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Review on Energy Efficient Routing Over Wireless Networks

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***Abstract* – Wireless Networks (WN) are energy constraint network. Typically WN are powered by batteries, which operates till a limited time period. Hence the WN lifetime is an essential factor. In this article, a comparison of lifetime, energy consumption and maximum number of hops are performed using different optimization techniques). This article shows an review of l i f e t i me of WN. Optimization algorithms have been applied on each and every cluster separately for clustering. By applying this approach, member nodes of a cluster leads to decrease the energy consumption for transmission of sensed data to their cluster head. Hence the lifetime of member node of the cluster increases. For routing, optimization techniques have been applied on cluster heads deployed over the whole area under consideration.**

***Keywords* – WN; Lifetime; Energy Consumption; PSO; GSA; LDC.**

I. INTRODUCTION

Wireless Networks (WN) are the important key for information gathering needed by modern society. It has the capability of computation, communication and to sense important parameters for an application. WN can build using nodes from a few to several thousands. Each such node has typically several parts. A radio transceiver used to transmit and receive data. A processing unit used to process or modify data. An energy source used to supply energy. An electronic circuit used to interface sensor. Using sensor, a node can sense physical or environmental conditions. It communicates with nearby nodes and do computation on collected data and pass the data through the network to the base station [2].

WN are used in several fields. (1) Area monitoring in which WN deployed over a considered region to observe certain movements. (2)Health care monitoring in which it can be wearable or implantable.

(3)Environmental sensing where we can monitor air pollution, water pollution, land slide and natural disaster. (4)Industrial monitoring to monitor machine health, structural health and data centre [1].

WN have several challenges and constraints such as:

(1) Energy is one of the major constraint as WN typically powered by batteries, which operates till a limited time period. (2)Self-management is one of the major challenge as WN generally work in remote and harsh environment. (3)Wireless networking poses various challenges such as attenuation in propagation medium and large distance between sensor nodes and base station. (4)Design constraints occurs in WN as we prohibits the integration of many desirable components due to energy, storage and other constraints [1].

Since WN are energy constraint network, to enhance the lifetime of WN, in this paper, we have used different optimization t e c h n i q u e s such as PSO, GSA and LDC.

The rest of the paper is distributed in different section such as: Section II contains related works, Section III contains brief introduction of energy model. PSO, GSA and LDC are introduced in Section IV, V and VI respectively. Simulation and Result is given in Section VII and finally conclusion is stated in Section

Wireless Networks (WN) is an temporary premise distributed having self designed wireless mobile nodes. WN is usually deployed in hostile and open area due to wide applications in emergency services. Open nature of communication media and vulnerable unreceptive environment generates a huge resistance during transmission and degrade the performance respectively. It leads for connection failure, volatility, asymmetric links, nosiness, unreliable medium and route failure etc. Such

networks are needed in situations where temporary network connectivity is required, such as in battleground, area of devastation and large meeting places. The Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) are Transport Layer Protocols [1] expected for point would point correspondence. Here, TCP is connection oriented protocol provides a reliable

[2] and guaranteed delivery using acknowledgement service where UDP follows connectionless procedure to provide fast and best effort delivery. TCP is demanding option for various applications but not adequate for ad-hoc networks. Subsequently, design failure in TCP not only reason for misroute discovery but also frequent packet loss. It leads for degradation in network performance. To conquer this issue

different research work has been done which are known as TCP-Reno, TCP Tahoe, TCP-New RenoTCP-Vegas, TCP-SACK, TCP West wood [3]. All the techniques proposed depend heavily on the presence of wire-based station network, and hence cannot be work for ad-hoc networks. Many studies showed that the standard version of TCP functions poorly in wireless scenario because of it is not able to make difference between the packet loss caused by congestion from those caused by Transmission error [4].

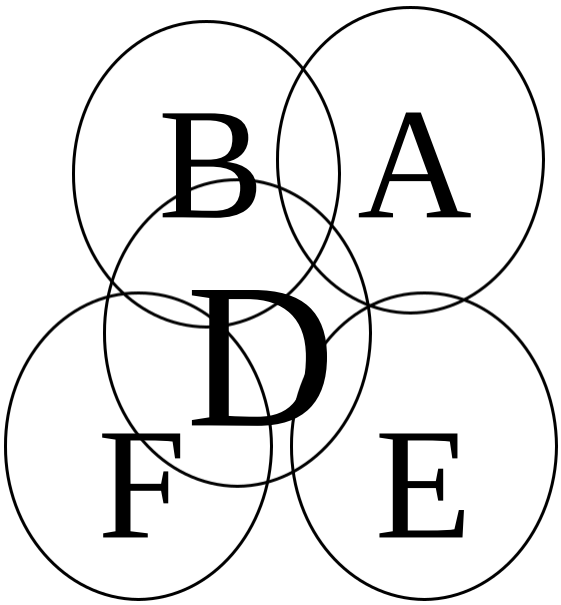

Figure 1: Wireless Network

II. APPLICATION

The set of programs for WNS is various, starting from small, static networks that are constrained by means of power sources, to big-scale, mobile, highly dynamic networks. The layout of network protocols for those networks is a complicated issue. Despite the application, WNS require effective

distributed algorithms to decide network organization, connect scheduling, and routing. Be that as it may, deciding conceivable routing paths and giving over messages in a decentralized domain where network topology varies isn't a legitimately described trouble [5]. While the shortest path (primarily based on a given cost characteristic) from a source to a destination in a static network is normally the optimal path, this idea isn't always without difficulty extended to WNS. Factors together with factor wireless link quality, propagation path loss, fading, multi- user obstruction, influence consumed, and topological modifications, end up plainly relevant issues.

The network ought to be able to adaptively regulate the routing paths to alleviate any of those effects. Besides, in a military domain, preservation of protection, latency, reliability, intentional jamming, and reclamation from failure are immense stresses. Military networks are intended to hold a low likelihood of capture as well as a low probability of detection. Hence, nodes favor to radiate as little electricity as essential and transmit as from time to time as viable, thus lowering the opportunity of detection or interception. A lapse by in any of these necessities may likewise debase the general execution and reliability of the network [5].

1. Important Parameters

In WN Security Because Of WN's special characteristics, there are some vital measurements in WN security that are essential in all security approaches; we call them "Security Parameters". Being uninformed of these parameters may cause a security approach pointless in WN. Figure 1 shows the association between security parameters and security challenges.

2. Congestion control in WNS

To keep and allocate network assets efficiently and pretty among a group of users is a primary issue. The resources shared basically are the bandwidth of the hyperlinks and the lines on the routers or switches. Packets are queued in those queues looking forward to transmission. At the point when an excessive number of packets are fighting for a similar hyperlink, the line floods and packets must be dropped. When such drops grow to be not unusual occasions, the network is said to be congested [7].

3. Advantages of WNS

The following are the advantages of WN [7, 8, 9]:

- They provide access to information and services regardless of geographic position.
- These networks can be set up at any place and time.
- Cost Estimation is very less.
- Uses the Dynamic Topology.
- There no any canalized authority
- The time required to install this network is very less.

III. AD HOC ON-DEMD DISTANCE VECTOR (AODV)

Mobile ad hoc network is a network configuration which is self-formed automatically by a plurality of mobile nodes without the use of a fixed infrastructure or centralized administration. Each node is prepared with a wireless transceiver that can communicate with other nodes in its range. For a node to send a packet to a node that is outside the range of the radio,

the support of end users in the communication network is required; This is called multi-hop communication. Therefore, each node must perform both a host and a router in the same time. The network topology changes usually due to the mobility of mobile nodes in the network.

In Latin, ad hoc means for this other way for this purpose only. This is a good and an iconic description of the idea why the ad hoc networks are needed. They can be set up anywhere without (. son or as base stations) need external infrastructure They are often mobile and that is why a WN is often used when talking about mobile ad hoc network WN is often defined as follows: WN or Wireless Networks is a network having the self-directed machine of moveable routers communicating through the wireless links.

IV. DATA MINING

Data mining is the extraction of interesting patterns or knowledge from huge amount of data. It can be known by different names like knowledge discovery (mining) in Databases (KDD), knowledge extraction, data/pattern analysis, data archeology, data dredging, information harvesting, business intelligence and others. The term data mining [2] is nothing but analysis of data in a database using tools which look for trends or anomalies without the knowledge of meaning of the data and is primarily used by statisticians, database researchers and business communities.

Clustering

As mentioned earlier, classification can be considered a supervised learning process. The grouping is similar to the mining classification technique. However, grouping is an unsupervised learning process. Clustering [4] is the process of grouping a set of physical or abstract objects into the class of similar objects, so that the objects in a group must be similar to a certain extent, they must also be different from those of other groups. . The classification file belongs to the predefined class Ned, while the group does not contain any predefined defined class. In grouping, objects are grouped according to their similarities. The similarity between the objects is defined by the similarity functions; generally, this is quantitatively the specific distance or other measures taken by industry experts in search of similarities. Most clustering applications are used in market segmentation. By grouping customers into different groups, professional service organizations can form different groups of customized markets. For example, depending on customer consumption, filing and retrieval patterns, a bank can group the market into different groups. For the different market groups below, the bank can offer different types of loans for houses and cars with different budget plans. In this case, the bank can provide better service and ensure that all loans can be claimed. [5]

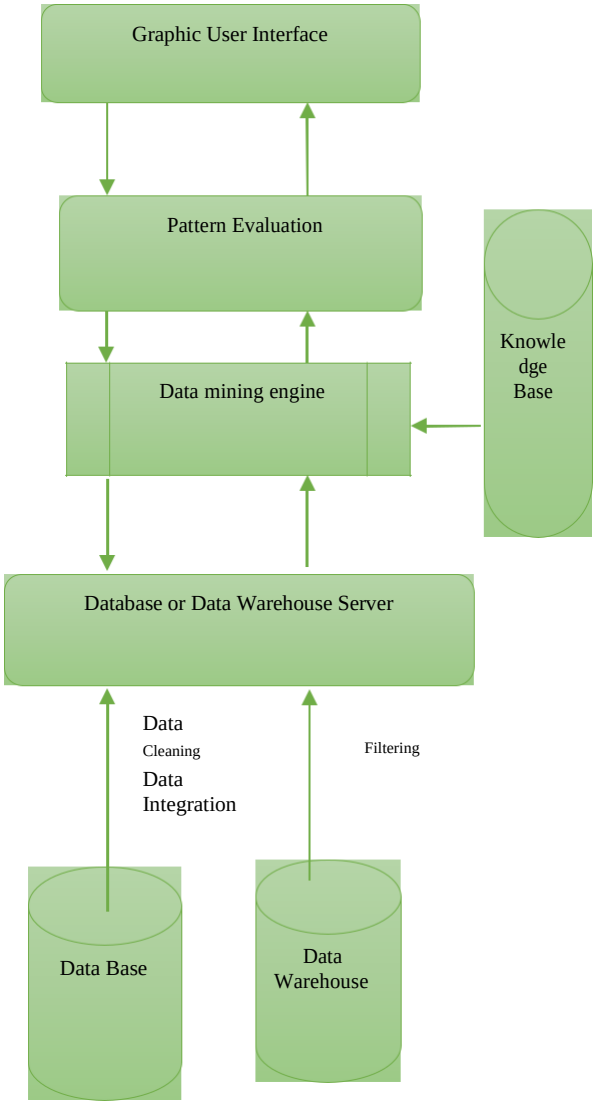

Figure 2 block diagram of data mining

V. LITERATURE SURVEY

The survey in [7] shows the requirements for designing a WSN. Energy conservation at various levels plays an important role for designing WSNs by which we can reduce energy consumption. In [8], a clustering technique has proposed which shows a reduction in packet drop, energy consumption etc. for dense WSNs. In [3], to enhance network lifetime, design constraints of WSNs are outlined using

several definitions for WSNs. LEACH is a clustering-based approach which has advantage of rotation of cluster head randomly. It is used to distribute the network load uniformly among the sensor nodes in WSN [4]. PSO has applied to address WSN issues such as optimal deployment, clustering etc. [2]. The routing problem can be treated as linear programming problem. Using PSO, energyhole problem can be solved efficiently [9]. In [10], WSN protocol based on PSO have studied and it shows how it helps to solve the energy consumption problem up to a certain extend. Gravity method can be used to optimize the sensor monitoring parameters. GSA can be used to optimize parameters, increase lifetime and energy consumption [11]. In [12], a movable aggregator sink is used which routes data to the base station as well as to reduce the load on cluster head. In [13], sensor node localization is concerned using swarm based GSA. In [14], Relay Based Clustering with Least Distance Head Selection technique is used to enhance the lifetime of WSN.

Neha Sharma, et al. [16] this paper delivers hybrid approach to deal with defeat congestion situation and dodge packet loss in wireless networks. Proposed Modified Hybrid method is the version of Hybrid-TCP (H- TCP) and TCP Reno. Proposed Modified Hybrid–TCP variant recollect the rate of increment parameter primarily based on signal power and noise issue to estimate a accurate retransmission time. Proposed Modified Hybrid-TCP is simulated the use of NS2 test system and assessed in advance with length of congestion window, packet delivery ratio, throughput with deference to mobility component (pace of node). Performance remark concludes that proposed Modified Hybrid-TCP version raises extensive overall performance improvement in the course of transmission over traditional TCP versions [16].

Istiklal et al. [21] provide analysis and techniques to select the most appropriate routing protocol for cooperating with TCP New Reno Congestion Control. Besides, they evaluate the chosen routing protocol to verify your participation with the ADTCP (TCP Friendly). Experimental results confirmed that the appropriate maximum routing protocol with congestion control could improve network performance, namely New Reno DSR and TCP. The cooperation between DSR and ADTCP offers better overall performance than DSR with TCP New Reno, because ADTCP can detect network conditions more accurately. However, routing protocols and congestion control cooperation face the uncertainty of making some exceptional connections, resulting in frequent road disruptions due to mobility. To deal with dynamic changes in network conditions, protocol features require additional physical layer parameters that are more unique and accurate, but with modest complexity in performance. The cross-layer is a promising method to improve the protocol of co-operation routing and congestion control mechanisms [17].

Keerthana et al. proposes a new common congestion planning and control algorithm for multi-hop wireless networks with dynamic class flows. The proposed algorithm provides a testable flow and an end-to-end verifiable delay of each float. The new joint congestion planning and control algorithm improves the performance and delay of a dynamic wireless network by moving the planning scheme with the virtual model. The proposed algorithm combines completely floating, window-based manipulation with a new rate-based, rate-based programming algorithm to allow the company to tell the story of the first class of the machine. This technique adaptively selects a set of routes based on the site's traffic load. In addition, this dynamic matching mechanism provides better results in terms of performance, processing delay and package delivery report [18].

Sujata V. Mallapur et al. [23] In this document, a decrease in forced admission and the loss of packets in packets implies congestion control and load balancing in WN networks. For example, this article presents an efficient routing technique known as MLBCC for extensive area networks to balance the load across multiple routes to reduce congestion efficiently. Congestion MLBCC offers a congestion control mechanism and a load balancing mechanism in the middle of the data transmission framework. The congestion control mechanism detects congestion through the use of an entry rate and an exit rate at a selected time in the T programming language. The load balancing mechanism consists of selecting a gateway node using the Hyperlink and route values to allocate the load efficiently by choosing the maximum number of applicable routes. For an efficient distribution flow, a standard deviation parameter of the degree of availability of the nodes is introduced. The simulation results, in Network Simulator 2 (NS-2), show that MLBCC improves the overall performance of FLMB and AOMDV concerning control overload, packet delivery ratio, standard drag, and loss report of

packages. Also, the consequences show that MLBCC successfully balances the node load within the network [19].

VI. CONCLUSION

To keep up and distribute resources of network adequately and reasonably among a collection of clients is a noteworthy issue. The assets shared generally are the data transfer capacity of the connections and the lines on the switches or routers. Bundles are lined in these lines anticipating transmission. At the point when an excessive number of bundles are battling for a similar connection, the line floods and parcels must be dropped. At the point when such drops end up noticeably basic occasions, the system is said to be congested. In Ad-hoc arranges, since there is no settled foundation there are no different system components called switches and consequently the versatile hubs themselves go about as the switches (i.e. they are in charge of steering the bundles). Blockage control techniques can be switch driven or have/hub driven. Congestion control methods have been fundamentally intended for media applications in WNs. System attributes like congestion and path disappointment should be recognized with a dependable mechanism.

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