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THE SURVEY OF APPLICATIONS, ROUTING PROTOCOL (PEGASIS AND LEACH) IN WIRELESS SENSOR NETWORK

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Abstract- A wireless device system (WSN) characteristically consists of a huge number of battery-powered sensor nodes. For lifetime extension, it is of utmost importance in WSNs to design an energy-efficient medium-access control (MAC) protocol that minimizes energy consumption while achieving the end-to-end delay constraint to meet applications' supplies. Wireless sensor networks are flattering an energetic topic of research, where sensors are units with sensing, processing, and wireless interacting competence. They can mechanically collect the information and report the measurements to the basin. Freshly, several wireless sensor networks must been designed and deployed for kinds of applications. An important role in many WSN operation models and applications, such as medium access scheduling, data fusion, beam-forming, target tracking, etc.

Keywords— Wireless Sensor Network, energy-efficiency, medium access control protocol and applications

I. INTRODUCTION

WSNs are hand-me-down in a wide variety of potential applications counting military, medical systems, and robotic exploration, which explains the important attention drawn by these types of networks in research field. As demonstrated by, since device nodes are typically battery powered, preserving their energy and extending the network life time are primary goals while designing protocols for those networks[1].

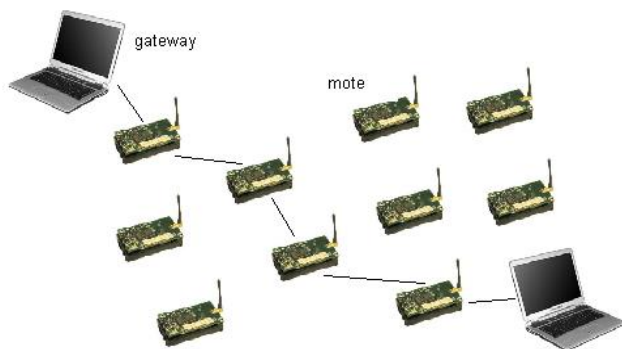


Fig no. 1 Wireless sensor network[1]

There is very less infrastructure in used in WSN. WSN consists of huge number of bulges which may differ from few thousands to obtain the data from the environment. WSN container is secret in to dualistic kinds: Organized and Formless. In Structured WSN the nodes are deployed in a pre-planned way which has an benefit of lower conservation cost[2]. The important and significant features of Wireless Sensor Network make WSN's different from other Contemporary networks are; self-organization, low electricity usage, little recollection stance, little bandwidth obligation for communication, important nodes, wireless and infrastructure-less architecture. Therefore, WSNs' designs must tackle these features aiming to engender a reliable WSN[3].

II. APPLICATIONS OF WSN

WSNs container be recycled for amount of applications ranging from investigation and environment monitoring to health care and military operations. Few applications need that sensor knobs be left unattended for a extended retro of time due to price insinuations or difficult admission to the deployment area[4].

- 1. Military Applications:** Martial knowledge, regulator, surveillance, intelligence, or directing systems can be promoted from WSNs. Since of quick nature, self-configuration, self-healing or[5] fault-tolerance physiognomies, WSNs are actual valuable to screen or regulator armed systems. If certain knobs are devastated by the opponent, it doesn't touch the general military process since WSN are containing of many quickly organized short price device knobs. Military commoners or bests can usage the ability of WSNs to display the condition of their throngs, the position or the obtain ability of the tackle in battlefield. Device welcoming to each troop, vehicle, or paraphernalia can echo the position by their individual. This info can be collected into the basin knobs or dishonorable residences or directed to the common privileged.
- 2. Smart Parking :** (a).Circulation observing - to analyses the normal rapidity of the automobiles which



transportation completed a highway by attractive the time spot at 2 dissimilar opinions [6][7].

(b). Flow or cramming control. – Underwood the movement or mobbing of vehicular circulation for well-organized way establishments in capitals: decrease trip times, reduce productions or save liveliness.

3. **Environmental monitoring:**(a).Anticipation or Regulator Energy Device System. : It is molded by dozens[8] of expedient devices organized in the neighborhoods of the atomic control plant or accomplishment the neighboring cities. Device knobs are connected in street illuminations or leaves or take inspiration from the interior battery which, at the similar time is invigorated using an unimportant astronomical panel philanthropic immeasurable generation to the system.

(b). Alternative radiation stratagem system. : If an energy outflow happens in a home where there is not a beforehand connected contamination device system, a spare nature can be complete in objective a couple of hours. Refuge corps just need to spread the device knobs on the pulverized at positive seats.

4. **Medical or health:** Wireless devices are used in medicinal or health area for measurement of blood flow, ECG(electrocardiogram) , breathing rate, blood pressure or oxygen extent ,pulse ox meter.

III. RELATED WORKS

Procedure is a varied awareness to extend the stability historical, which is crucial for many applications. The presentation of the proposed procedure is likened by existing similar and heterogeneous protocols. Simulation results show that the planned protocol delivers a longer constancy period, more energy efficiency and higher average throughput than the existing protocols[9].

Data collection protocol called EDAL, which stands for Energy-efficient Delay-aware Lifetime-balancing statistics collection. The procedure enterprise of EDAL influences one result after OVR to protest that the challenging research is integrally NP-hard. For that reason, proposed both a centralized heuristic to reduce its computational overhead and a dispersed experiential to make the procedure scalable for large-scale system operations. We also develop EDAL to be closely combined with compressive detecting, an developing technique that potentials considerable reduction in total traffic cost for collecting device analyses under movable delay limits. Finally, we methodically evaluate EDAL to associate its presentation to related procedures in both reproductions and a hardware tested[10].

A new composed safety WZ-lcp procedure which can attain our supplies. Principal, now every ability we store two into which can be recycled as the keys for the authentication, and also can be altered with the time. Additional, we do time harmonization to inform keys. Finally the future scheme achieves balanced and security without costing power-wasting and data collision[11].

WSN and Internet Protocol (IP) interoperability that allows distant controlling and handling through Internet. Finally, this investigation generates a web-based request which will be practical to a wireless Admission Point (AP) for informal WSN remote supervisory. Furthermore, it might provide accommodations WSN from several vendors by software only solution[12].

Engage in actual data gathering. As a result, both the projected preparation and procedures are significant to get hold of low energy ingesting as well as increase the lifetime of sensors confidential the grid. The energy consumption perfect is also obtainable. This study is established by simulating the WSNUAV system employing our proposed model[13].

IV. ADVANTAGES IN WSN

1. **Energy saving:** Mobile agent removes data fusion as well as processing from sensor node to agent; data are ready-made when agent is actually relocating [4]. This may lessen data targeted visitors from the network, help save network bandwidth, lessen end-to-end hold off as well as enhance support responsiveness. Thus mobile agent could possibly lessen energy consumption effectively, as well as increase network lifetime.

2. **Simplify network protocol:** WSN is actually a type of application-oriented network, which in turn demands the unique desire connected with various individual needs to be understood by simply grid protocols, from request layer to system level as well as data link layer. System protocols are situated throughout reduce tiers connected with nodes software program, so intricate protocols are difficult to development and gaze after, and they are an easy task to create network breakdowns. Mobile agent could possibly know users desire as well as encapsulate network protocols in the reduce layer. While user's desire is actually modified, solely the actual agent needs to be modified as well as network protocols stay the identical [6].

3. **Flexibility and autonomy:** This mobile agent may be reprogrammed; new agent may be injected into the network in any time as well as redistribute duties; furthermore, a single sensor node could possibly function a number of agents

simultaneously. And then network mobility as well as versatility are much better. Moreover, mobile agent could possibly comprehend natural environment modify separately as well as create reply rapidly, as well as maintain the system with perfect condition.

V. ROUTING PROTOCOL IN WSN

Routing protocols in WSN are divided into flat, hierarchical and location based protocol according to the structure of the network. In flat routing protocol all the sensor nodes in the network have same functionality. The aim of this protocol is not to organize the network or maintain the traffic, but to transmit information through hopping and finding the best route to reach the destination. This type of routing is used mainly in flat structures which contain a huge number of sensor nodes. Every node has a separate entry in the routing table. All the nodes in the network are equal and behave in same way in task of information gathering and sensing data. As global IDS cannot be assigned hence this is a data centric approach in which every node is considered as a potential receiver. In this protocol a node sends query in a particular region and waits for a response from that region. SPIN (sensor protocol for information and negotiation) is an example of flat routing protocols. Some other flat routing protocols are Directed Diffusion, Report Routing, Smallest Cost Advancing procedure, Incline Based routing, Information Driven Sensor Query and Constrained Anisotropic Diffusion Routing. Hierarchical routing protocol is used in hierarchical structures like internet. In these protocols different clusters are formed and then a cluster head is chosen depending on the energy of the nodes. This protocol is efficient in terms of scalability as it reduces the number of entries in the routing table and load on nodes. Hierarchical Routing has two layers. In the first layer cluster head is selected and in the second layer routing is done. Hierarchical Routing reduces the energy consumption in a cluster and reduces the transmitted message by data aggregation.

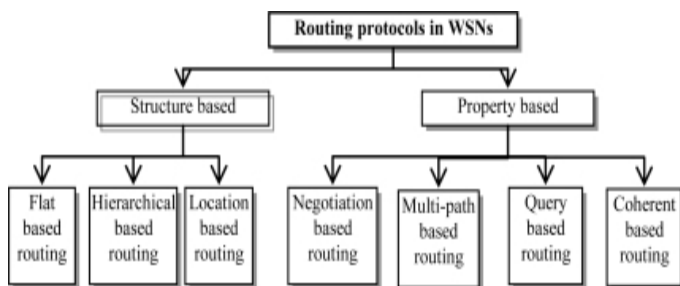


Fig No 2 Routing Protocol in WSN[5]

and fusion to the base station. LEACH (low energy adaptive clustering hierarchy) is a form of hierarchical routing protocol. In location based routing the nodes are identified by their

location and the distance between the neighboring nodes can be determined by the incoming signal strength. Location of a node can also be determined by equipping them with a small GPS. Some location base protocols also have nodes working in sleep and active modes. In these protocols we can easily find the optimum path using the coordinates already known, but location based routing is expensive. Geographic adaptive fidelity (GAF), GEAR (geographic and energy aware routing) are examples of location based routing[14].

1. DSR routing protocol: (a) Dynamic Source Routing (DSR) is a reactive protocol using the source route tactic [9]. Within Dynamic Source Routing (DSR), revealed in Figure.3, the particular protocol is founded on the link state algorithm in which source initiates route breakthrough upon requirement basis.

(b) The sender ascertains the particular route by source in order to destination spot also it contains the address to deal with of second time beginner's nodes towards the route history from the packet. DSR seemed to be designed for variable hop networks for tiny Diameters. It is a beaconless protocol in which no HELLO messages are exchanged among nodes in order to notify these with their nearby neighbor's from the network [2].

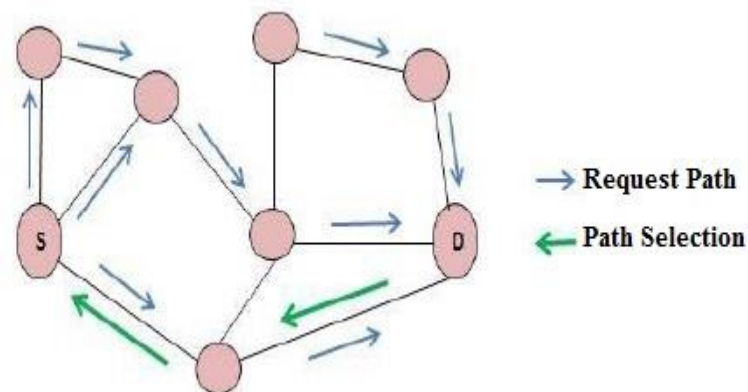


Fig no: 3 DSR protocol[9]

2. AODV routing protocol: (a) AODV [13] is simply an improvement of DSDV. However, AODV is a reactive routing protocol as opposed to proactive. This reduces the quantity of broadcasts by simply developing avenues dependent on requirement, and that is incorrect for DSDV. Whenever any source node would like to mail some sort of packet to a destination spot, which broadcasts some sort of route request (RREQ) packet. Your neighboring nodes in turn broadcast the particular packet to their neighborhood neighbor's and also the process proceeds until the packet extends to the particular destination spot.

(b)The technique of forwarding the particular route ask, second time beginners nodes history the particular deal with from the neighbor from where the initial duplicate from the

broadcast packet is acquired. This history is located of their route furniture, which often aids for starting some sort of reverse course. In the event that added copies from the similar RREQ are after acquired, most of these packets are thrown away. Your reply is sent using the reverse course. Pertaining to route maintenance, whenever a source node actions, it could reinitiate some sort of route breakthrough process. In the event that any second time beginners node actions within a unique route, the particular neighbor from the drifted node can easily discover the communication inability and communicates a web link inability notice in order to its upstream neighbor. This process proceeds until the inability notice extends to the original source node. In queue with the acquired details, the original source may choose to re-initiate the particular route breakthrough cycle.

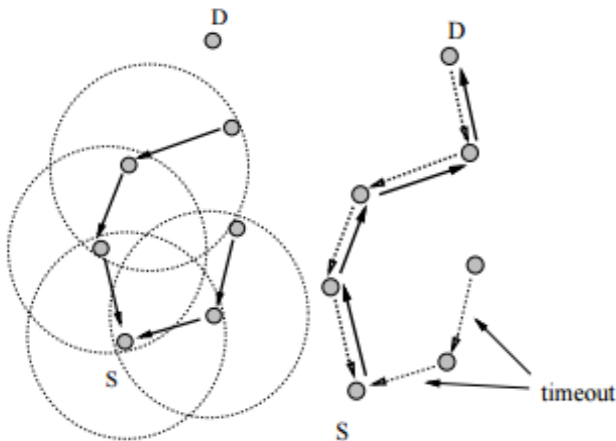


Figure no: 4 AODV Protocol(Reverse and forward path)[13]

VI. LEACH VS PEGASIS PROTOCOLS

A. LEACH: (Low-Energy Adaptive Clustering Hierarchy) It assumes a dense device network of alike, energy unnatural knobs which shall report their data to a sink node. In this protocol, each CH collect data from its members and after aggregating these data sends them directly to the sink. Since the sink is often far away, CHs chomp additional energy. Thus, LEACH exploits randomized revolution of CHs to evenly distribute the energy load among the sensors.

As Figure 5 shows, the LEACH protocol is organized in some rounds and once an optimal percentage P of CHs is recognized, LEACH procedure proceeds in $(1/p)$ bands. In every round, a set of CHs of predictable size nP (n the total number of nodes) of knobs is chosen from the set G of knobs that have not yet served as a CH. . Each round consists of setup phase and steady state phase. LEACH is self-organizing protocol, with occurrence of each round new CH is elected and broadcast TDMA schedule as per schedule each node send its sensed value to CH and sleeps rest of the time. Upon reception of values from all the nodes in network CH performs aggregation over them and sends aggregated data to Base Station [15].

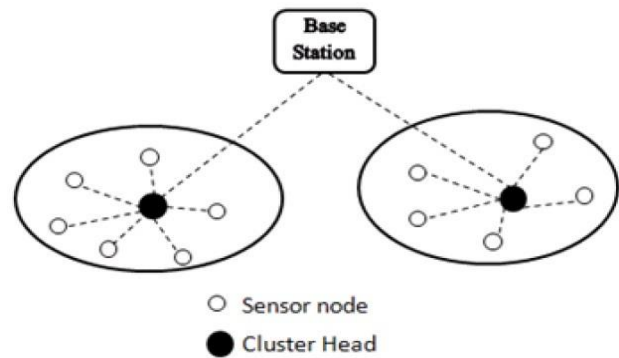


Figure no: 5 Leach Protocol[15]

B. Pegasus Protocol : Edified by the idea of the traditional ant colony algorithm, we propose a routing protocol-PEG-ant using an improved ant colony algorithm to construct the chain of PEGASIS. In the building process, to choose a node as the next one on the chain, we make all of the current node's neighbors as candidates and we make all of the current node's neighbors as candidates and take factors such as the remained energy of the candidate, the amount of consumed energy if we transmit unit data along the branch between the current node and the candidate, and also the quantity of pheromone on the branch as selection standard[16].

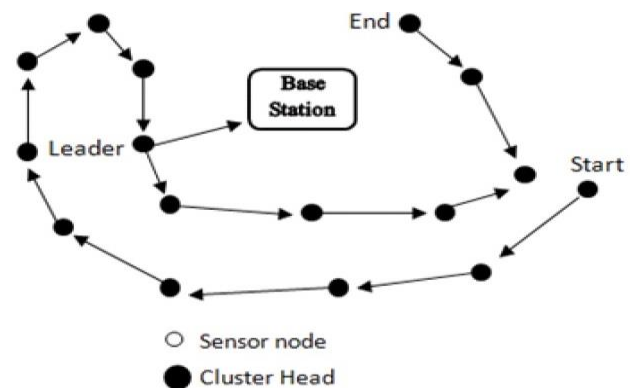


Figure no: 6 Pegasus Protocol[16]

VII. CONCLUSION

In current times, the technology of wireless sensor network has a great crash on technical fields like wireless message, information technology, electrical etc. Though the major problem faced in this knowledge is that the sensor nodes track out of energy very rapidly. Several direction-finding procedures have been planned to solve this problem mainly focus on the success of minimizing the energy utilization in the sensor system. In this paper we converse overview of the wireless sensor network, how differ from the tradition network, and challenges, structures, procedure stack of the sensor network. But wireless sensor networking has a bright future in the field of computer interacting since we can solve the monitoring problems at an advanced level in the future



with the help of such technology of networking.

VIII. REFERENCES

- [1] H. Idoudi, "Lightweight Balanced Power Saving MAC Protocol for Wireless Sensor Networks," 2014.
- [2] P. Huang, L. Xiao, S. Soltani, M. W. Mutka, and N. Xi, "The Evolution of MAC Protocols in Wireless Sensor Networks: A Survey," *IEEE Commun. Surv. Tutorials*, vol. 15, no. 1, pp. 101–120, 2013.
- [3] M. M. S. Manoj Kumar, Kapil Pandey, "Survey on Wireless Sensor Networks Using MAC Protocol," *9th Int. Conf. Ind. Inf. Syst. (ICIIS), 2014*, pp. 1 – 6, 2014.
- [4] R. W. Pazzi, D. Zhang, A. Boukerche, and L. Mokdad, "E-TRAIL: Energy-efficient trail-based data dissemination protocol for wireless sensor networks with mobile sinks," *IEEE Int. Conf. Commun.*, no. July 2011, 2011.
- [5] C. Intanagonwiwat, R. Govindan, D. Estrin, J. Heidemann, and F. Silva, "Directed diffusion for wireless sensor networking," *IEEE/ACM Trans. Netw.*, vol. 11, no. 1, pp. 2–16, 2003.
- [6] L. Wang and Y. Xiao, "A survey of energy-efficient scheduling mechanisms in sensor networks," *Mob. Networks Appl.*, vol. 11, no. 5, pp. 723–740, 2006.
- [7] Y. Gu, A. Lo, S. Member, and I. Niemegeers, "A Survey of Indoor Positioning Systems for Wireless Personal Networks," *Ieee Commun. Surv. Tutorials*, vol. 11, no. 1, pp. 13–32, 2009.
- [8] F. W. Zaki, R. Rizk, and F. Farouk, "Multi-level stable and energy-efficient clustering protocol in heterogeneous wireless sensor networks," *IET Wirel. Sens. Syst.*, vol. 4, no. October, pp. 159–169, 2014.
- [9] Y. Yao, Q. Cao, A. V Vasilakos, and S. Member, "Lifetime-Balancing Data Collection Protocol for Heterogeneous Wireless Sensor Networks," vol. 23, no. 3, pp. 1–14, 2014.
- [10] Y. Xu, Y. Jiang, C. Hu, H. Chen, L. He, and Y. Cao, "A Balanced Security Protocol of Wireless Sensor Network for Smart Home," *2014 12th Int. Conf. Signal Process. (ICSP 2014) Proc.*, pp. 2324–2327, 2014.
- [11] S. B. Wibowo, G. D. Putra, and B. S. Hantono, "Development of embedded gateway for Wireless Sensor Network and Internet Protocol interoperability," *Proc. - 2014 6th Int. Conf. Inf. Technol. Electr. Eng. Leveraging Res. Technol. Through Univ. Collab. ICITEE 2014*, pp. 5–8, 2015.
- [12] A. K. Paul and T. Sato, "Effective Data Gathering and Energy Efficient Communication Protocol in Wireless Sensor Network," *Wirel. Pers. Multimed. Commun. (WPMC), 2011 14th Int. Symp.*, vol. 3, pp. 1–5, 2011.
- [13] A. Chauhan and R. Bhargove, "A Framework for Energy Efficient Routing Protocol for Homogeneous Wireless Sensor Networks Using Sensing Range," pp. 438–443, 2014.
- [14] H. B. Patel, "E-LEACH: Improving the LEACH Protocol for Privacy Preservation in Secure Data Aggregation in Wireless Sensor Networks."
- [15] H. K. Kalita and A. Kar, "W s n s a," vol. 1, no. 1, pp. 1–10, 2009.
- [16] W. Guo, W. Zhang, and G. Lu, "PEGASIS protocol in wireless sensor network based on an improved ant colony algorithm," *Educ. Technol. Comput. Sci. (ETCS), 2010 Second Int. Work.*, vol. 3, pp. 64–67, 2010.

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