and knowledge to take up and complete this research work.

ABSTRACT

The ongoing development of mobile devices and their applications increases the requirements for high data rates and large capacity of the wireless communication networks rapidly. There are Different types of wireless network systems have been developed to offer the user requirement and fitful anywhere and anytime bases. Typical examples of this wireless networks are UMTS, WIMAX and WLAN. An important issue is to integrate these heterogeneous networks and manage the mobile nodes while moving across heterogeneous networks with session continuity, lower handover failure between networks and reduce the number of unnecessary handover. To achieve this, it is important to find the right point in time to perform a handover between networks and to find a new network that, in fact, improves the connectivity over a reasonable time span.

In this thesis, vertical handover techniques for mobile users were proposed in order to reduce the unnecessary handover and handover failure. By takes the receive signal strength (RSS), available bandwidth, Travelling time prediction and mobility as decision parameters. MATLAB-2013 simulation program is used to make handover decision. It is found that when the handover delay is (τi =1s) the probability of unnecessary handover is equal ZERO. And when the handover delay is (τi = 455ms) the probability of unnecessary handover is equal 0.04. Therefore, the probability of handover failure when the handover delay is (τi =1s) it is reduced by 69.28% .And when the handover delay is (τi =455ms) the probability of handover failure is reduced by 85.71%.

المستخلص

نتيجة لتطور الموبايل وتطبيقاتة فاننا نحتاج لزيادة السعة وسرعة وصول البيانات، هنالك عدد من انواع الشبكات اللاسلكية تم تطويرها لكي توفر للمستخدم حوجتة في استخدام الشبكات في اي مكان واي زمان ,وهذة الشبكات هي النظام العالمي للاتصالات المتنقلة،واي ماكس، الشبكات المحلية اللاسلكية ،ولكن من المهم جدا تجميع هذة الشبكات الهجينية وادارتها بالصورة المطلوبة لكي تسهل للمستخدم التحرك بينها من دون حدوث فشل في التنقل العمودى و الانتقال العمودى الغير ضروري وانهيار الاتصال لكي نحل هذه المشاكل لابد من ان نختار الزمن والنقطة الصحيحة عند اتخاذ القرار في الانتقال العمودى . في هذا البحث تم تقليل فشل الانتقال العمودى و الانتقال العمودى غير الضروري وانهيار الاتصال باستخدام عدة عوامل مثل قوة الاشارة المستقبلة ،سعة النطاق ،توقع زمن وصول والتجوال. بأستخدام هذة العوامل وادخالها في برنامج الماتلاب وجد انه عندما يكون تأخر زمن التسليم والتسلم يساوى واحد ثانية فأن احتمالية الانتقال العمودي الغير ضروري يساوي صفر ,وعندما يقل تأخر زمن التسليم والتسلم الي 455 مل ثانية فأن احتمالية الانتقال العمودي الغير ضروري يساوى 0.04.وكذلك احتمالية فشل الانتقال العمودي عندما يكون تأخير زمن التسليم والتسلم يساوي واحد ثانية وسرعة الهاتف الجوال (100km/h) فأنة يقل بمقدار 69.28% وعندما يقل تأخر زمن التسليم والتسلم الي 455 مل ثانية فأن احتمالية فشل الانتقال العمودي يقل بمقدار1 85.7%.

TABLE of CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

β	Path loss coefficient
d_{ref}	Distance between the AP and a reference point.
L_0p	Distance between the AP and point P.
Lop_i	Distance between the AP and the entry point of the WLAN cell coverage
los	Distance between the AP and where the MT takes an RSS sample
los_1	Distance between AP location O and sampling point S1
$los2$	Distance between AP location O and sampling point S2
M	Middle point of the traveling trajectory
pL_{ref}	Path loss at the reference point
P_{Tx}	the transmit power of the WLAN AP in dBm
Pb	Connection breakdown probability
Pf	Probability of a handover failure
Pi	Entry point of the WLAN cell coverage
Po	Exit point of the WLAN cell coverage
Pu	Probability of an unnecessary handover
$Rssp_i$	RSS at point p_i
RSSs	RSS at the sampling point S
T_1	Time threshold for minimizing handover failures from WLAN
T_2	Time threshold for minimizing unnecessary handover
τ	WLAN to 3G handover delay
σ	Standard deviation of the shadow fading before averaging RSS

ABBREVIATIONS

1G	1st Generation
2G	2nd Generation
2.5G	2.5 Generation
3G	3rd Generations
3.5G	3.5 Generation
4G	4th Generations
3GPP	Third-Generation Partnership Project
AMPS	Advanced Mobile Phone System
BS	Base station
CS	Circuited switched
FEC	Forward Error Correction
GSM	Global System for Mobile Communication
GPRS	General Packet Radio Service
HN	Handoff Need
HNE	Handover necessity estimation
JTACS	Japanese Total Access Communication system
LTE	Long Term Evolution
MIMO	Multiple-Input Multiple-Output
MSC	Mobile switch center
MT	Mobile terminal
MUs	Mobile Users
NMT	Nordic Mobile Telephone
OFDMA	Orthogonal Frequency Division Multiple

PS	Packet switch
PoA	Point of attach
RSS	Receive signal strength
SC-FDMA	Single Carrier Frequency Division Multiple Access
TACS	Total Access Communication System
TD-SCDMA	Time Division-Synchronous Code Division multiplex
TNS	Target Network Selection
UMTS	Universal Mobile Telecommunications System
UMB	Ultra-Mobile Broadband
VHO	Vertical Handover
Wi-Fi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access