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Designing And Development Of Sensor Network Surveying Issues Using Computational Intelligence

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ABSTRACT:WSNs have attached much attention in recent years. The potential application of WSNs is boundless. They are heterogeneous networks of distributed autonomous gadgets, which might monitor physical or sense or environmental condition cooperatively. They have been utilized for storing, sharing and collecting sensed data. It combines various technologies like microelectronic,computational, modern sense communication and distribution processing technology. The models of CI are effectively utilized in latest years to find numerous issues like energy aware routing, data aggregation and fusion, optimal development, security, task scheduling, and localization. We surveyWSNs, mobile ad hoc network, fixed sensor networks, & cellular network. It provides optimal solution of uncertainties by the applications of adaptive critic design in power system. The aim of this survey will to define the state of art in utilizing CI models for sensor network design to detect present survey issues & recommend probable future survey directions.

Keywords: Computational intelligence (CI), data aggregation, security, wireless sensor network (WSNs), radio frequency identification (RFID), sensor nodes (SNs)

1. INTRODUCTION

Now a day, sensor technology development grows rapidly with capability not only for sensing and signal acquisition but also for computing and communicating to other device[1,2]. This sensor technology is known as WSN. The WSNs are distributed in nature whereas SNs operate independently without any centralized authority. The WSNs in network sense external data from nearby environment process the sense data locally and then send the data to base station for further processing through wireless communication[3-7]. The WSN is the main important method in 21[st]century.Normally, SNs have been clustered in clusters and every cluster has a node, which performs as a cluster head. Everynode forwards this sensor data to cluster head that is turn routes it to particular node named sink node. Wireless sensor technology refers to RFID and WSNs based sensors.Due to increase interest in the field of wireless sensor network s many applications has led to expansion of novel extent of wireless sensor gadgets based on RFID[8]. The main difference between RFID and WSN is that, RFID don't have any cooperative capabilities but WSN authorized different networks

topologies. The different topologies of WSN can vary from a simple star topology to an advanced multi hop wireless mesh topology. The WSN has to ability to monitor any building,site, highway, machine and many others area[9,10]. CI merges element s of leaving, adaption, evolution and fuzzy logic for creating intelligent machine. Besides the standards like evolutionary computing, neuro computing and fuzzy computing. It encompasses methods like artificial system, swarm intelligence and fusion of the two of them[11-14]. Some standards of CI have found practical approach in different fields such as biometric, robotics, products design, intelligent control and sensor networks. The range of this special is encouraged to the new researches and development in thefield[15,16].
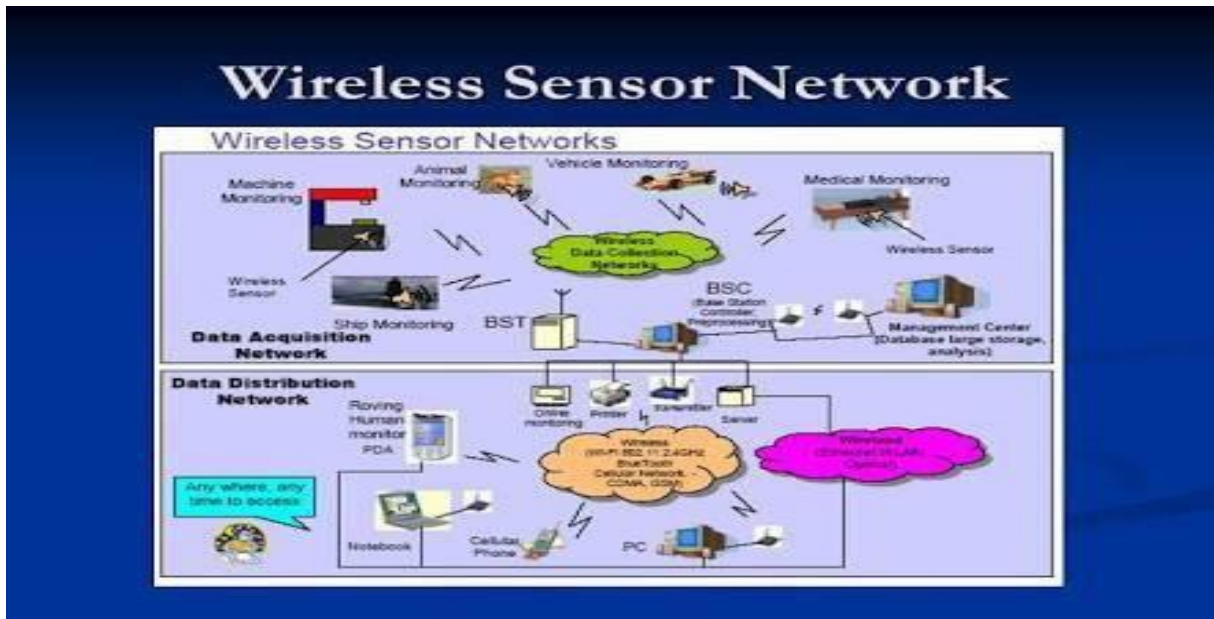

Figure.1. WSN Various Applications

Over view

CI in wireless sensor networks made the communication with broadcast very easy and compromised. WSNs are widely dispersed system nowadays but in traditional times its algorithms can't be useful as they have unique characteristics. Sensor nodes which can broadcast are classified as self-diagnosis, self- identification, reliability and timecoordination.

In future smart environments, WSNs are performing a main role in collecting, sensing&distributingdata about environmental phenomena. The sensing diverse applications signify novel standards for network operation, one that has diverse aims from many outdated wireless networks. This study examines this emerging field to categorize wireless micro-sensor networks as per diverse data delivery methods, communication functions, &network dynamics. In common,this node comprises of numerous sensor networks. This capability creates many issues to keep its synchronization. Energy efficiency is also a major problem in synchronization due insufficient batterycapacity.

1. Various Issues in the Area

There are so many problems, which influence the plan & presentation of WSN is as follow:

Deployment – means setting up operational sensor network in node deployment &real-world

environment will be main problem to be solved in WSNs. The SNs might be deployed by dropping it from plane. While sensor nodes have been deployed in real world, node death because of energy depletioncaused by a usual battery discharge will be normal issue that might led to wrong sensor readings.

There are two deployment models at present-

- Staticdeployment

- Dynamicdeployment

➢ Calibration – it will be procedure of regulating the readings of raw sensor attained from sensors into corrected values by comparing it with few typical values. The manual calibrations of sensors in sensor network will be time taking & critical task because of SNs failure &random noise that creates man
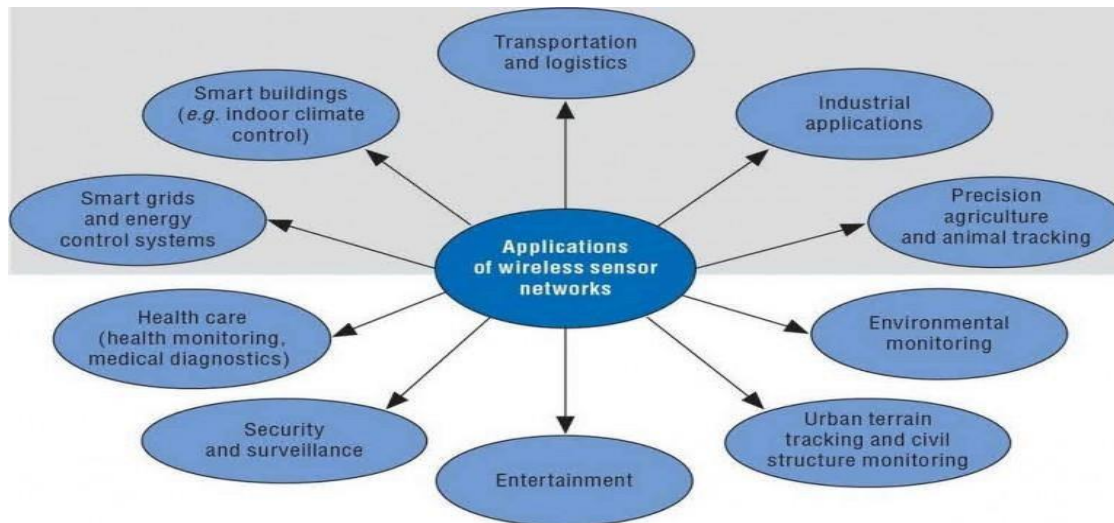

Figure 2. Applications of wireless sensor networks

➢ Network Layer Problems – As we know that, routing is significant for sending data from SNs to routing &base station in sensor networks. In the network layer to enhance energy saving we require to offer a flexible platform for executing data management & routing.

➢ Transport Layer Problem– In this layer, End-End reliable communication will be offered. It might suffer because of many causes: The nodes placement is not external &predetermined obstacles might cause poor communication presentation among 2 nodes. If this kind of issue will be encountered then end-end communication will suffer. The next issue will be nodes failure because of battery depletion.

➢ Security - Many wireless sensors collects sensitive information and WSNs provide high security requirements with over controlled resources. The remote and unattended operations of SNs are enhancingtheir exposure to malicious attacks & intrusions. The safety needs in WSNs are contained for node authentication and dataconfidentiality.

➢ Synchronization – It is a method for successful communication between nodes on the network. It has an ability to determine the movement, location and speed. It will be required

for power management, transmission scheduling, data fusion & numerous applications.

2. Issue Wise Solutions Approaches

- Physical resource restraints: The significant restriction imposed on sensor network is limited battery power of SNs. The effective lifetime of SN is directly defined byitspowersupply. Therefore, sensor network lifetimewill be alsocalculated bypower supply.
- Theselections made at physical layer of SN influence energy consumption of whole gadget & plan of higher-level protocols. Therefore, energy consumption is significant plan problem of protocol. The restrictedmemory size &computational power will be next restriction, which influences the data, which might be stored in distinct sensor node.
- Design constraints: the main aim of WSN is to make inexpensive, smaller, & much effective gadgets. These restraints and necessities also influence the software design at numerous levels, for instance, the operating frameworks should have minor memory footprints& effective in their resource management tasks. Nevertheless, many advanced hardware typessimplifysmall design&effective operating frameworks. A sensor's hardware restraints also influence plan of numerous protocols & methods performed in aWSN.
- Expandability: Many applications are required; numerous SNs deployed should be to hundreds, thousands or more. The protocols must scalable adequate to respond and execute with many SNs.
- Fault-Tolerance:In hostile atmosphere, a sensor node might fail because of physical damage. If few nodes fail, the protocols, which have been working upon accommodate these variations in network.
- Security:Numerous WSNs gather sensitivedata. The unattended &remote execution of SNs enhances their experience to attacks & malicious intrusions. Moreover, wireless communications create it simple for adversary to eavesdrop on sensortransmissions

3. APPLICATIONS

- The sensor networks comprise numerous diverse kinds of sensors like visual, magnetic, thermal, seismic, radar, &infraredthat has been capable to display many conditions.
- The sensor networks might comprise numerous diverse kinds of sensors like seismic, magnetic, thermal, radar, visual, &infrared that capable to monitor numerous conditions.
- These networks have been utilized in environmental tracking, like flood detection, forest detection, weather prediction, animal tracking, forecasting &in commercial applications such as monitoring &seismic activities prediction.
- Health applications, like monitoring & tracking of doctors &patients utilize these networks.
- The WSN applications significantly incorporatemilitary,health, environmental, home, & other commercialareas.

4. COMMON FINDING

The WSNs are networks of distributed autonomous gadgets, which might monitor environmental or physical situations cooperatively. Common in every research is that WSNs is very convenient and easy for protection and security purpose. It can sense different nodes. It plays a vital role in development as by wireless networks it can sense and communicate between many objects and networks. It provides the time management as it work very fast and frequently and reduces energy consumption also such that it can compensate electricity utilization. It can sense many kinds of networks which are of so many types and works

separately. It is very useful at every field such as military, medical, scientifically, environmental, and everyday life of a human. It is playing a vital role in developing our nation.

5. SCOPE FOR THE WORK

In future, WSN is everywhere to create future methods, infrastructure, environment, as smart as probable. It is generated a much cost effective & powerful gadgets, which might be utilized in numerous applications like sensing based, underwater acoustic sensor schemes, cyber physical schemes, time critical application, privacy, & protection management. The WSN has potential to trigger further revolution in computing. Whereas its potential profits &applications might spread far and beyond, and might lastly break barriers among digital &physical worlds to permit computationdisappearances. For example, Mobile charging in wireless power sensors network has been a long time coming. In future not just Samsung, but all android smart phones manufacture will include wireless charging is standard. Wireless sensor network more and more crucial to everyday life availability faults become lesstolerable.

7. CONCLUSION

The recent researches shows their attention on innovation techniques using CI which makes use of WSNs by making use of its different functions. Current execution of computational intelligence in various heterogeneous networks is represented in this review manuscript. Various patterns and manyissues by wireless networks are briefly presented &CI methods utilized by examiners are explained briefly. In addition to this it serves as a guide for utilizing CI methods for WSNs.It grabs the importance of network security as the hackers introduce novel risks and protection vulnerabilities to balance normal operations ofnetworks.

WSNs are very vulnerable to diverse safety attacksas they are deployed typicallyin unattended environments. There have been models & approaches that have been utilized to design these networks for security. In addition there is a large scope for efficient data representation and advanced methods for data discount.Upcoming researches should concentrate on emerging as well as analytical method of multi sensor assessment issue whereas there is time varying bandwidth. Although a successful CI application in WSNs, the important concern is that methods are in growing stage and they might forever be in non-developing stage. But very few of them have developed out of simulated environment. Therefore, the aim of CI survey community for CI future in WSNs is to develop already currentexplanations andimprove them for well-performing. There are only very few publishedinitiatives in thisdirection.

8. REFERENCES

[1] R. Rajakumar, J. Amudhavel, P. Dhavachelvan, T. Vengattaraman, "GWO-LPWSN: Grey Wolf Optimization Algorithm for Node Localization Problem in Wireless Sensor Networks", Journal of Computer Networks and Communications, vol. 2017, Article ID 7348141, 10 pages, 2017. https://doi.org/10.1155/2017/7348141

[2] B. B. Bhanu, K. R. Rao, J. V. N. Ramesh and M. A. Hussain, "Agriculture field monitoring and analysis using wireless sensor networks for improving crop production," 2014 Eleventh International Conference on Wireless and Optical Communications Networks (WOCN), 2014, pp. 1-7, doi:

10.1109/WOCN.2014.6923043.

[3] Dhage, Manisha &Vemuru, Srikanth. (2018). Routing Design Issues in Heterogeneous Wireless Sensor Network. International Journal of Electrical and Computer Engineering. 81. 1028-1039. 10.11591/ijece.v8i2.pp1028-1039.

[4] D. K. Yadav, G. Karthik, S. Jayanthu and S. K. Das, "Design of Real-Time Slope Monitoring System Using Time-Domain Reflectometry With Wireless Sensor Network," in IEEE Sensors Letters, vol. 3, no. 2, pp. 1-4, Feb. 2019, Art no. 2500304, doi: 10.1109/LSENS.2019.2892435.

[5] Chowdary, T. & Satyanarayana, K.. (2016). Data Gathering in Wireless Sensor and Actor Networks. Indian Journal of Science and Technology. 9. 10.17485/ijst/2016/v9i31/95660.

[6] R.Sushmitha, B.Naga Jagadeesh," Analysis of Wireless Sensor Application and Architecture", International Journal of Recent Technology and Engineering (IJRTE),Volume-7, Issue-6S5, April 2019

[7] Shanmukhi M., Amudahavel J., Vasanthi A., Naga Sathish G. (2019) A Comparison Review on Comb–Needle Model for Random Wireless Sensor Networks. In: Bapi R., Rao K., Prasad M. (eds) First International Conference on Artificial Intelligence and Cognitive Computing. Advances in Intelligent Systems and Computing, vol 815. Springer, Singapore. https://doi.org/10.1007/978-981-13-1580-0_42

[8] Praghash K., Karthikeyan T., Kumar K.S., Sekar R., Kumar R.R., Metha S.A. (2021) An Investigation on the Impact of Machine Learning in Wireless Sensor Networks and Its Application Specific Challenges. In: Kumar A., Mozar S. (eds) ICCCE 2020. Lecture Notes in Electrical Engineering, vol 698. Springer, Singapore. https://doi.org/10.1007/978-981-15-7961-5_39

[9] Deepak Ganesan et.al, "Networking Issues in Wireless Sensor Networks", Elsevier Science, 9thDecember 2005

[10] AndriesP. Engelbrecht. Computational Intelligence: An Introduction. Wiley Publishing, 2nd edition, 2007

[11] Raghavendra V. Kulkarni, Senior Member, IEEE, Anna Förster, Member, IEEE and Ganesh Kumar Venayagamoorthy, Senior Member, IEEE :Computational Intelligence in Wireless Sensor Networks: A Survey. Publishing,2011

[12] Osmani, A., Dehghan, M., Pourakbar, H., Emdadi, P.: Fuzzy-based movement-assisted sensor deployment method in wireless sensor networks. In: IEEE Proceeding of the International Conference on Computational Intelligence, Communication System and Networks, India,(2009)

[13] Neha rang , Anuj Gupta, " Wireless Sensor Networks : A Overview", IJMCS,Vol.1,iss.2, 2013.

[14] Basma Solaiman, Alaa Sheta , "Computational Intelligence for Wireless Sensor Networks: Applications and ClusteringAlgorithms",2013

[15] Rao, M. & K, Raghava. (2018). A Secure data packet transmission in wireless sensor network using HECC algorithm and Finding malicious packet. International Journal of Engineering & Technology. 7. 16. 10.14419/ijet.v7i2.7.10247.

[16] K. Swetha, V. Lahari, G. V. V. Manikrisha and K. B. Sai, "A Survey on Placement of Sensor Nodes in Deployment of Wireless Sensor Networks," 2019 International Conference on Intelligent Sustainable Systems (ICISS), 2019, pp. 132-139, doi: 10.1109/ISS1.2019.8907968.