Contents

Contents List of Figures							
							1
	1.1	Motivation					
	1.2	Problem Definition					
	1.3	Contributions of Dissertation	3				
	1.4	Dissertation Organization	4				
2	Background and Related Work						
	2.1	Cognitive Radio	5				
	2.2	Cognitive Radio Networks					
	2.3	Routing challenges in multi-hop CRAHNs	8				
		2.3.1 Lack of Common Control Channel (CCC)	8				
		2.3.2 Spectrum aware communication	8				
		2.3.3 Set up of quality routes	8				
		2.3.4 Route maintenance/reparation	8				
	2.4	Routing framework for CRAHNs	9				
	2.5	Classification of routing schemes for CRAHNs	10				
3	Pro	posed CR-AODV and CR-AOMDV Routing Schemes	11				
	3.1	System Model and Assumptions	11				
	3.2	CR-AODV Routing Scheme	12				
		3.2.1 Route discovery	12				

			3.2.1.1	RREQ processing by intermediate nodes	13			
			3.2.1.2	RREP processing by intermediate nodes	14			
		3.2.2	Route m	naintenance	14			
	3.3	outing Scheme	15					
		3.3.1	Route d	iscovery	16			
			3.3.1.1	RREQ processing by intermediate nodes	16			
			3.3.1.2	RREP processing by intermediate nodes \dots .	19			
		3.3.2	Route n	naintenance	19			
		20						
4	Simulation Results							
	4.1	Simula	ation Set-	up	21			
	4.2	2 Simulation Environment						
	4.3	Result Analysis						
		4.3.1 Normalized Routing Overhead (NRO)						
		4.3.2	Packet I	Delivery Ratio (PDR)	25			
		4.3.3	End to ?	End Delay (EED)	26			
		4.3.4	Data Tl	nroughput	27			
5	Conclusion and Future Work							
	5.1	Conclusion						
	5.2	Future	e Work .		28			
Bibliography								

List of Figures

1.1	Usage of frequency Spectrum [2]	1
1.2	Opportunistic usage of Spectrum Hole [2]	2
2.1	Spectrum management framework for CRAHNs [1]	7
2.2	Illustration of Cognitive cycle [1]	7
2.3	Routing framework for CRAHNs [1]	9
3.1	Flowchart for AODV RREQ processing by an intermediate node A after receiving from neighbour node B	12
3.2	Flowchart for AODV RREP processing by an intermediate node A after receiving from neighbour node B	14
3.3	Flowchart for AOMDV RREQ processing by an intermediate node A after receiving from neighbour node B.	16
3.4	Flowchart for AOMDV RREP processing by an intermediate node A after receiving from neighbour node B	19
4.1	NS-2.31 CRAHN patch architecture [5]	22
4.2	Normalized routing overhead with variation of network size	24
4.3	Normalized routing overhead with variation of data flows	24
4.4	Packet delivery ratio with variation of network size	25
4.5	Packet delivery ratio with variation of data flows	25
4.6	End to end delay with variation of network size	26
4.7	End to end delay with variation of data flows	26
4.8	Data throughput with variation of network size	27
4.9	Data throughput with variation of data flows.	27