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AN APPLICATION-SPECIFIC NEW PROTOCOL ARCHITECTURE FOR WIRELESS MICROSENSOR NETWORKS: A SURVEY

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Abstract-*Networking along quite of low cost small detector nodes permits users to accurately monitor a foreign surroundings by showing intelligence combining the information from the individual nodes .They networks need sturdy wireless communication protocols that square measure energy economical a nd supply low latency.*

In this servey paper, we discover and analyze low -energy adaptive clustering hierarchy (LEACH), a protocol architecture for micro sensor networks that combines the ideas of energy -efficient cluster-based routing and media access beside application-specific information aggregation to attain sensible performance in terms of system period of time, latency, and application-perceived quality. LEACH includes a replacement, distributed cluster formation technique that enables self-organization of huge numbers of nodes, algorithms for adapting clusters and rotating cluster head positions to equally distribute the energy load among all the nodes, and techniques to modify distributed signal process to avoid wasting communication resources.

Our results show that LEACH will improve system period of time by AN order of magnitude compared with all-purpose multi hop approaches.

Keywords— *wireless micro sensor network, routing techniques, routing protocol, cluster based routing, leach protocol.*

INTRODUCTION

Advancement in sensor technology, low-power electronics, and low-power radio frequency (RF) design have enabled the development of small, relatively inexpensive and low -power sensors, called microsensors that can be connected via a wireless network.

These wireless microsensor networks represent a replacement paradigm for extracting information from the setting and change the reliable watching of a range of environments for applications that embrace police investigation, machine failure diagnosis, and chemical/biological detection.

An important challenge within the style of those networks is that 2 key resources—communication information measure and energy—are considerably a lot of restricted than during a bound network setting.

These constraints require innovative design techniques to use the available bandwidth and energy efficiently.

A. Easy Deployment: device networks might contain tons of or thousands of nodes, and that they might have to be deployed in remote or dangerous environments, permitting users to extract data in ways in which wouldn't are doable otherwise.

This requires that nodes be ready to communicate with one another even within the absence of a long time network infrastructure and predefined node location.

B. System Lifetime: These networks ought to operate for as long as doable. It may be inconvenient or not possible to recharge node batteries. Therefore, all aspects of the node, from the hardware to the protocols, should be designed to be very energy economical.

C. Latency: information from device networks area unit generally time sensitive, thus it's necessary to receive the information during a timely manner.

D. Quality: The notion of "quality" during a micro sensor network is incredibly totally different than in ancient wireless information networks.

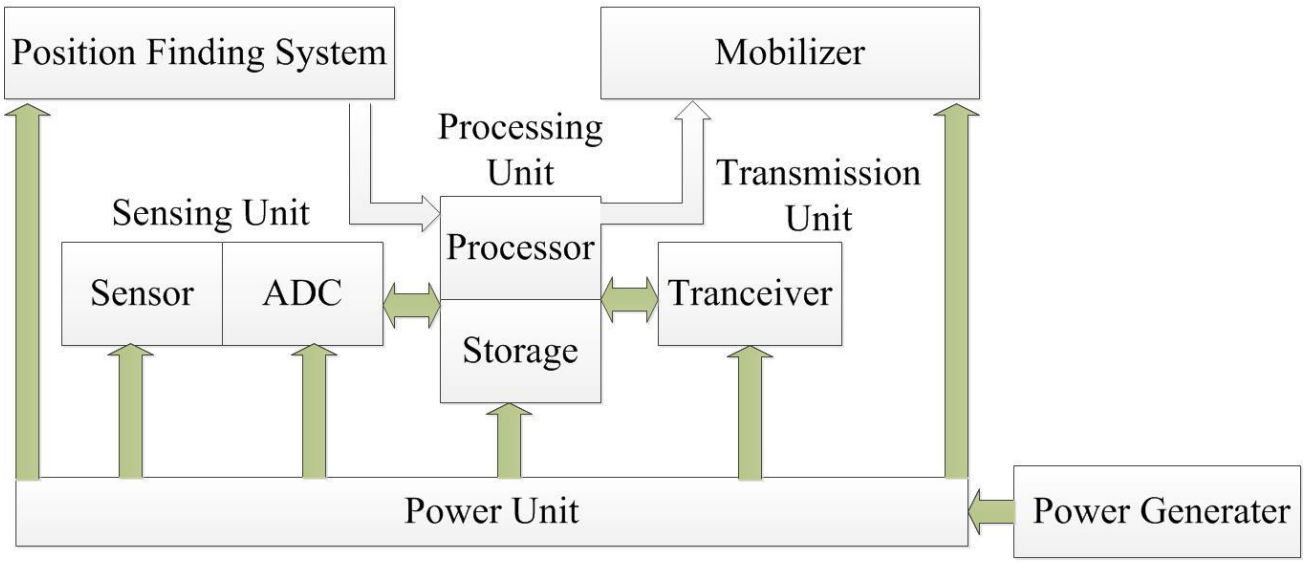

Fig: 1 Component of a Sensor Node

ROUTING

Routing is that the method of choosing a path for traffic during a network or between or across multiple networks. Broadly, routing is performed in many varieties of networks, as well as circuit-switched networks, like the general public switched phone network (PSTN), and laptop networks, like the web.

ROUTING PROTOCOL IN WSN

A routing protocol specifies but routers communicate with each other, distributing data that permits them to pick out routes between any 2 nodes on a electronic network.

ROUTING CHALLENGES AND DESIGN ISSUES IN WSN

These networks have many restrictions, e.g., restricted energy provide, restricted computing power, and restricted information measure of the wireless links connecting sensing element nodes.

• **Node Readying:** Node deployment in WSNs is application dependent and affects the performance of the routing protocol. The deployment can be either deterministic or randomized.

• **Energy Consumption While Not Losing Accuracy**: sensing element nodes will burn up their restricted provider of energy playacting computations and transmittal data during a wireless surroundings. As such, energy preserving types of communication and computation ar essential. Sensor node lifespan shows a robust dependence on the battery lifespan [1].

• **Information News Model:** information sensing and news in WSNs relies on the appliance and also the time criticality of the information news. Data news may be categorized as either time-driven (continuous), event-driven, query-driven, and hybrid [2].

• **Node/Link Heterogeneity:** In several studies, all sensing element nodes were assumed to be homogenized, i.e., having equal capability in terms of computation, communication, and power. However, looking on the applying a device node will have totally different role or capability.

• **Fault Tolerance:** Some sensing element nodes might fail or be blocked thanks to lack of power, physical damage, or environmental interference.

• **Scalability:** the amount of device nodes deployed within the sensing space could also be within the order of lots of or thousands, or more.

• **Network Dynamics:** Most of the network architectures assume that sensing element nodes are stationary. However, quality of each BS's or sensing element nodes is typically necessary in several applications [3].

• **Transmission Media:** during a multi-hop sensing element network, communicating nodes are linked by a wireless medium. The traditional problems associated with a wireless channel (e.g., fading, high error rate) may also affect the operation of the sensor network.

• **Connectivity:** High node density in sensing element networks precludes them from being fully isolated from one another. Therefore, sensing element nodes are expected to be extremely connected.

• **Coverage:** In WSNs, every device node obtains a particular read of the surroundings. A given sensor's view of the environment is limited both in range and in accuracy

• **Information Aggregation:** Since sensing element nodes might generate vital redundant information, similar packets from multiple nodes can be aggregated so that the number of transmissions is reduced.

• **Quality of Service:** In some applications, information ought to be delivered inside a definite amount of your time from the instant it's perceived, otherwise the information is going to be useless.

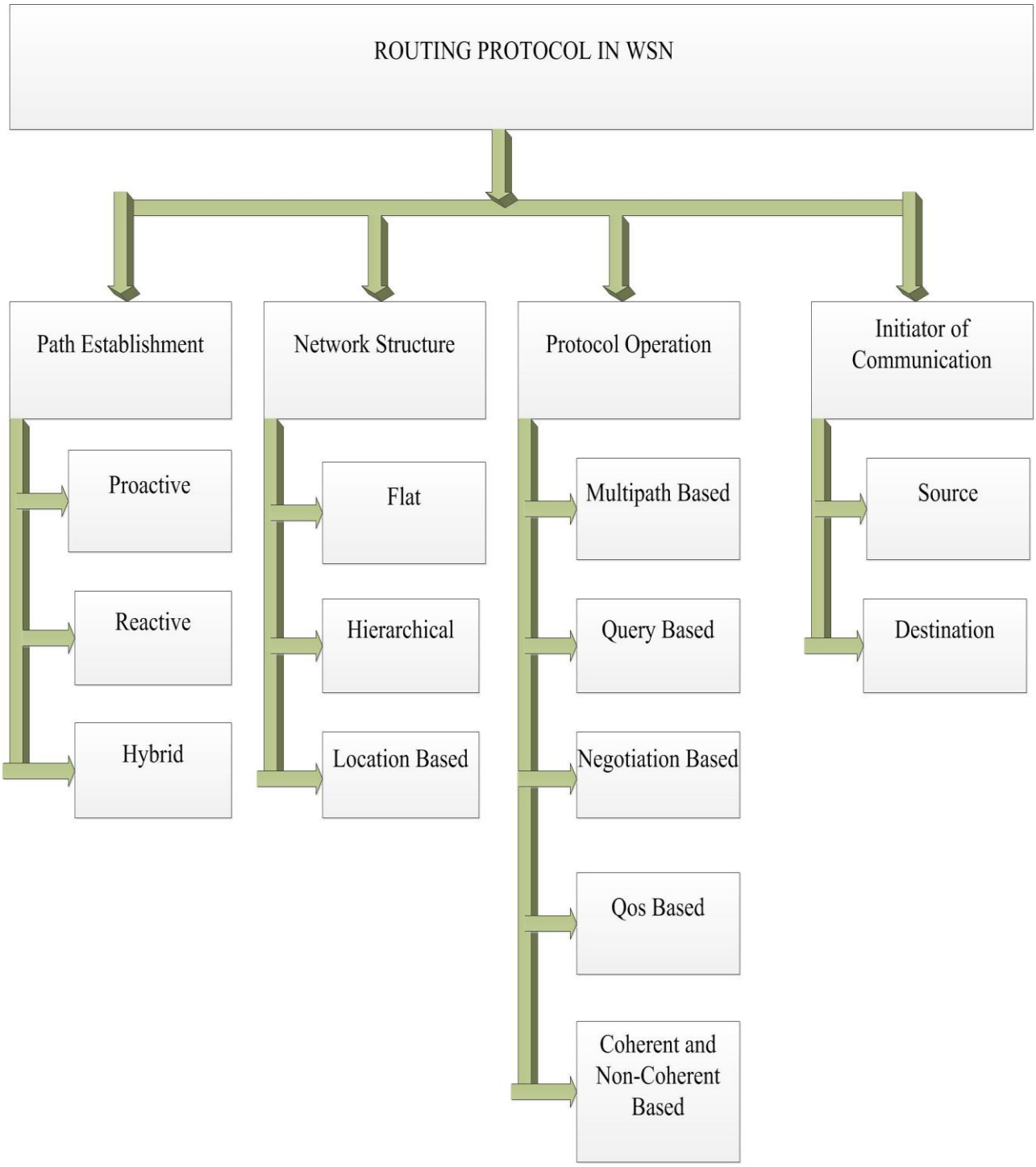

Fig: 2 Classification of Routing Protocol

LEACH PROTOCOL

LEACH protocol: Heinzelman, et.al [1.]Introduced a stratified bunch rule for device networks, known as Low Energy adaptation bunch Hierarchy (LEACH).LEACH may be a cluster-based protocol, which incorporates distributed cluster formation. LEACH randomly selects a few sensor nodes as cluster heads (CHs) and rotates this role to evenly distribute the energy load among the sensor in the network.

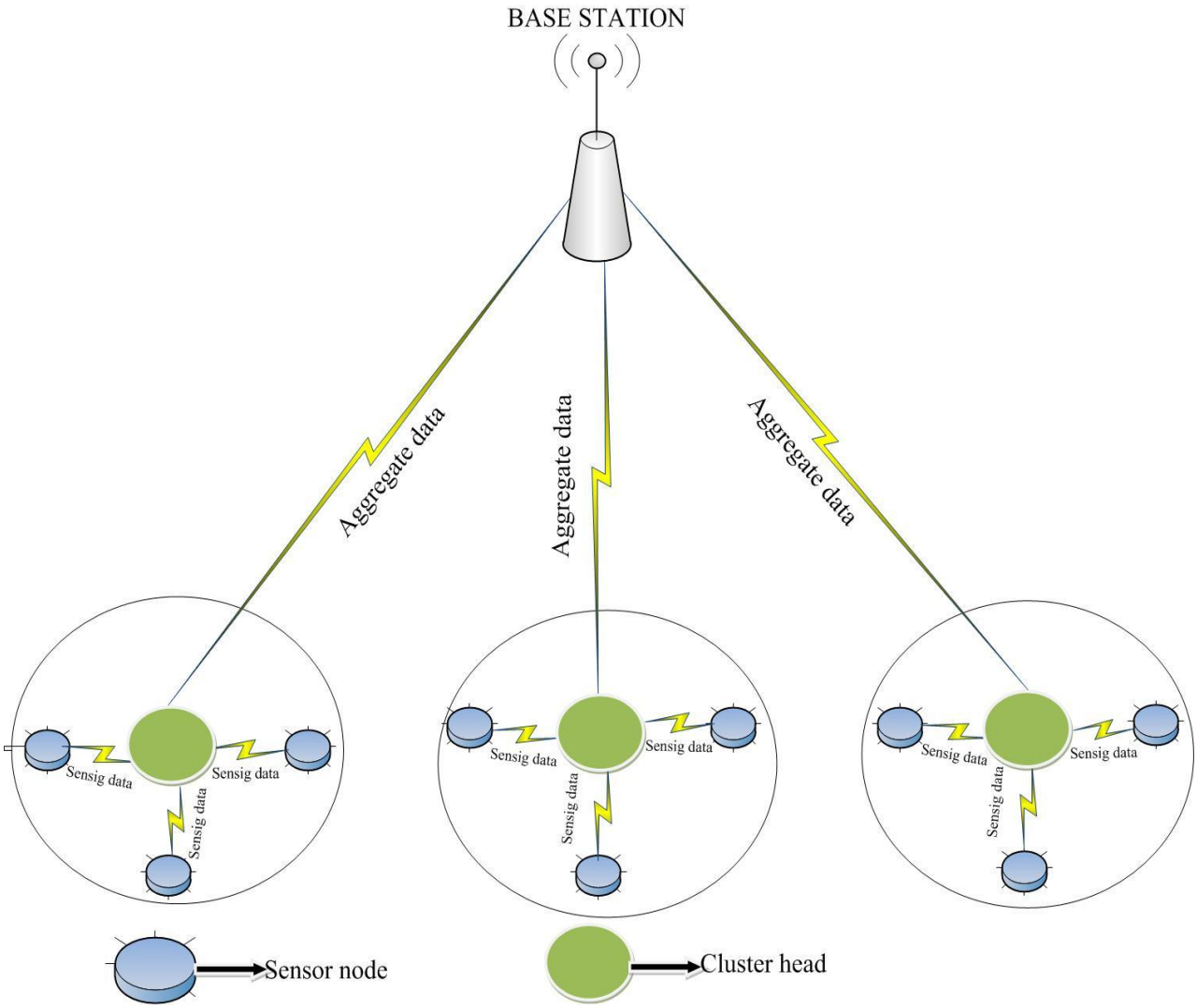

Fig: 3 Architecture of Leach Protocol

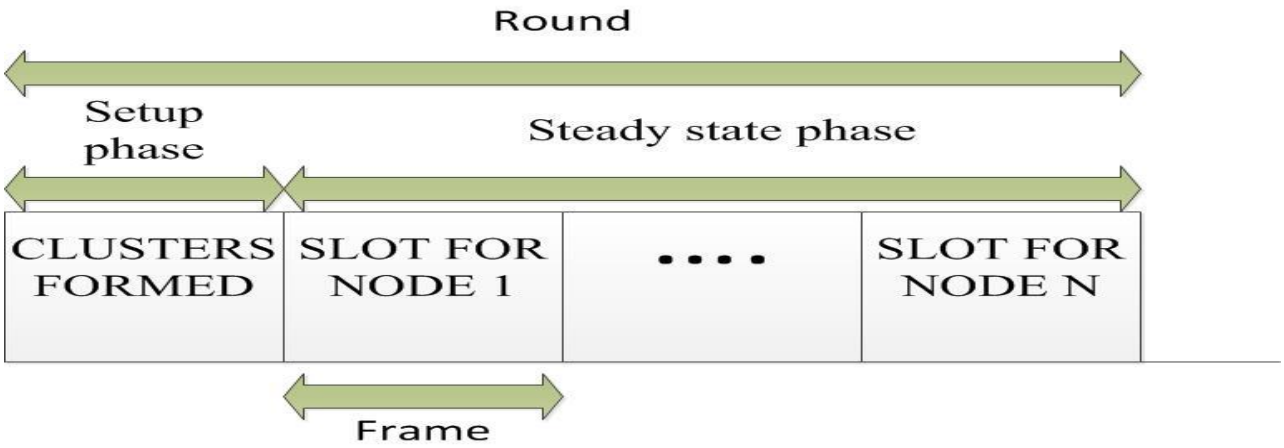

Fig: 4 Steady State Phase

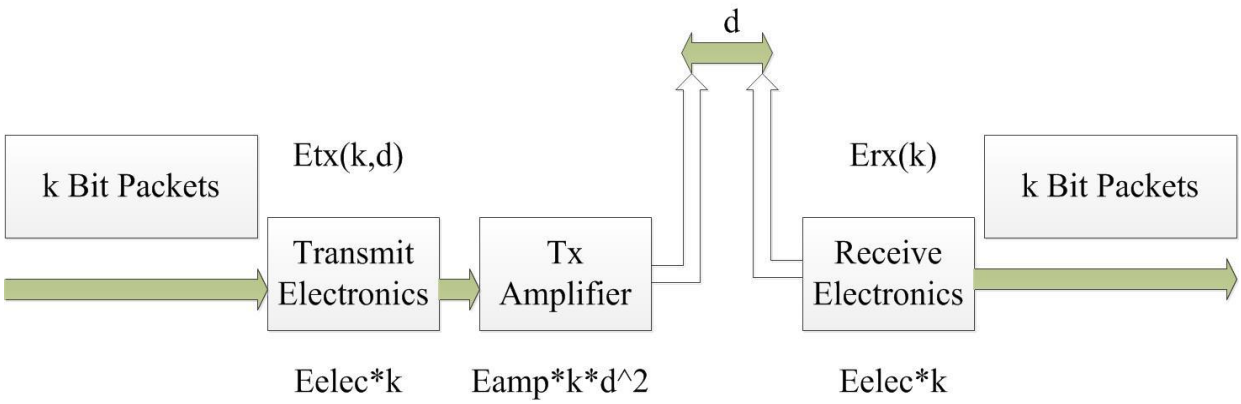

Fig: 5 Energy Dissipation Model

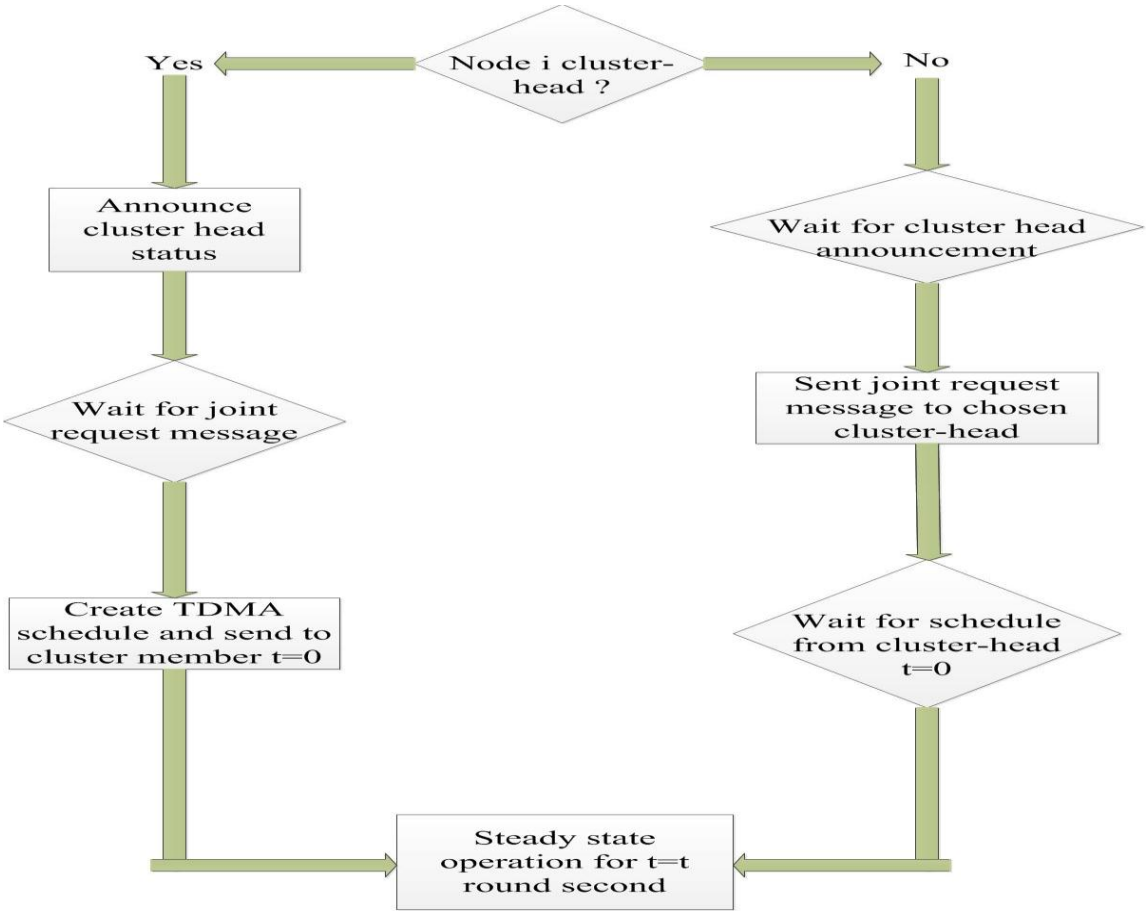

Fig: 6 Cluster Formation of Leach

TYPES OF LEACH

LEACH is an efficient protocol for wireless sensor networks. A lot of research work has been done to improve LEACH Protocol which have been discussed in brief as follows [4]

1. LEACH-C Protocol
2. LEACH with deterministic cluster-head selection
3. Power economical Communication Protocol for information Gathering on Mobile detector Network
4. TL-LEACH Protocol
5. EECS Protocol
6. LEACH-M Protocol

7. Energy-LEACH Protocol
8. MELEACH Protocol
9. EEPSC
10. MELEACH-L Protocol
11. LEACH-ME Protocol
12. EWC Protocol
13. EECED Protocol
14. EE-RRT Protocol
15. V-LEACH Protocol
16. NECHS Protocol
17. T-LEACH Protocol
18. DSMS Routing Protocol
19. EBC Protocol
20. W-LEACH Protocol
21. N-LEACH Protocol
22. LEACH-B Protocol
23. LEACH-P Protocol
24. Associate adaptive Cluster based mostly Routing theme for Mobile Wireless detector Networks
25. MR-LEACH Protocol
26. HABRP
27. LEACH-MF Protocol
28. I-LEACH Protocol
29. Associate energy economical hybrid MAV protocol for WSN containing mobile nodes
30. EEEPSC Protocol
31. Far-Zone LEACH Protocol
32. A modified LEACH protocol using Chaos-PSO
33. Zone Division Multi Hop Hierarchical Clustering for Load balance
34. ECHSSDA Protocol
35. LEACH-SM Protocol
36. ER-LEACH Protocol
37. Cell-LEACH Protocol
38. Wise-LEACH Protocol
39. Improved Far-Zone LEACH Protocol algorithm
40. Energy efficient cluster based routing protocol
41. Approach for improvement in LEACH protocol for WSN
42. ICCA Protocol (Jian-Zhen et.al., 2012) [50] introduced a new protocol
43. Improved-LEACH
44. EL-LEACH Protocol
45. Multi-hop LEACH Protocol
46. FL-LEACH Protocol
47. Protocol
48. GCEDA Protocol

49. Q-LEACH Protocol
50. I LEACH Protocol
51. MODLEACH Protocol
52. EBRP Protocol
53. DAO-LEACH Protocol
54. LEACH Protocol
55. EP-LEACH Protocol
56. Ad-LEACH Protocol
57. TLHCLP
58. K-LEACH Protocol
59. An energy efficient optimization in LEACH architecture by using sleep wakeup based decentralized MAC protocol
60. EELP
61. Multi-Level LEACH Protocol\
62. LPEDAP

ADVANTAGES OF LEACH

• LEACH is a completely distributed approach.

• It does not require any global information of network.

• It is a powerful and simple routing protocol.

• It uses random rotation of cluster-Head, which provides each node to become a cluster head node in a round.

• It uses TDMA so that each node can participate in rounds simultaneously.

• Each sensor node communicates only with associated cluster head (CH). It provides localized co-ordination and control for cluster setup and operation.

• Only a cluster head node (CH) aggregates the data collected by the nodes to minimize the data redundancy.

DISADVANTAGES OF LEACH

• In LEACH Protocol only cluster head (CH) is responsible for sending data to base station (BS) directly. So, failure of CHs leads to lack of robustness.

• Single Hop Routing technique is used in LEACH Protocol, which needs high energy for data transmission from CH to BS directly in case of large network.

• Selection of CH in any round is random and does not consider energy level of node, which can lead to drainage of a particular node.

• Dynamic clustering technique is used in LEACH which results in extra overhead like selection of CHs and advertisement.

CONCLUSION

Routing technique is required to save energy while routing the data .LEACH could be a important protocol in wireless detector network. A lot of descendant protocols are derived from LEACH protocol. Each planned variation of the LEACH routing protocol is examined to assess the advance in energy potency and outturn. Research on performance enhancements to the LEACH protocol is in progress. Our analysis is additionally tatted on rising.
LEACH performance to reduce the amount of nodes stranded because the cluster heads die and on increasing network life and outturn via load balancing.

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