

Contents

Chapter 1–Introduction	1
1.1. Background	1
1.1.1. MANET applications.....	4
1.1.2. Design issues and constraints in MANETs.....	6
1.2. Problem statement and objectives	8
1.3. Contributions	9
1.4. Layout of this thesis	10
Chapter 2–Introduction to Video Streaming over MANETs.....	13
2.1. Achievable transmission rate in wireless ad hoc networks.....	13
2.2. Adaptive video streaming.....	18
2.3. Video streaming over MANETS.....	21
2.3.1. Conclusions.....	23
2.4. Summary.....	23
Chapter 3–AQA-AODV: A cross-layer routing Protocol for MANETs.....	25
3.1. An overview on routing protocols in mobile ad hoc networks:	25
3.2. QoS routing protocols for mobile ad hoc networks.....	27
3.3. AODV and QAODV routing protocols.....	28
3.4. Routing protocol proposal: AQA-AODV	30
3.4.1. Bandwidth estimation.....	31
3.4.2. Route discovery in AQA-AODV	38
3.4.3. Route recovery mechanisms.....	40
3.5. Performance Evaluation	43
3.5.1. The Simulation Environment	43
3.5.2. Sample Network: static linear topology with 7 nodes.....	44
3.5.3. Scenario 2: Static linear topology with variable length.....	46
3.5.4. Scenario 3: random mobile topology	49
3.5.5. Conclusions.....	51

3.6. Summary	52
Chapter 4–Adaptive Video Streaming over MANETs using AQA-AODV.....	53
4.1. Adaptive scalable video streaming	53
4.1.1. Scalable Video Coding	54
4.2. Video transmission evaluation.....	56
4.3. Proposed evaluation framework for scalable video streaming.....	58
4.3.1. Video Encoding.....	60
4.3.2. The Pre-process	60
4.3.3. Simulation	61
4.3.4. Post-processing and decoding.....	62
4.4. Performance analysis of the SVCEval-RA framework.....	63
4.4.1. Simulation environment	63
4.4.2. Results.....	66
4.4.3. Conclusions.....	72
4.5. Adaptive video transmission using AQA-AODV	73
4.5.1. Video analysis.....	73
4.5.2. Simulation environment	74
4.5.3. Simulation Scenarios	74
4.5.4. Video performance metrics.....	75
4.5.5. Simulations Results	76
4.5.6. Conclusions.....	85
4.6. Summary	86
Chapter 5–QoS-aware gateway discovery extension for AQA-AODV	87
5.1. Interconnectivity in heterogeneous networks	87
5.2. Related works	89
5.3. Proposed Gateway discovery process in AQA-AODV	90
5.3.1. Gateway discovery process	90
5.3.2. Route establishment.....	95
5.4. Performance evaluation	95
5.5. Simulation Environment	96
5.6. Results.....	97
5.6.1. Conclusions.....	99
5.7. Summary	99
References.....	101
Appendix A–List of Publications	109