PREFACE

Mobile Ad-Hoc Networks (MANETs) are infrastructure less, decentralized, random, dynamic, rapidly changing, and multi hop networks composed of bandwidth constrained wireless links and no centrally accessed routers or servers. Due to these properties, it has got potential applications in both military and civilian systems.

The routing protocols in MANET are classified into two groups: single path and multi path. Single path routing protocols are further classified into four groups namely proactive, reactive, hybrid and geographic routing protocols. Node density is considered to be an important parameter, as at lower density the destination may not be reachable. The mobile nodes are free to move (constrained by mobility models) within the area with a minimum and maximum speed. Mobility model is the pattern in which the nodes travel from a point to another in a network. They define the location of node at a particular time. They also have an effect on the performance of routing protocols. The commonly used models are Random waypoint mobility model, Gauss Markov model, Manhattan Grid model and Reference point group mobility model. The transmission range is the distance to which a node is capable of sending packets. A node has limited battery power, so conserving the power will result in longer runtime.

Fault tolerance is the level of tolerance offered by the network when a number of nodes stop working i.e. sending and receiving packets. In that case, the remaining nodes take over the load.

The subject matter of the thesis has been divided into the following seven chapters:

- **Chapter 1** is the introductory part of the research work, comprising of a general introduction of MANET. An overview of the simulation studies is detailed.

- **Chapter 2** presents the fundamentals of MANET, routing protocols, mobility models and simulators.

- **Chapter 3** deals with the comparison of two popular simulation platforms NS2 and Qualnet for AODV and OLSR routing protocols.

- **Chapter 4** describes the analysis and comparison study of routing protocols (DSR, LAR, OLSR and ZRP) for variation in Node Velocity, Node Density and Mobility Models. For few selected applications, range of simulation parameters and suitable mobility models are proposed to effectively model them.

- **Chapter 5** discusses the study of routing protocols by varying transmission range, node density and node speed over three routing protocols namely OLSR, DSR and ZRP.

- **Chapter 6** deals with the possibility of fault tolerance offered by single path and multi path routing protocols in MANET.

- **Chapter 7** models a post disaster management system using MANET consisting of three stages namely disaster location, assign tasks and relief base.

- **Chapter 8** concludes the thesis.

References is provided after the concluding remarks.