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Energy Efficient Resource Allocation In Cognitive Radio Network By Using Ieera Clustering Apporch

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Abstract:

The Cognitive Radio Network (CRN) is a set of a heterogeneous network that comprises the number of the users dynamically accessing the spectrum. the cognitive radio network has a major issue which is related to the allocation of resource channels for users in the network environment where the impact of inefficient resource allocation may result in increased user interference. we suggested a resource allocation approach as a solution for the cognitive radio network in this paper, we proposed the solution of resource allocation for cognitive radio network using the modified improve energy efficient resource allocation (IEERA)– a metaheuristic approximation. This new methods uses dynamic resource allocation on the basis of their location. The objective is to obtain the optimal solution of channel allocation by Cognitive Radio Users. By observing the overall result, it can state that propose IEERA based resource allocation techniques improve the channel allocation and attain the fairness in the Cognitive Radio environment, and then the throughput is increased.

Keywords: *Cognitive Radio Network, IEERA, dynamic resource allocation, Throughput.*

I. INTRODUCTION

The demand is increasing for wireless radio spectrum and power resources has been sparked by the quick proliferation of new wireless applications and devices. The paradigm embraced by cognitive radio (CR) for the spectrum licensing scheme which makes use of the spectrum even more efficiently by letting unlicensed (secondary) users' access to the radio spectrum under certain restrictions this is the dynamic spectrum management model. CRs allow spectrum sharing from a greening perspective with agile access to the spectrum and smart operation. Spectrum efficiency is not the same as energy efficiency, however, because the formula of Shannon capacity shows the tradeoff between power and bandwidth. A promising model for the optimization of CR and green communication provision is Cooperative relay network. Having several nodes in the network which will help to achieve diversity by transmitting one another is the basic concept. The transmission range is shorter in cooperative relays and so it can minimize transmission power and can theoretically yield high SNR i.e. signal-to - noise ratio and produce less interference. The engagement in CR networks which are cooperative relay-based by the system which is primary so their suitable users that are secondary to transmit their transmission to improve the transmission of the primary output, such as improving reliability/ throughput that is achievable and/or saving of energy. A portion of the spectrum access benefits for secondary transmission relays to secondary consumers is additionally provided to the primary network. The cooperation strategy may be a) three-phase TDMA-based cooperation, that is the first phase is broadcast in the primary system and there is a relay by the secondary system in the phase two, and the broadcast of the secondary system is in the phase three; b) two-phase FDMA-based cooperation, in which the primary system divides the spectrum into two orthogonal sub-bands and broadcasts in the firms in the first sub-band

As energy harvesting i.e.EH, being implemented in the communication networks which are wireless, in addition to data and spectrum sharing, the idea of spectrum and energy sharing has caught the attention considerably. Energy harvesters take fuel from readily available sources of atmospheric

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sources such as solar, geothermal, hydro, biomass, tides, wind and even RF. Current approaches follow three strategies to address green energy source challenges and uncertainties. Cognitive Radio also termed as CR, an adaptable and reactive radio network technology capable of dynamic detection of nodes available in a wireless spectrum and modifying parameters of transmission by enabling more wireless communication channels in the network and enhancing radio network efficiency. Cognitive radio is a promising technology that aims to allow efficient use of available channel resources by proposing coexistence on the same spectrum of radio nodes licensed (or primary) and unlicensed (secondary or cognitive) [16]. One of the key challenges in designing cognitive radio networks is to build algorithms for dynamic spectrum allocation that allow cognitive nodes to access the available wireless spectrum in an opportunistic manner without interfering with existing primary nodes. Therefore, wide-ranging alternatives to spectrum exposure have gained significant attention. In [2] and [3] the cognitive radio problem was discussed from a theoretical perspective of consciousness. The cognitive transmitter is believed to be transmitted at the same frequency, along the same primary path. Interference is mitigated through the use of complex preceding techniques which provide accurate information about the primary signal. [9] introduced the idea of a block of time and proposed guidelines for the allocation of these blocks. In [22] the authors derived optimum and sub optimally distributed strategies for determining the channels to be defined and accessed for secondary users under a Partially Observable Markov Decision Process (POMDP).

Many different structures can be identified in a large-scale network which approaches the centre of a network. They are the basic definitions but are important to understand and describe in the inferential method. Figure 1 shows the best way to represent a network the aim is to imagine a broad and wide-ranging network's connectivity topology. Depending on the degree of accuracy of the logical representation, every node will represent a computer terminal, router, or subnetwork. The connection between two adjacent nodes is called the relation. A link is a direct connection between 2 nodes. A route is determined by union of adjacent connections. This is a logical representation, in which each logical connection is a chain of physical connections connected to the router. A source node and a destination node are constructed as path. To define the measurement on this path, the source node transmits a message (packages) to the destination node, passing through multiple nodes which share the same pathway. A potential inference technique is to use the measurement obtained and perform other characteristics of the internal relationship, such as estimating the rate of loss or estimating the delay link. It increases its frequency, capacity and other parameters by adding to CN operation so that more results can be obtained. The parameters that these include are PFA ratio, delay, energy consumption & throughput. An autonomous system which can be accessed from CR to derive more work effectively according to his job is the working of this. The CR studied its own radio frequency in a continuous manner that can be learned from other. Then CR can use this output for other work so that WMN can communicate securely and get the full output in less time. So, it can provide good quality of the necessary data.

II. OBJECTIVES

- To analysis the resource allocation routing protocol approach with well-known available schemes to prevent maximum energy used by network.
- To compare existing routing protocol algorithms.
- To design an algorithm that can perform better than existing ones.
- To implement our improved Resource Allocation Routing Protocol approach on top of routing protocols, such as DSR in MANETs to further evaluate its effectiveness by Using the Ant colony shortest path algorithm for sending the Data with less cost.
- To compare performance metrics in terms of packet delivery ratio, end to end delay, throughput and energy consumption in network**.**

III. Proposed Work:

By using the following proposed step we can able allocate the resources properly with minimum energy utilization,

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(i) While designing the localization algorithm need to think on Low cost hardware, energy efficiency of the algorithm.

(ii) To deploy GPS enable node for localization is not at all the solution for localization because it itself has its several disadvantage such as cost of hardware, size of node and deployment cost, not work in NLOS environment and not energy efficient. So GPS is not suitable for WSN.

(iii)In WSN a resource which we used for localization are very crucial and has very much constraint such as battery life, computational capabilities, low data rates, low memory constraint and small size requirement by the researcher. It is pretty challenging to design a system for localization

(iv) In localization schemes, the problem of line of sight (LOS) in range based approach can lead to erroneous result.

(v) In localization, precision is increasingly important, when any position nodes are measured incorrectly, the accuracy of the algorithm is wrong, since we use a cooperative approach in network to estimate the nodes that impact on the overall network accuracy.

(vi) Node density is an important issue while designing a localization algorithm.

IV. Result & Discussion:

While ensuring a proper routing and communication mechanism at the network and cognitive layer is very difficult, in this research it proposes improving the energy-efficient resource allocation system (IEERA), which not only offers high data transfer between nodes, but also provides affordable genuine services to the Community. Following Table 01, the 500 m CRN milieu at a distance of 500 m has different node numbers. The CUs were mobile in nature, where they could at any time detach or reconnect from their network. The CU mobility rate was set at 0–10 m / s, with 30 m contact range. The underlying MAC layer protocol was also 802.11 for moving objects, while the routers' contact range was set at 120 m. In order to measure the protection, during the handoff and communication process the malevolent nodes or CUs were embedded in the environment using the probability distribution.

4.1 Simulation:

Performance Analysis of proposed system model namely improve energy efficient resource allocation (IEERA) in cognitive radio network using clustering is evaluated and compared with Improve DSR routing protocols based on Packet Delivery Ratio, Processing Delay and throughput to verify & how efficient the resources can allocate with shortest path through network in presence of number of nodes.

As proposed algorithm works in iterative in nature for improvement in accuracy with maximum throughput following parameter, we are going to consider for simulation purpose, and measure the performance of system with proper resource allocation,

Sr No	Parameter	Value
1	No of Nodes	10-50
2	Simulation Time	100 seconds
3	Area	750×750
4	Traffic Type	CBR
5	Packet Size	100 *Bytes*
6	Packet Interval	1 second
7	Node Distance	Random
8	Antenna Type	Omni Directional
9	MAC Type	IEEE 802.11
10	Routing Protocol	DSR

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11	Visualization Tool	NAM, TRACE

Table 01: Simulation Parameters (Random Scenario)

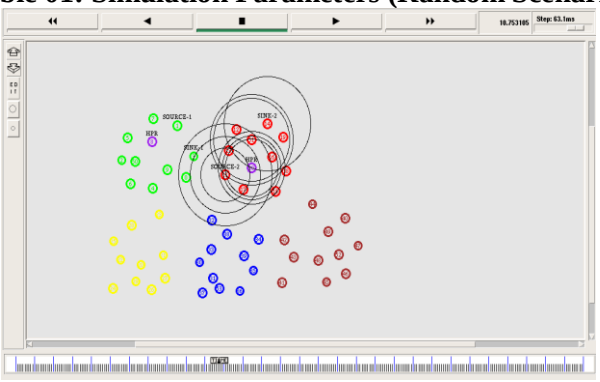

Figure 1: Simulation of improve energy efficient resource allocation (IEERA)

In above figure 1 , shows the proposed (IEERA) routing scheme, the each node allowed have their proper location by using that Send messages RREP and RREQ. In other words, a route can be formed between S and D only by shortest nodes of the path. As the usual nodes will not retransmit the forward RREP or RREQ messages, overhead as well as transmission power will be reduced as with the cluster largely. As each node is capable of transmitting messages to longer distances, the total length of the route will be reduced. Reducing the length of path would minimize the gap between end and end. Furthermore, regular nodes will only be required to transmit to the closest next node in which the transmission power's (tx) size is reduced by that, this represents the power consumption which is overall and is expressed in the reduction of the overhead routing.

Following flowchart shows the flow of data through proper route to get the maximum throughput with less energy usage by using proper resources.

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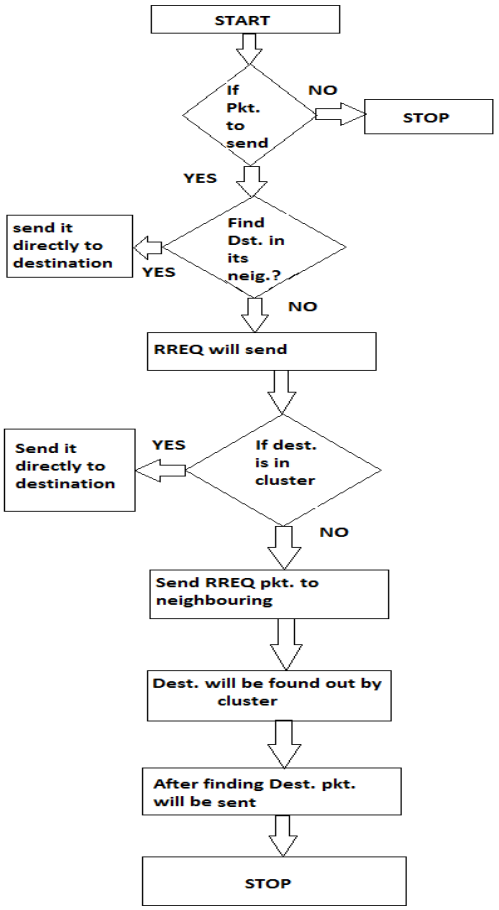

Figure 2: Flowchart of propose system

Following figure shows the simulation of working model it contain all actual outcomes by observing the actual scenarios with packet delivery ratio, end to end delay, throughput & energy consumption.

4.2 Comparative Analysis

Performance Analysis of different algorithm with proposed system (IEERA) are evaluated and compared based on different parameters like Packet Delivery Ratio, Processing Delay , throughput and energy consumption to verify, how efficient the DSR routing protocol with IEERA works.

Parameters	DV-Hop	APIT	Monto-carlo	IEERA
Packet Delivery Ratio	98.14	98.816	98.216	99.112
Throughput	40.946	24.154	38.488	42.704
End to end Delay	0.0512	0.054	0.0516	0.0438
Energy Consumption	5.536	6.36	6.1	5.22

Table 2: Average Performance of All algorithms with different Parameters

The PDR performance of the DSR using Proposed IEERA system is given in table 2 and the results are shown in graph 1. The IEERA outperformed producing good performance.

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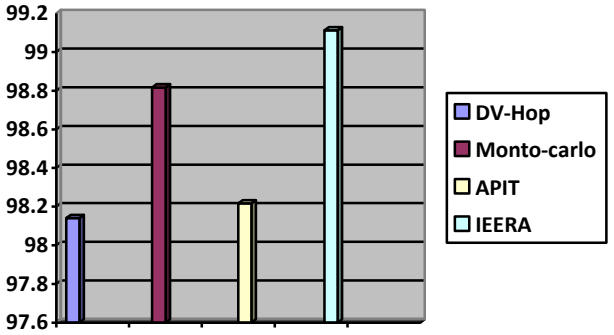
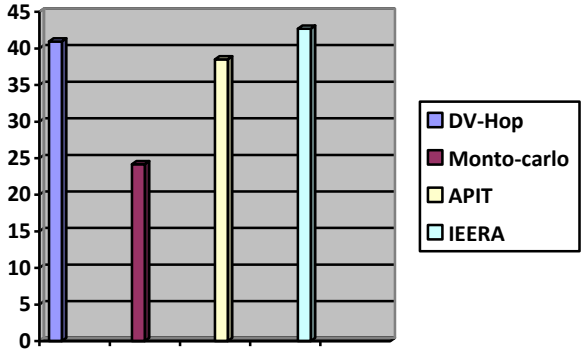
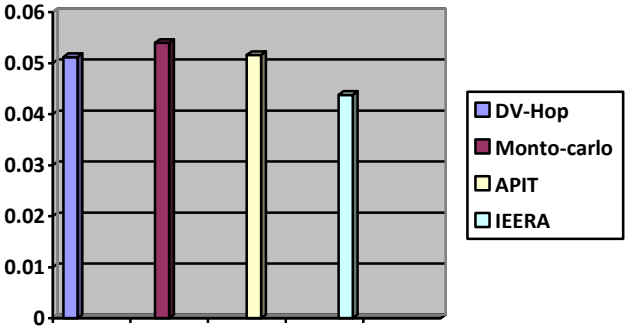


Graph 1: Average Performance Packet Delivery Ratio

The Throughput performance of the DSR using Proposed IEERA system is given in table 2 and the results are shown in graph 2. The IEERA outperformed producing good performance as compare to other methods.



Graph 2: Average Performance ThroughPut



Graph 3: Average Performance End to End Delay

The performance of Energy consummation on the DSR using Proposed IEERA system is given in table 2 and the results are shown in graph 4. The IEERA outperformed producing good performance as compare to other methods and save the energy.

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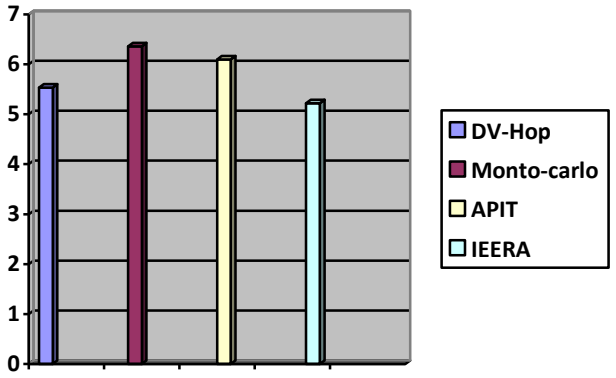

Graph 4: Average Performance Energy Consumption

V. Conclusion:

In this research work the different resource allocation localization techniques in Cognitive radio network has been discuss and presented with existing and with Proposed improve energy efficient resource allocation (IEERA). This new methods using dynamic resource allocation give best results along with some new challenges such as Low cost hardware, energy efficient algorithm, location accuracy, NLOS, Node Density, Performance parameter of the algorithm. An overview of proposed system, issues in CRN, and a comparison of recent IEERA solutions to the CR resource allocation issue to give better performance.

From the current rate of growth of IEERA applications, it is envisioned that IEERA will continue as an important optimization technique in several engineering fields including CRNs with proper resources allocation to give maximum throughput with minimum energy. Also, it gives a comparative study of distributed localization methods with proper location of each node so can forwarded the data with minimum time span based on aspects related to performance of an IEERA algorithm. But every method has its own beauty. By observing the overall result, it can state that propose IEERA based resource allocation techniques gives maximum throughput with less energy consumption.

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