Qos Enhancement using Coginitive Method in Manet with Various Conditions

Resmi G Nair, Kumar Narayanan

Abstract— MANET (Mobile ad hoc network) is authority from central to local stage of the network which is characterized by the dynamic topology method. The MANET is the quality of services which will be evaluated with complex and also difficult task. This complexity will arise because of bandwidth constraints and dynamic nature present in the network. A routing protocol play as a vital role in terms of performance present in MANET. This routing metrics helps to analyze and to establish the credible route between a pair of transmitting to receiving nodes as a result of the packets will be delivered with timely manner. The cognitive MANET is to develop for the mission critical networks. The MANET is to be used in network centric operations; which is a increasing require for a systematic methodology for evaluating the performance of the network during the period. The fashion in cognitive networking as a possible means of exploiting unused spectrum, there is now a increasing requires learning how to create a cognitive network using automated techniques. In this paper we proposed a survey of the quality of services enhancement using the cognitive method with various parameters conditions. The quality of services will be enhanced with the help of the incorporating cognitive method present in MANET. The major objective of this research paper is to examine the QoS interms of energy efficiency is obtaining in cognitive MANET. This quality of services is to be satisfied under the various conditions such as network scalability, dynamic topology and node behavior.

Keywords – MANET, cognitive approach, quality of service, energy efficiency, dynamic nature, dynamic topology

I. INTRODUCTION

A MANET (mobile ad hoc network) is to derive the traditional problems present in the wireless or mobile communications services such as transmission quality, power control, and bandwidth optimization. The mobile ad hoc network has the dynamic topology is to high dynamic and random manner. The quality of service performs the survey of the level of the network user satisfaction which is to be provided by the communication system. The quality of services is to be achieved with more deterministic behavior present in the communication. In the MANET, the cognitive approach is used to improve communication among nodes and to develop the high efficient is that network. It is very popular for flexibility, survivability and self – organized capability. It is stable in high layer protocols which are to give the high tunable parameters which are predicting the behavior of the network.

In TCP protocol, the window size will be major factor. When the window size is too small as a result bandwidth will dissipate, while the high window size gives the result in error recovery. So the quality of service will be guaranteed with the adjustable protocol parameters will be feasible. The parameter choosing is the most difficult task present in the end to end quality of services.

This is the most intelligent network which can be perceived the current network conditions, deciding and conditions.

MANET has the flat or hierarchical structures and this is the simplest. In the wireless networks, the network topology will be changed and then routing table will be constantly adapted. This method has the requirement of the traffic control during transmission which is to increase when the network size is too large. There are many users are to be used with high range of mobile users operating in the similar frequency channel which is to share present resources between them. This gives the perfect result present in the low throughput for predictable user.

MANET efficiency is to be increase the network will be separated to various clusters with finite number of users with the similar frequency. Each and every cluster has the nodes and a cluster head which is to responsible for the clustering management. This is to be controlled methods of the nodes, monitors links quality and traffic load. The cognitive network is to be represented in the secondary users which are to need with accurate manner which is to identify the primary user which helps the occupancy spectrum. In this mechanism there are two data fusion strategies are to be used which are depends on the various amount of the dynamism present in the cognitive approach present in the mobile ad hoc network.

After introduction, section II has the cognition mobile adhoc network. Section III has the QoS in MANET and section IV contains the QoS with cognitive approach with various conditions. The section V has the summarization of this paper and gives the further development work.

II. COGNITIVE APPROACH IN MOBILE AD HOC NETWORK

The cognitive radio mobile ad-hoc network [9] is widely used which is to resolve the problems present in the wireless

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network technology. In the classical cognitive radio networks is the central network entity which has represented as the base station present in the cellular network which is responsible for spectrum, and routing management which the responsibility lays on the end user devices. The cognitive radio MANET performs routing protocols which is too robust and to cooperate with the spectrum sensing methods. There is various awareness mechanisms present in MANET in cognitive radio. The Kohonen network [10] is to be estimated which is called as self organizing map (SOM) which to visualize complex and multi dimension situational data. In the self organizing map is to be used for network security status are to be monitored. Cognitive networks are to be required with simple manner. Because of that they are enable the users which are to be focus on the things other than the managing networks.

The location of the cooperative spectrum sensing will be analyzed present in multi channel cognitive radio MANET . [6] In this method, the novel secure preserving spilt cooperative spectrum sensing scheme is to be applied. The signal to noise ratio will be exchanged with the help of the novel anonymization method which is based on the random manipulation scheme. The distributed channel assignment will be analyzed for the purpose of the location privacy and sensing performance through the network channel. In the multi channel cognitive mobile ad hoc network are to be performed based on the cooperative spectrum sensing. This method helps to analyze the signal to noise ratio which is based on the random manipulation of the exchanging the anonymization technique. The algorithm has the following stages which are to be specified in below.

- Anonymization
- Coalitional game theoretic channel assignment in an initialization and single iteration of the channel assignment.

The cognitive channel hoping protocol is to be proposed which helps to utilize the multiple loaded channels and heavy external interference. Cog-Fi is to exploit the channel diversity without explicit coordination.

[3] The basic parameters are to be analyzed in the cognitive MANET with the valuable access to the spectrum. These parameters are to be communicated with various layers which are integrated into single utility function which is a global indicator present in the network. The cognitive radio mobile ad hoc network performance will be analyzed with the dynamic spectrum allocation access. The dynamic spectrum access has the various performance metrics such as per stream metrics, time depedent metrics, global metrics, and network performance assessment metrics. This is to be validated with the help of the real time cognitive radio network demonstrated. This is to be needed for transmission traffic control which is helps to increase the network size is high. This is the very useful approach for the execution of MANET. The cognitive radio technology is widely implemented in the mobile ad hoc network [1]. There are various problems are to be presented which is occurred in cognitive radio network are to be analyzed. The spectrum sensing are to be analyzed and the channel assigning are the major part of the research. The spectrum sensing is to be analyzed which is oriented on the frequency gaps determine when the wireless technology is to be used. This method will be sensed with the help of the fuzzy logic method which is tried to resolve the problem with effective channel assigning. The channel assigning method has the two different methods such as non intelligent and intelligent methods which are to be compared with effective manner.

In the cognitive radio, mobile ad hoc network has the novel scheme like PUSH (proactive unified spectrum handoff) [5]. This scheme is to be applied for secondary users will move to other with the unused spectrum band and it is obtained by the unified spectrum handoff. The PUSH algorithm helps to perform the prediction availability of the cognitive link which is to estimate the maximum link accessibility period. This method will be established with the routing based on the channel availability. The channel availability depends on the various parameters such as primary users, secondary user activity, mobility and channel heterogeneity. The secondary user will be moved to another unused spectrum with the help of the unified spectrum handoff analytical model. When the secondary user mobility is to be operated the channel handoff won't be performed. This process will be operated with the help of the local flow handoff (LFH) mechanism. In the cognitive mobile ad hoc network, the secondary users are to be required for the purpose of the accurately prediction of the primary user occupancy spectrum which is to be used [7]. In this process, the secondary malicious secondary users are to be predicted. The malicious secondary user triggers other secondary user to design an unwanted spectrum occupancy decision with the help of the feeding inaccurate measurements.

The primary user spectrum occupancy identification process is to be developed because of the accurate prediction of the presence of malicious users. The accuracy will be analyzed present in the large number of the malicious users. To design for the automatic reconfiguration of the cognitive MANETs are to be analyzed. [11] The cognitive techniques are to be employed which is to utilize the unused spectrum present in the military architectures. The designing of the MANETs has the various cognitive features are to be presented at all layers. The designing has the various objectives such as topology based, routing based and application based. This design has the following steps such as place platforms, design hierarchy, design topology, design routes or design paths, design MAC schedules, and manager checks.

III. QOS ENHANCEMENT IN MANET WITH COGNITIVE APPROACH

The cognitive mobile ad hoc network has the challenging mechanism for providing the novel end to end quality of services. [2] This method will be operated with the black box approach. The end to end transmission has the quality of services conditions are to be reflected back to the end because of the typical quality of services parameters. The multi object genetic algorithm is to be used for relationship between the qualities of services parameters and tunable parameters. This method helps to estimate the different

node mobile speed when the topology changes in rapid. The multi object genetic algorithm is the classical and the heuristic searching method which is the minor modification and it is to be applied in the network area and end to end quality of service guaranteed problem. This algorithm states the genes in every chromosome are the tunable parameters and the length of the chromosome equals to the number of the all tunable parameters. The quality of services is to be guaranteed based on the genetic algorithm. This quality of services will be implemented with the help of the adjustable tunable parameters. [12] The quality of services parameters are to be analyzed and the tunable parameters are to be analyzed which are deals with the multi object genetic algorithm. The quality of services is to be enhanced with efficient quality and high user satisfaction with the help of voice over internet protocol. The cognitive radio network has to keep the call quality with the acceptable limit. The quality of service parameters are to be developed based on the development model such as delay, jitter and packet loss present in the cognitive radio technology. The modified voice over internet protocol parameters are to be analyzed as a result of the high quality voice over internet protocol calls as the witnessed. [13].

The quality of service in the cognitive radio network has to be processed in the heterogeneous network model. The scheduling technique is to be processed based on the following algorithm such as modified cognitive radio spectrum sharing algorithm, and Hungarian algorithm which are to be related to first come first served (FCFS) scheduling technique. These method are to be achieved based on the parameters such as SNR ratio, data rate and spectrum utilization. This method processed on time sensing which has zero effect on the system performance. The quality of service is too difficult which is to ensured for the secondary users. [14] This model helps to obtain the quality of services in cognitive radio networks such as blocking probability, completed traffic and termination probability of secondary users. The quality of services will be improved with secondary users the channel reservation scheme will be proposed.

This scheme will make the terminated secondary users which are shift to the reticent channels which is present on communications. The blocking probability cost will less expensive present in the dynamic nature. The cross layer optimization model is to be used in multicast video present in cognitive radio networks. The major role of this approach is to utilize the overall received video quality, to achieve the proportional fairness between multicast users and to keep interact to various users. The figure.1 shows the performance analysis of the system model. [24] The cognitive layer present in the parallel and the interaction in the network layer which are to be comprises with the two processes such as learning path and learning trust. The first process will be processed which is depends on the machine learning methods and the trust management latter process. This method will be processed with the trust based which are to be evaluated with various parameters such as end to end delay, communication overhead, time progress and packet delivery ratio.

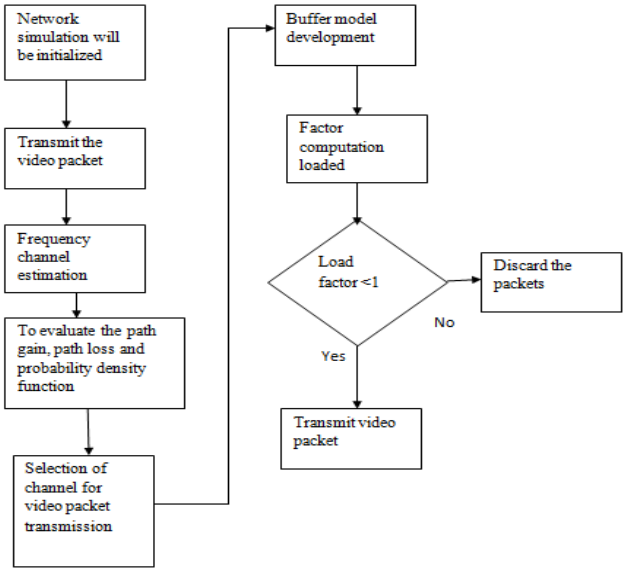

Figure.1 system model

IV. NETWORK SCALABILITY IN MANET WITH COGNITIVE APPROACH

[15] This method helps to resolve the integrated integer nonlinear programming equation which has the low complexity and proven optimally gap. The efficiency and performance will be demonstrated with the MPEG-4 fine scalability video. This method has following process present in the quality of services in cognitive MANET such as network model, spectrum sensing, opportunistic spectrum access, video performance measure, proportional fair allocation, enhancement layer partitioning and tile allocation, tile scheduling in time slot, and performance analysis. This method handles the time slot scheduling mechanism. This method helps to increase the efficiency of the cognitive network mechanism. The cognitive networking with the opportunistic routing protocol is to be proposed present in the MANETS. The main goal of this method is to increase the performance of network when high the network scalability. The channel model will be developed which is to estimate the signal strength in different areas present in the complex indoor mechanism [16]. The state machine will be developed which is to allocate the spectrum efficiently with different state system which is to give service to the customers. The data will be evaluated with real time and the system is very strong and robust with different cases. This method has the various parameters such as spectrum model and spectrum access method, the system assumption, state machine of system, stabilization of normal state, transition of system, state boundary, evaluation of the arrival rate and service time, and performance analysis [17]. The key will be determining the secondary spectrum which does not used in an attractive method for the commercially interesting methods. This methods helps to determine that the regulation which is to present a significant barriers. [18] This method has the following methods such as scenarios for secondary spectrum

access, technical evaluation of scalability and feasibility, primary interface protection, systematic evaluation toolkit and performance analysis.

V. DYNAMIC TOPOLOGY IN MANET WITH COGNITIVE APPROACH

[19] The work is to be focused on the effective designing topology reconfiguration methods which are to provide the optimal routing solutions. The topology control will be analyzed which is to determine the CRN topology problem which can be formulated with multi objective optimization problem. This method is to be processed with the ant colony optimization techniques which are to be configured with optimal decision making problem. This method has the following parameters such as system overview, topology configuration scenarios, problem formulation, and topology reconfiguration; enhance ant colony algorithm, EACO topology reconfiguration, and performance evaluation. [20] The dynamic adapt network parameters are to be used for the licensed spectrum slots which are currently not to be utilized. This type of network has the spectrum holes spot which is to be utilized them interference to the incumbent users.

This method helps to process the end to end delay and also sensitive method. In the wireless links, the healing problem will be analyzed with time varying quality which helps to avoid the high level reconstruction of the tree when the destroy tree present in the localized and decentralized manner. This healing algorithm helps to increase the broadcast latency and connectivity ratio which are compared to the global reconstruction of trees. The healing methodology will be introduced for the purposed of the localization of the topology. This method gives the better insight to the reader and the broadcast tree mechanism will be represented in figure.2. This method helps to interference on channel 2 because of the stages of the interferer (PU). When the interferer begins helps the channel 2 at that time node 3 and node 4 does not discussed with each other.

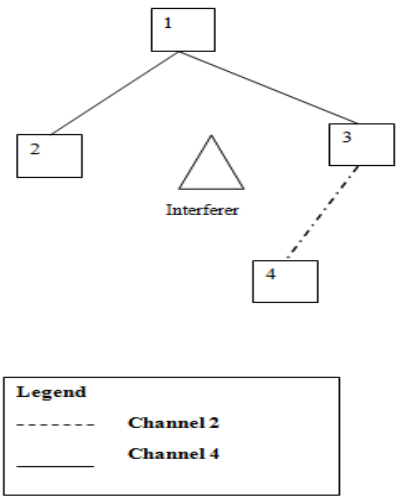

Figure.2 Network in which interference in channel 2

[21] The reinforcement learning method helps to combine the various artificial intelligence problems which are concerned with the dynamic nature. In the method, the network will be designed with dynamic topology in nature and a performance is to be improved with the help of the standard RL algorithm. The performance degradation will be presented with the differentiation of the cell blocking and dropping between the various phases of the network topology. This is to be increased with usable range of the loads when occur traffic present in the network. This method has the following parameters such as dynamic spectrum assignment learning problem, dynamic topology, radio propagation model, traffic model, learning objective, stateless Q- learning, Q-table initialization, action selection strategy, learning rate and performance analysis. [22] The cognitive and sensor helps to maximize the spatial sensing coverage and also connectivity between micro unmanned aerial vehicles. The performance will be analyzed with dynamically adapted mobility algorithms which are to analyze and also compare the lognormal channel conditions. This method helps to maintain the connectivity issues which are to be optimized the goal and the spatial coverage is to be declines the channel quality. This method has the following stages such as micro unnamed aerial vehicle process, cognitive fading countermeasure methodology, and performance analysis.

[23] The topology information will be analyzed present in the cognitive radio environment. This information has been used which are to be implicated on the connectivity and capacity and also estimates of the network. The network decisions are to be considered as the quantity measuring approach which is to be characterized using the spatial statistic models. The methodology has the various processes such as spatial statistics, point process, commonly encountered models, location correlations, network characteristics, connectivity, neighborhood counts, and performance analysis.

VI. NODE BEHAVIOR IN MANET WITH COGNITIVE APPROACH

[25] The policy based trust management framework which is used to behavior of the neighbor MANET nodes which are to determine and analyze various attacks. The policy rules are to be evaluated based on the behavior of the neighboring nodes and shared the values by peers. The framework will be designed which is based on a wormhole attack. This scheme is the most scalable and robust. This method has the various processes such as MANET operation, techniques for launching a wormhole attack, techniques for detecting wormhole attacks, wormhole indicators, analyzing network behavior, and distributed trust evaluation, and performance analysis. In this paper, the distributed trust evaluation technique is to be used. The correlated hazard function is to be extended with the Cox model which is to capture the correlated events. The tab1e.1 shows that there is the analysis of correlated and uncorrelated hazard ratio.

Event	Correlated hazard ratio	Uncorrelated hazard ratio
Selfish	3.265	1.14
Malicious	2.64	0.8635

Table.1 correlated Vs uncorrelated hazard ratio

[26] The behavior will be analyzed present in the malicious node detection with the various routing algorithms which are processed in MANET. The malicious node will be detected with the shortest distance whose datas it needs to connect. The probability will be reduced because of this method will be used which is to wait and check the replies from the neighbors.

This method gives the better protocol for providing the security is known as adhoc on demand routing protocol. The performance will be compared with other protocol like dynamic source routing protocol which gives the highest result providing the performance than the existing protocol. The following platform and simulation tool is to be used in this mechanism such as NS2 and Linux operating system.

The method has the following mechanism such as security, power, routing, routing protocols, and blackhole attack behavior, black hole attack with request send and reply, and performance analysis. [27] The cooperation tuning mechanism is to be proposed for the purpose of the designing of the distributed system which is based on the logic like fuzzy interference system logic with the input of the system is cooperativeness and assertiveness and a result is the conflict. This method has a degree of the conflict so that each and every node transmits a data or retaining its energy. This node behavior has the different types such as collaborating, competing, compromising, avoiding, and accommodating. This tuning mechanism has the increase throughput of the network and less selfishness among nodes. This process has the following mechanism such as mobile adhoc network, cooperation in MANET, Fuzzy mechanism, and Brownian motion mobility, technologies of node behavior, fuzzy implementation method, and performance analysis. [28] The node behavior prediction method is to be developed with the trust management system which is to preserve large stability and security for the reliable data delivery.

This method will be predicted and identified node behavior which is to be differentiating between the unintentional errors and the intentional errors based on the trust. This method helps to increase the stability and security for the reliable data delivery. This method has the following process such as node behavior, trust management approaches, node behavior prediction, and semi [32] process for node behavior prediction, trust management system, and performance analysis. [29] The routing node behavior will be classified and predicted with the help of the proximity relation analysis with Bayesian classifier present in the MANET. This method helps to predict the link failure present in the MANET which has the hidden association approach with the help of the routing information system. These are to be characterized and to route the notes [30] based on the fuzzy routing model present in the mobile ad hoc network. This method has the various processes such as routing information system, Fuzzy proximity relation, routing information system, ordered routing information system, Bayesian classification, and performance analysis.

VII. SIMULATION AND RESULT DISCUSSION

We proposed a survey of the quality of services enhancement using the cognitive method with various parameters conditions. The quality of services will be enhanced with the help of the incorporating cognitive method present in MANET. The quality of services will be analyzed with throughput parameter which is compare to various existing methods. The figure.3 shows that there is the throughput analysis of the various methods. The figure.4 shows that there is the analysis of the delay performed in various papers. [20] In the cognitive WMN with conditions of dynamic channels, the normalized latency is to be analyzed with respect to various groups of nodes. The figure.5 shows that the there is the analysis of the normalized latency.

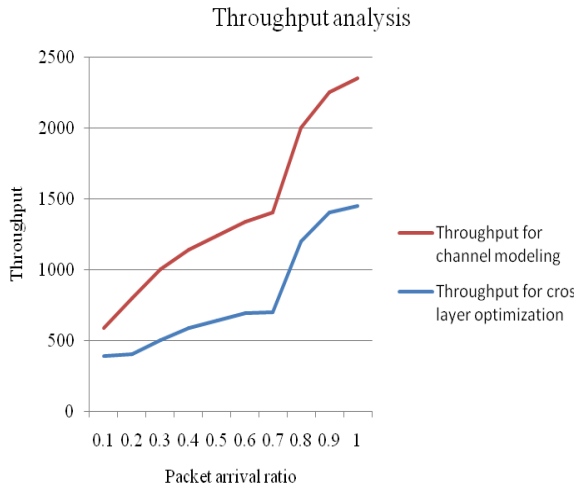

Figure.3 Throughput analysis

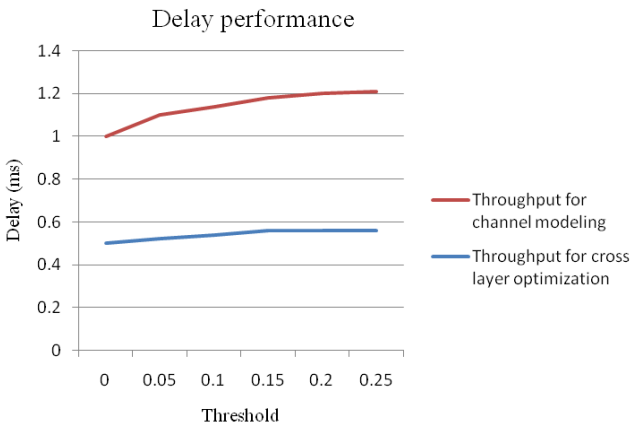

Figure 4: Delay Performance

The cognitive radio network algorithm performance are to be analyzed which are represented in below.

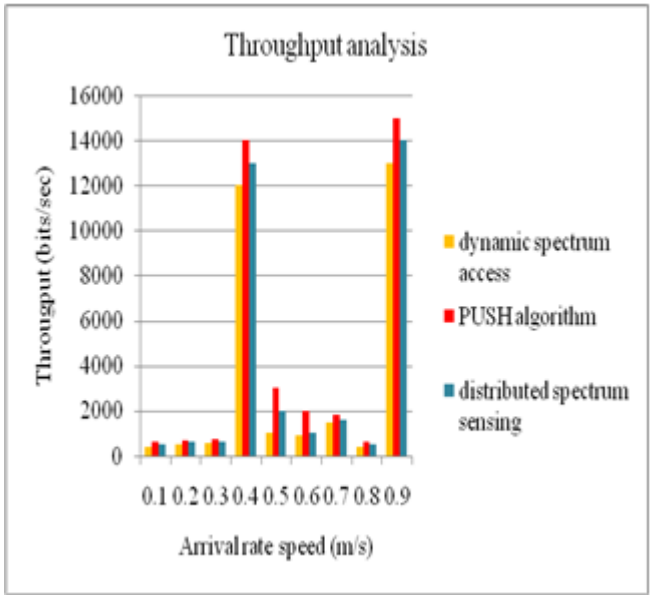

Figure.5 throughput analysis of cognitive radio network

The figure.6 shows that there is the analysis of the topology analysis in cognitive network with various cognitive spectrum assignments in dynamic topology and cognitive topology Aerial mesh network.

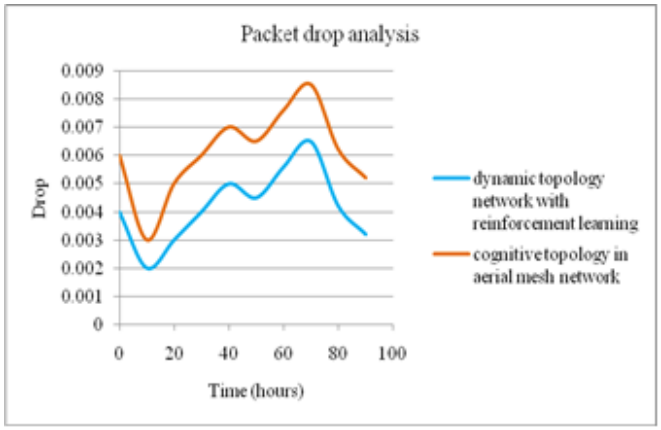

Figure.6 Packet drop analysis in the cognitive topology

VIII. CONCLUSION

Here, proposed a survey of the quality of services enhancement using the cognitive method with various parameters conditions. The quality of services will be enhanced with the help of the incorporating cognitive method present in MANET. The major objective of the paper is to examine the QoS interms of energy efficiency is obtaining in cognitive MANET. This quality of services is to be satisfied under the various conditions such as network scalability, dynamic topology and node behavior. In this survey paper, we analyzed the various protocols related to mobile ad hoc networks. The quality of service with cognitive radio mobile ad-hoc network will be analyzed and referred with various papers.

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