



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 5, May 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.512

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Different Routing protocols for Cognitive Radio Networks

Deepti L Vilegaonkar¹, Dr. U. B. Shinde²

B. E Student, Department of ECE, CSMSS Chhatrapati Shahu College of Engineering, Kanchanwadi,
Aurangabad, India¹

Principal, Department of ECE, CSMSS Chhatrapati Shahu College of Engineering, Kanchanwadi,
Aurangabad, India²

ABSTRACT: There has been rapid development in the evolution of various wireless devices and applications in recent eras. As a result, better utilisation of available resources and spectrum is needed. Cognitive radio networks have advanced, allowing for more efficient use of wireless spectrum. If the spectrum approach and selection is opportunistic in the spectrum band selection, it may be useful for unlicensed or primary users. The best available spectrum hole will be identified and used by the secondary user. In the recent years, many routing algorithms have been developed in this regard. This paper provides the different routing protocols for cognitive radio networks.

KEYWORDS: Spectrum, Cognitive Radio Networks, Spectrum Hole, Routing Algorithms

I. INTRODUCTION

Joseph Mitola introduced the name "cognitive radio" in his PhD thesis at the Royal Institute of Technology in Stockholm, Sweden. A Cognitive Radio Network (CRN) is characterised as a network that is managed by a cognitive process (CP) [2]. In the recent year there is fast evolution of various wireless devices and the applications in it. There is a need to make better use of existing resources and spectrum. There is a need to make better use of existing resources and spectrum. The rapid adoption of wireless networking communication in today's society is due to the advancement of mobile and Personal Communication Services. A wireless network may be either an infrastructure-based or an ad-hoc network [1]. CRNs (Cognitive Radio Networks) maximise spectrum efficiency by using unused or underutilised spectrum. Unlicensed users have access to licence spectrum as long as the amount of interference experienced by licence users is kept to a minimum. This means that new communication and networking technologies that can use the spectrum more effectively (in terms of increased bit/s/Hz/cell, for example) are needed, as well as new advanced techniques to improve spectrum utilisation [2]. This paper gives different Routing protocols for Cognitive Radio Networks developed in the recent years. The rest of the paper is organized as follows. Section two describes the related work, section three concludes the paper and future work.

II. LITERATURE SURVEY

Mohammed Hashem et al. [3] present a Tree routing protocol for cognitive radio network (C-TRP). This protocol not only jointly utilizes the tree routing algorithm with a spectrum management module in but also new metric used in taking the best route decisions. We also use a neighbour table technique to speed up the forwarding of data packets, which improves the conventional tree routing algorithm. In addition, we add a robust recovery module to C-TRP to enable the network to restart in the event of a connection failure. The design of C-TRP was primarily motivated by the need for rapid data transmission and the maximisation of data speeds. The NS2 simulator is used to evaluate the results. The simulation results showed that the C-TRP protocol outperforms the CTBR and STOD-RP routing protocols in terms of average "PDR," "end-to-end latency," and "routing overhead ratio."

Sharmin Akter et al. [4] present an efficient reactive routing protocol considering the mobility and the reliability of a node in Cognitive Radio Sensor Networks (CRSNs). This proposed system measures the weight for an edge the measuring the mobility patterns of the nodes and channel availability and also the proposed routing protocol defines a node's mobility pattern in terms of distance, speed, direction, and node reliability. Furthermore, the proposed protocol

measures spectrum awareness based on the number of shared common channels and channel quality. The proposed routing protocol performs better than other recently implemented protocols, according to simulation results.

Chunxia Wang [5] proposed a priori cross layer routing protocol CLC-DSDV routing protocol in cognitive Ad Hoc network. In this proposed system, the protocol will combine channel management mechanism and DSDV routing protocol in Ad Hoc network. This proposed protocol eliminates all drawbacks or problems like primary user interference, routing load imbalance, routing reconfiguration from the existing routing protocol DSDV-MC. The simulation of the routing protocol based on NS2 and the simulation result shows that the all drawbacks or problems like utilization of licensed spectrum rate, throughput, delay, packet loss rate, routing load and other aspects etc. effectively improve by the the CLC-DSDV routing protocol. This proposed routing protocol was more outstanding than the original multi channel routing protocol DSDV-MC.

Yashoda Krishna Lenka [6] proposed ROPCORN and WCETT i.e. Routing Protocol for Cognitive Radio Ad Hoc Network and Weight Cumulative Expected Transmission Time respectively. These two routing protocols used to address the efficient route selection between the source and destination in a Cognitive Radio Ad-Hoc Network (CRAHN). These two protocols are satisfy different requirements from users like multi-radios multi-channels, equal number of radios and channels and single radio multi-channels etc. The simulation results show that ROPCORN has a significantly higher average throughput in single radio multi-channels than WCETT, with an average throughput of 48.25 percent higher. WCETT, on the other hand, has a significant average throughput when there are an equal number of radios and channels, as well as when there are many radios and channels, where the average throughput gap is 38.22 percent and 34.63 percent, respectively.

Venkaiahnaidu. A. et al. [7] proposed AODV-COG, an improved AODV (Ad hoc On-Demand Distance Vector protocol) that provides an interface to a route for efficient spectrum use and finding a high-throughput path among paths with the same hop count. This proposed system contains two parts; one is the path selection function (combines the min-hop metric and the ETX metric to find the best route and the other is a Channel assignment module), this can detect dynamic SOPs on a regular basis and, if necessary, adjust the interface. And second is; In the NS-2 simulator, a new module called Send Control Module has been added to enable the simulation of the cognitive routing protocol. AODV-COG is able to increase the overall throughput in the cognitive mesh network, according to simulation results. In this proposed based on the simulation results with OLSR compare with ODV-COG we will able to increase the overall throughput in the cognitive mesh networks.

Lesiba Morries Kola and Mthulisi Velepini [8] propose an agile extended Weighted Cumulative Expected Transmission Time (xWCETT) routing protocol. This protocol Combines the features of the Ad-hoc On-demand Distance Vector (AODV) and the weighted cumulative expected transmission time (WCETT) routing protocols, where The AODV and WCETT routing metrics are combined in the xWCETT protocol to create a new improved routing protocol. In NS-2 simulators, The xWCETT protocol was implemented to evaluate its performance in comparison with the AODV and the WCETT protocols and it is found that the xWCETT protocol outperformed the AODV and WCETT protocols in terms of latency, throughput, PDR, and the NRL.

Fatima Zohra Benidris et al. [9] proposed a novel routing protocol for cognitive radio ad hoc networks (CRAHNs) based on clustering model. This clustering model amends swiftly to the topological changes and establishes the routing efficiently. This proposed not only approach is thoroughly evaluated through simulation study but also the suitability for cognitive radio ad hoc networks and demonstrate. This proposed system provides finding the source-destination route, reducing the amount of messages that are transmitted all over the network and minimizing the routing delay. Experiments show that, when compared to the AODV protocol, our protocol works very well by adding cluster-heads in each cluster in the network, resulting in a higher success rate in finding source-destination routes, even when there are a lot of CR nodes.

Rita Ahmad Abu Diab et al. [10] proposed an efficient routing protocol for cognitive radio (ERCR) networks, which is location-based and can fully operate over a single wireless channel using a channel access mechanism. This proposed routing protocol follows the IEEE 802.11 distributed coordination function as well as increases the per-node capacity to meet the operational requirements of different IoT applications. The efficiency of the proposed protocol has been tested for a broad range of performance metrics under various operation levels of licensed users in terms of channel occupancy probability and length using comprehensive network simulator-2 computer simulations. The simulation



results show that ERCR is capable of transmitting stable packets with low packet transmission latency while conserving the cognitive radio network nodes' energy with a relatively low overhead.

III. CONCLUSION

The growing demand for broadband wireless technology has resulted in spectrum shortage, inefficient use, and underuse. The Cognitive Radio (CR) technology has emerged as a promising approach for better spectrum use. The complex design of the CR networks, however, makes routing difficult. This paper provides the different routing protocols for cognitive radio networks used in the recent years, and also useful for the researchers who are going to developed the new system for cognitive radio networks.

REFERENCES

- [1] Christine E. Jones, "A Survey of Energy Efficient Network Protocols for Wireless Networks", Kluwer Academic Publishers, 2001.
- [2] Adrian Popescu, "Cognitive Radio Networks", 9th International Conference on Communications (COMM), IEEE, 2012.
- [3] Mohammed Hashem, Shrief Barakat and Mahmoud Atta Alla, "A tree routing protocol for cognitive radio network", Egyptian Informatics Journal, 2016.
- [4] Sharmin Akter, Mohammad Shahriar Rahman and Nafees Mansoor, "An Efficient Routing Protocol for Secured Communication in Cognitive Radio Sensor Networks", IEEE Region 10 Symposium (TENSYMP), pp. 5-7, June 2020.
- [5] Chunxia Wang, "Routing Protocol of Cognitive Ad Hoc Network", International Journal of Future Generation Communication and Networking, Vol. 8, No. 5 (2015), pp. 259-272.
- [6] Yashoda Krishna Lenka, "Performance Analysis of ROPCORN and WCETT Routing Protocols in Cognitive Radio Ad-Hoc Network (CRAHN)", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 5, Issue 11, November 2016.
- [7] Venkaiahnaidu.A, B.RameshBabu, Sk.MansoorRahaman and K.RajasekharaRao, "A New OLSR Routing Protocol in Cognitive Wireless Mesh Networks", International Journal of Modern Engineering Research (IJMER), Vol.2, Issue.1, Jan-Feb 2012 pp-496-498.
- [8] Lesiba Morries Kola and Mthulisi Velepini, "A model to improve the routing performance of Cognitive Radio Wireless Mesh Networks", South African Computer Journal, Vol 29 (3), 2017, pp. 64-80.
- [9] Fatima Zohra Benidris, Badr Benmammam, Leila Merghem-Boulaiah and Moez Esseghir, " An Efficient Cluster-based Routing Protocol in Cognitive Radio Net-work",
- [10] Rita Ahmad Abu Diab, Atef Abdrabou and Nabil Bastaki, "An efficient routing protocol for cognitive radio networks of energy-limited devices", Telecommunication Systems, Springer, 2019.



INNO  **SPACE**
SJIF Scientific Journal Impact Factor

Impact Factor:
7.512

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details