Proposed Area and Topic of Research

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Field of Research: Networking – Wireless Sensor Networks

Proposed title of the work:

Energy Based Clustering and Routing Process Using Efficient Optimization Algorithm

Research problem:

Fault Tolerance

If any sensor node miscarries while passing the data in a network, the network should be adopted with its connectivity based on interruption. The Well Effective Routing is applied for retransmission of data.

High bandwidth

The sensor network is collected and communicated with multimedia information. Their interaction is not the main aspect when handling and passing a multimedia content. High bandwidth is essential for a transmission.

Energy

Sensor nodes require high energy for data processing, data gathering, and data communication. Because the nodes acquire less power and impossible to recharge.

Hardware and Software Issues

WSN contains more number of nodes, the cost is very low. The memory used in that network is FLASH memory, it is also inexpensive. Central Processing Unit (CPU) utilize more energy and compute capacities of a node. To preserve the flexibility of CPU, it contains more amount of microprocessor, micro controller, and FPGAs. Critical to monitoring the radio range inside the network, because it doesn't have any installed infrastructure. Algorithms and protocols are designed for making less complexity.

Medium Access Control (MAC) Layer issues

MAC layer creates energy utilization in idle listening, control packet overload, and collisions. It has a straight influence on the energy utilization.

Data collection and Transmission

It's the main thing in WSN. Data is gathered, processed and passed to the sink or BS. It consumes more energy when a number of transmissions occurs the signals get overlapped and interacts the transmission process.

Calibration

Comparing the standard sensor values with raw sensor values gathered from sensors. By the failure of nodes, it consumes time and difficult. It makes the manual calibration too expensive.

Synchronization

Synchronization among the sensors and nodes is should be important. It can improve the accuracy among the transmissions.

Scientific background:

Major demand in positioning WSN for energy dispersion of sensor nodes.Energy consumption is high when the CHs are sensed in long distance.To discover the shortest path amid the CH is to decrease the excessive use of energy and to raise the network lifetime. Transmission range, Energy utilization and network lifetime these are the major concerns while sending the data in WSN. For creating an effective transmission, GSO and ACO algorithms are developed. These algorithms take care of network lifetime, load balancing, energy consumption and energy balancing.

Novelty:

The existing methods have energy exploitation is more and low network lifetime. To overcome these problems Glowworm Swarm Optimization (GSO) clustering and Ant Colony Optimization (ACO) routing algorithms are implemented. The GSO is implemented for

discovering the CHs inside the group of clusters, to avoid the confusion in the sensor nodes. ACO is equipped to search the shortest path amid the CHs. By discovering the shortest path, the transmission will be fast, decreases energy utilization and it raises the lifetime. Finally shortest path, lifetime and energy consumption will be improved.

Objectives:

The following points are mainly considered to make an effective Wireless Sensor Network (WSN)

- To enhance energy efficiency and to improve the data distribution, an efficient techniques are utilized.

- To reduce the traffic inside the network in order to improve the energy efficiency and to improve the network lifetime.

- To resolves the link unreliability issues and resource constraints problems.

- To transmit the data efficiently and also to identify the metric gives the energy consumption of nodes in the event area for transmitting a data packet to sink.

- To discover the shortest path among the CH is to decrease the excessive use of energy and to rise the network lifetime.

- To improve the efficiency of data transmission, the number of ants required to search for routing is great, resulting in great energy consumption.

Methodology:

- Deployment of sensor
- GSO based clustering
- Extract CH
- Routing by ACO
- Performance analysis

Research time plan(Chart):

- Preliminary plan(start) – 3 weeks
- Research plan - 6 months
- Mid-study evaluation – 6 months
- Phd thesis – 18 months

Possible outcome:

The following parameters have evaluated the behavior of planned methodology.

- Shortest path amid the source and destination will be determined.

- CH miscarries can be tolerated by these algorithms.

- When failure of nodes occurs inside the network, the acknowledgment 'HELP' message is broadcasted.

- The multi objective fitness function is found by the using of efficient particle encoding scheme.

- Separation among the sensor nodes can be measured, rely on the received signal.

- Energy consumption was minimized rely on the election of CHs.

- Quick extinction of CH will be decreased.

- By applying load balancing clustering protocol, the lifetime will be increased.

- Energy compensating is gained by sending the packets to forward motion.

- The behavior of the sensor nodes will be analyzed, based on lifetime, energy utilization and energy balancing.