

Chapter One

Introduction

1 Introduction

1.1 Preface

Handover process is one of the most important parts of any wireless. Handover is the process of maintaining a user's active sessions when a mobile terminal changes its connection point to the access network for example a base station or an access point. Handover can either be horizontal or vertical. A horizontal handover takes place between point of attachment supporting the same network technology, for example between two neighboring base stations of a cellular network or two access points. Vertical handover takes place in heterogeneous wireless networks[1].

A heterogeneous network here means a combination of several networking technologies and access to these technologies when needed, taking into account different kind of communication requirements at specific situations and user needs[2].

In heterogeneous networks, vertical handoffs can be initiated for convenience rather than connectivity reasons. A decision algorithm gives a better performance when several parameters are considered, more so when a combination of static and dynamic parameters are considered. But the trade-off is with the increase in decision time and complexity of the algorithm. The decision may depend on various groups of parameters such as Network-Related Parameters, Terminal Related Parameters, User-Related Parameters and Service Related Parameters [2].

A vertical handover process (VHO) can be segmented into three phases; System Discovery, Handoff Decision and Handoff Execution. System Discovery to find out the available wireless networks and to decide which amongst them can be used is the responsibility of the Mobile Terminal. Handover Decision the mobile device decides whether the connection to be continued with current network or to be switched over to another one. The decision may depend on various parameters which have been collected during handoff initiation phase. Handover Execution the connections should be transferred in a seamless manner from the existing network to the new network.

1.2 Problem Statement

Heterogeneous Wireless Networks have different access technologies, overlapping and coverage, and network architecture, protocols for transport, routing and mobility management. Also different operator offers different service demands from mobile users (voice, video, multimedia, text etc.) in the market. Because of these variations, when the mobile user moves, there is a need to handover the communication channel from one network to another by considering its features and also the user requirements[1].

1.3 Objectives

The objectives of this thesis are as follow;

- Simulate the vertical handover decision making in heterogonous wireless networks using MATLAB.
- Evaluate the QoS for Class1 and Class2 using different basic bandwidth unit in vertical handover decision making .

1.4 Methodology

MATLAB language simulator was used to perform vertical handover decision making. There are a number of parameters that need to be known to determine whether a handover is required. In this thesis the Received Signal Strength (RSS) was used to determine whether a user should stay in the current network or handover to another network [3]. When a handoff to a different network occurs its traffic is checked to detect its class, according to its class, it is directed to the corresponding partition. The call will be assigned to the partition if it has enough bandwidth, otherwise the call will be blocked.

1.5 Thesis Outline

This thesis consists of five chapters as follows:

Chapter 2: Presents the related work in this area, a general background about Heterogeneous Networks such as Heterogeneous networking framework, mobility management in Heterogeneous Network. It also presents the vertical handover process scheme and its classification.

Chapter 3: Vertical handover decision criteria concept is introduced in this chapter. To evaluate the vertical handover decision some parameter such as RSS, Available bandwidth were covered. Also the performance evaluation metrics for the vertical handover decision algorithms were covered.

Chapter 4: Simulates and analyzes the Vertical Handover Decision Making in Heterogeneous Networks.

Chapter 5: States the conclusion and proposes recommendation for future work.