International Journal of Movement Education and Social Science
IJMESS Volume 10, Issue 2 www.ijmess.org
ISSN (Print): 2278-0793
ISSN (Online): 2321-3779

Efficient Data Transmission in Wireless Vehicular Networks

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Abstract- Vehicular ad hoc networks (VANETs) are a subset of mobile ad hoc networks (MANETs). These networks do not have a specific structure, in which network-forming nodes are moving vehicles. In the recent development of vehicular Adhoc network, the consumption of energy by its nodes is a major problem now a day. To overcome this problem many algorithms are proposed. The two main aspects that can resolve this issue is by having proper routing and network design. In this project we discuss the issues which are associated with the cooperative transmission in wireless vehicular networks. The cooperative transmission includes the use of cellular terminals as relay stations to develop the transmission high-quality and to growth the community overall performance and reduce energy intake.

Keywords- cooperative transmission, vehicular Ad hoc networks, mobile terminal; relay station.

I INTRODUCTION

Vehicular Ad-hoc Network (VANET) is a subclass of an ad hoc network. Vehicles in VANET communicate with close by vehicles or road side units that are mounted in centralized locations such as intersections and parking lots. There are two types of communication: vehicle-to-vehicle (V2V) and ve to-infrastructure (V2I). In V2V communication nearby vehicles exchange data by using short range wireless technologies, Wi-Fi and WAVE. Vehicles have a special electronic device that allows them to receive or relay messages. In V2I, vehicles are connected to the nearby road infrastructure via continuous wireless communication through Wi-Fi hotspots or long/wide range wireless technologies for exchanging information relevant to the specific road segment.

Several works in mobile ad hoc networks have shown that nature inspired (bio inspired or swarm intelligence) algorithms inspired by insects such as ant colony based optimization (ACO), can be successfully applied for developing efficient routing algorithms. These algorithms have a quantity of advantages compared to other routing algorithms. For example, they reduce the routing overhead by sharing local information for future routing decisions. They also offer many paths enabling selection of another route in case of link failure on the previously selected path.

ACO algorithm is a hybrid routing algorithm that makes effective use of the bandwidth. This algorithm is scalable and robust to link failures. We subdivide the nodes into zones with each vehicle belonging to one or two overlapping zones. We use proactive approach to find a route within a zone and reactive approach to find routes between zones using the local information stored in each zone thereby trying to reduce broadcasting and congestion [2]

A few works in mobile adhoc networks have demonstrated that nature motivated algorithms motivated by creepy crawlies, for example, insect state based advancement (ACO), can be effectively connected for creating productive routing algorithms. These algorithms have an amount of favorable circumstances contrasted with other directing algorithms. For instance, they lessen the directing overhead by sharing nearby data for future routing choices.

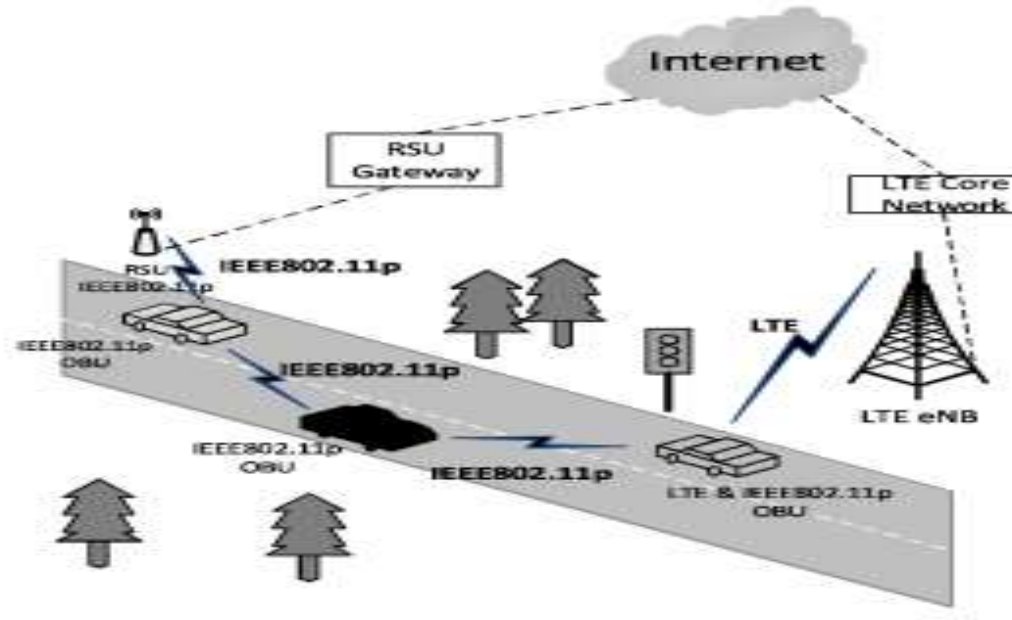

Fig. 1. Example of vehicular network with IEEE802.11p and LTE.

II RELATED WORK

In this paper [2] author developed associate design for a context-based node and a testbed platform for the analysis of energy consumption of heterogeneous cooperative communications are conferred. The demonstrative testbed contains a Wi-Fi Access purpose that provides Wi-Fi coverage within the infrastructure mode, moreover as nodes capable of human activity through short-range ultra wide band Wi Media

In this paper [5] author researched on Transmit diversity that is usually needs quite one antenna at the transmitter. However, several wireless devices are restricted by size or hardware quality to 1 antenna. Recently, a replacement category of ways referred to as cooperative communication has been planned that permits single-antenna mobiles during a multi-user surroundings to share their antennas and generate a virtual multiple antenna transmitter that enables them to realize transmit diversity. this text presents an outline of the developments during this burgeoning field.

In this paper [8] author improved a large-scale cooperative relaying theme supported coherent combining has been projected. Best amplitude parameters are derived below combination relay power constraint. The amplitude parameter contains a relay specific complicated amplitude term and joint social control issue. It's shown that important SNR gains are often achieved, here illustrated in an exceedingly easy relay mesh grid pattern, however the performance depends for the most part on acceptable level of the relay density.

In this research [9] author worked on the energy-efficient transmission protocols for wireless networks that exploit spatial diversity created by antenna sharing: coordinated transmission and/or process by many distributed radios. They specialize in single-user transmission and examine many prospects for the strategy utilized by the aiding radio, or relay, as well as secret writing and forwarding similarly as amplifying and forwarding. In every case, author develop receivers primarily based upon most-likelihood and/or maximum S/N criteria, relate their structures, and compare their bit-error likelihood performance by suggests that of study and simulations and forged single-hop and multihop routing into our framework for comparison functions

III.PROPOSED SYSTEM

The main aim of this paper is to explain a tree-based multicast directing protocol called MAV-AODV. Its intension is to provide an increasingly proficient multicast directing plan in VANETs. MAV-AODV based up on MAODV protocol [5] and utilizations reference point messages and standards of the Ant Colony Optimization (ACO) metaheuristic [6] to qualify courses, in point of their life period.

Multicast directing is the bundle transmission to a hub collecting distinguished by a solitary goal address. This kind of of routing is the very effective method for gathering correspondence [10]. There are a few arrangements for multicast routing. The most normally utilized depends on the way structure, of which there are commonly three sorts: tree-based, mesh based and hybrid [11]. The tree-based structure gives objectivity in the routing information (whenever contrasted and different structures). Notwithstanding, it is a structure that does not give robustness, tree-based structure provides objectivity in the routing data (if compared with other structures). However, it is a structure that does not provide robustness.

Meta-heuristic optimization: **-** Ants navigate from nest to food source. Shortest path was discovered via pheromone trails. Each ant moves randomly Pheromone is deposited on path more pheromone on path increases possibility of path being followed. As Shown in ACO was really a recently proposed Meta heuristic approach for solving hard combinatorial optimization problems. Artificial ants implement a randomized construction heuristic helping to make probabilistic decisions ACO shows great performance with the “ill-structured” problems like network routing.

ACO – Construct Ant Solutions.

An Ant will move from node i to node j with probability $PI,J = TI,J\alpha \ (ni,j\beta \ ) \ (TI,J\alpha \ )(ni,j\beta \ )$ Where TI,J Is the amount of pheromone on edge I,j A is a Parameter to control the influence of TI,Jni,j is the desirability of egdei,j(typically $1/di,j$) B is a Parameter to control the influence of ni,j ACO – Pheromone update Amount of Pheromone is updated according to the equation TI,J = (1-p) TI,J + $\Delta Ti,j$ Where TI,J is the amount of pheromone on a given edge i,j P is the rate of pheromone evaporation. $\Delta Ti,j$ is the amount of pheromone deposited, typically given by $\Delta TI,JK = 1 \,/\, Lk$ if ant k travel on edge i,j 0 Otherwise Where Lk is the cost of the kth ant’s tour (typically length)

MULTICAST ROUTING PROTOCOL

Phase1: Neighbor-Group creation and Multicast Neighbor selection is done through two sub-phases namely: Neighbor-List creation and Multicast group selection. The sub-phases are detailed below:

Neighbor-List creation: The current one-hop neighbor collection is the responsibility of the Neighbor-List creation subphase.The current one-hop neighbor of a particular node forms the neighbor-list set. The neighbor nodes share this list for selection of distant nodes. As the sparse and partially connected areas incorporates in deterministic high mobility, the Neighbor-List is to be updated dynamically. A pro-active approach of sending periodic „hello" message is undertaken to encounter the above issue. The hello messages are network layer based ; they are sent out by the network layer. It is more convenient to sent the „hello" messages through the network layer because routing functions can be performed without consideration of the underlying MAC layer technology

Multicast group selection The existing Border node Based Routing (BBR) protocol floods the network without considering the relative distance between the nodes, resulting in an inefficient bandwidth utilization; Considering this issue, the MAV-AODV protocol introduces a threshold τ to classify the current one-hop neighbors which will receive the multicast data packet with respect to the current forwarding(Distant) node. The multicast packet receiving nodes are selected on the basis of transmission time (as transmission time in low node density,light traffic area is directly dependent on physical distance between nodes,other factors are negligible). The „hello" messages contain the current timestamp before it has been sent out. The current forwarding node receives „hello" messages from it" s current one hop neighbors and computes the transmission time and averages two recent successive transmission times of all the one-hop neighbors and then compares with a threshold τ for selection of data packet receiving neighbors.

IV. **IMPLEMENTATION AND RESULTS**

Here using simulations, we study the application of Multicast Adhoc on Demand Vector, MAODV. We propose then Motion-MAODV, an improved version of MAODV that aims at enhancing routes built by MAODV in vehicular networks and guarantee longer route lifetime. Finally, to enable geographic dissemination as required by POI applications, in this paper a routing protocol Melody that provides a geocast dissemination in urban environments. Through simulations, Melody ensures more reliable and efficient packet delivery to a given geographic area compared to traditional geo-broadcasting schemes in highly dense scenarios. To evaluate our proposed protocol, MATLAB is used to perform simulation.

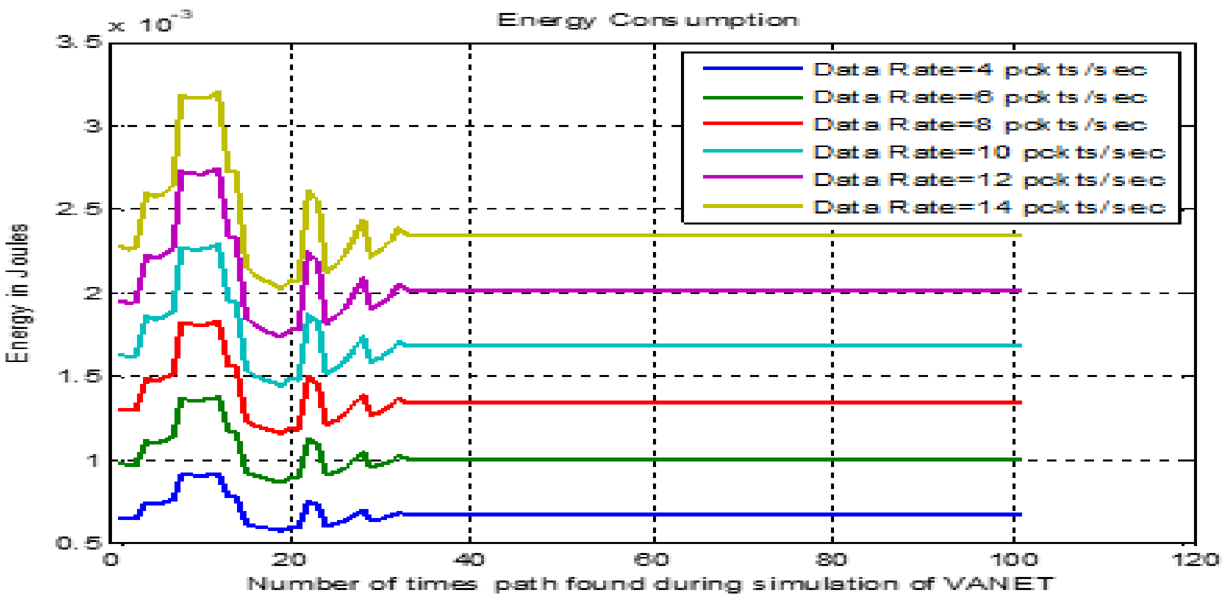

Fig 2. ENERGY Vs NUMBER OF PATHS

In the above fig 2 indicates the energy in joules and number of times paths foud during simulation of VANET.. in this process average data rate 4 packets/second is indicated by blue colour average data rate 6 packets/second is indicated by green colour. average data rate 8 packets/second is indicated by Red colour. average data rate 10 packets/second is indicated by light blue colour. average data rate 12 packets/second is indicated by yellow colour.

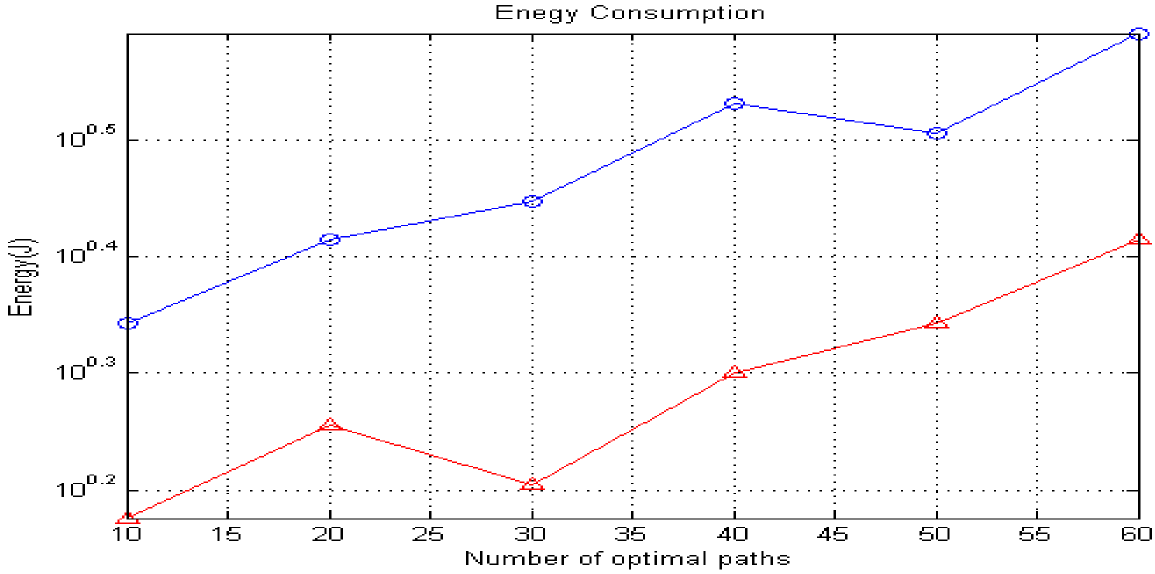

Fig 3. COMPARISION OF ENERGY vs NUMBER OF PATHS

In fig 3 the upper line indicates the Energy Consumption in the path by using Mobile Terminals. In Graph, the lower line indicates the Energy Consumption in the path by using VANET.By comparing the Energy Consumption by Source and Destination of VANET and Mobile Terminal. From graph concluded the VANET has less energy consumption.

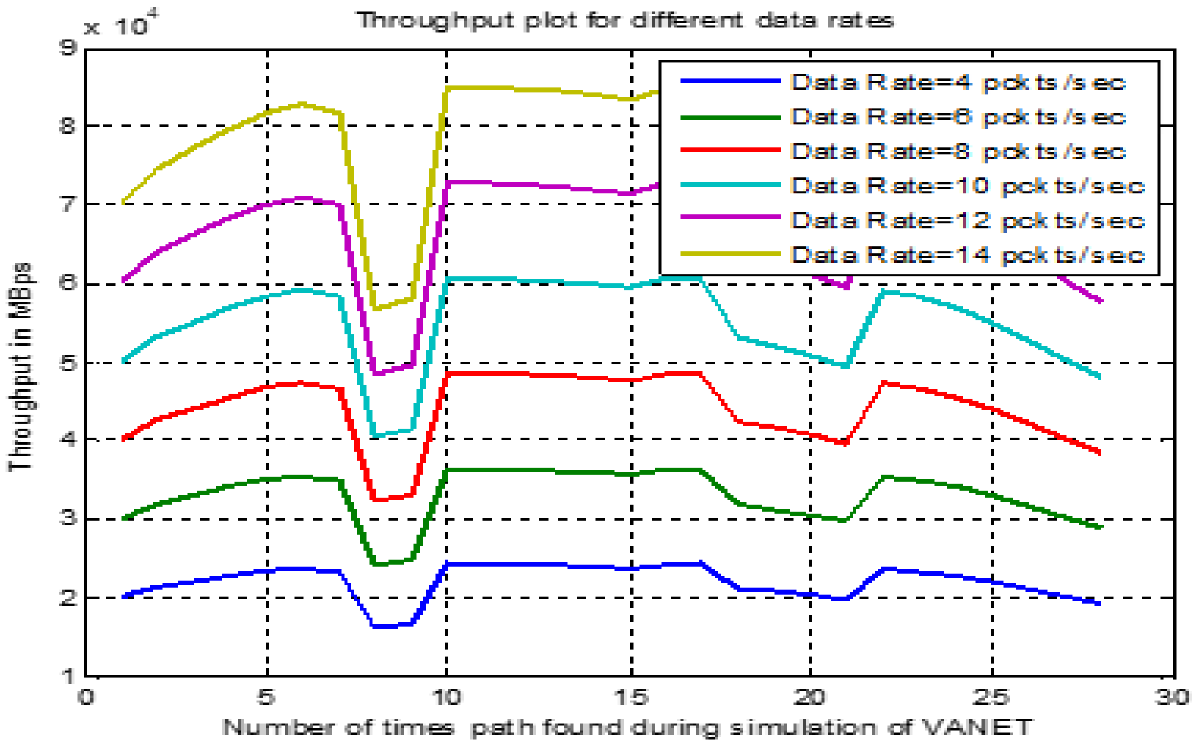

Fig 4 THROUGHPUT VS NUMBER OF PATHS DURING SIMULATION OFVANET

The above fig 4indicates the throughput vs the number of paths during simulation of VANET. Here throughput is plotted for different data rates.in this process average data rate 4 packets/second is indicated by blue colour average data rate 6 packets/second is indicated by green colour. Average data rate 8 packets/second is indicated by Red colour. average data rate 10 packets/second is indicated by light blue colour. Average data rate 12 packets/second is indicated by yellow colour.

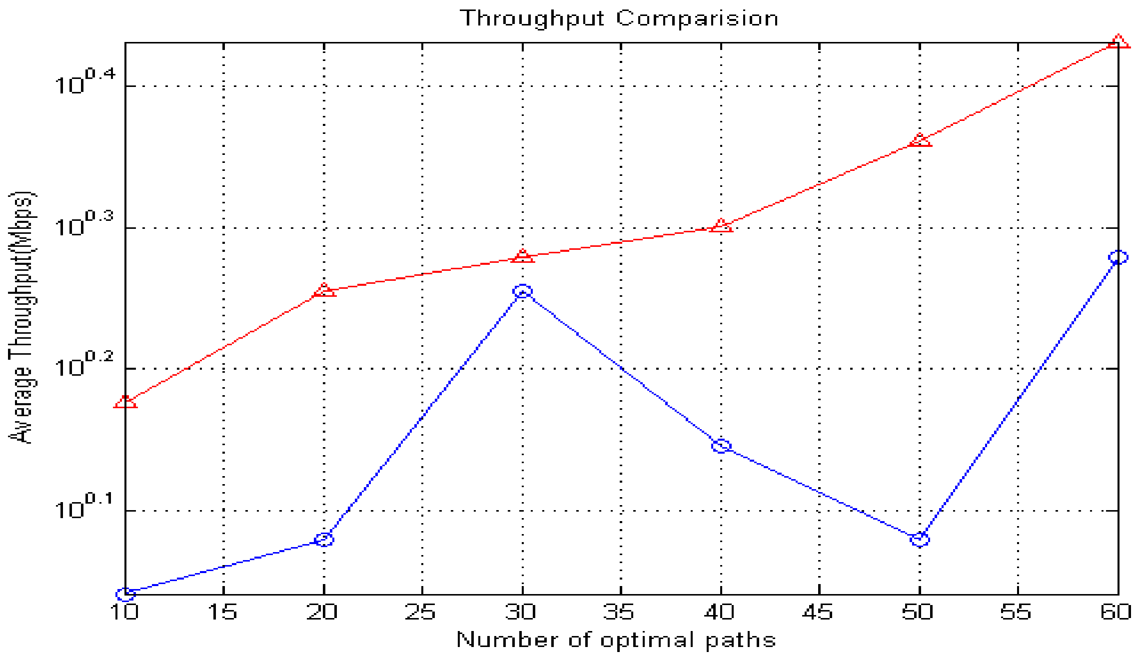

Fig. 5 AVERAGE THROUGHPUT VS NUMBER OF PATHS.

In fig 5, The upper line indicates the Average Throughput by using VANET.In Graph,the lower line indicates the Average Throughput by using Mobile Terminals.By comparing the AverageThroughputofSourceandDestinationofVANETandMobileTerminal.From graph concluded the VANET has more throughput.

Here we see the results as network lifetime their comparisons, how much distance travelled from source and destination, throughput vs number of paths during simulation ofvanet, Energy vs number of paths

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V.CONCLUSION

In this paper we comparatively study the works of reactive in addition to routing protocol and ant colony optimization technique and developed the MAV-AODV (Multicast with Ant Colony Optimization for Vanets based on MAODV) protocol that makes use of vehicular mobility information to build stable trees.. We include simulation results to analyze the MAV-AODV protocol efficiency. The classical technique required extra power and experiencing greater delays in order to lessen efficiency and overall performance of routing protocol. To make routing protocol greater efficient we're developing it with the help of ant colony optimization (ACO) set of rules for you to examine the performance by way of considering parameter like stop-to-quit overdue arrival, jitter price, strength intake and throughput..

References

[1] A.M.S. Abdelgader, W. Lenan, "The Physical Layer of the IEEE802.11p WAVE Communication Standard: The Specifications and Challenges," Proceedings of the World Congress on Engineering and Computer Science 2014 Volll WCECS 2014, San Francisco, USA, pp. 22-24 October, 2014.

[2] M. Alam, P. Trapps, S. Murntaz, J. Rodriguez, "Context-aware cooperative testbed for energy analysis in beyond 4G networks". Telecommunication Systems, Vol. 64, Issue 2: 2017 pp. 225- 244.

[3] Z. Mir Hameed, F. Filali, "LTE and IEEE802.11p for vehicular networking: a performance evaluation," EURASIP Journal on Wireless Communications and Networking 2014.

[4] T. Hunter, A Nosratinia, "Diversity through Coded Cooperation," IEEE Transactions on Wireless Communications.

5 (2) pp. 283-289. 2006. [5] A Nosratinia, T. Hunter, A Hedayat, "Cooperative communication in wireless networks," IEEE Communications Magazine, 42 (10), pp. 74- 80,2004.

[6] A. Sendonaris, E. Erkip, B. Aazhang, "User cooperation diversity. part I. System Description," IEEE Transactions on Communications, 51(11), pp.1927- 1938,2003.

[7] A. Sendonaris, E. Erkip, B. Aazhang, "User cooperation diversity. part II. implementation aspects and performance analysis," IEEE Transactions on Communications, 51(11), pp. 19391948, 2003.

[8] P. Larsson, "Large-scale cooperative relaying network with optimal coherent combining under aggregate relay power constraints,". WWRF: New Air Interfaces, Relay based Systems and Smart Antennas. 2004. 5

[9] J. Laneman, G. WomeU, "Energy-efficient antenna sharing and relaying for wireless networks," IEEE Wireless Communications and Networking Conference, I, pp. 7-12, 2000.

[10] S. Navaratnarajah, A Saeed, M. Dianati, "Energy efficiency in heterogeneous wireless access networks," IEEE Wireless Communications. 20 (5), pp. 37-43, 20\3.

[11] Nomikos N., Nieto A., Makris P., Skoutas D.N., Vouyioukas D., Rizomiliotis P., Lopez J., Skianis C. "Relay selection for secure 5G green communications" Telecommunication Systems. Vol. 59, Issue 1, pp. 169-187, 2015