**A NEW ERROR RESISTANT PROTOCOL FOR GROUPING OF SENSOR NODES THROUGH GAUSSIAN NETWORK FOR WSN**

**ABSTRACT:**

In this paper, we present a new error resistant grouping to address the hierarchical topology-based WSNs' error-resistant problem. Combining clustering and labelling sensor nodes as Gaussian integers creates the hierarchical topology. In light of this, the network area is broken up into tiny square grids, with the cluster head forming each grid an integer with a Gaussian distribution. These groupings of heads are together, they form a Gaussian network utilizing node symmetry, as well as the Gaussian network's shortest distance, this study also discusses the benefits of multi-path routing outlines a new error-resistant clustering routing technique that is based on a wireless sensor network using a Gaussian network. The main objectives are to increase data throughput and error resistance dependability and energy conservation.

**Index Terms**—Clustering, fault-resistance, Gaussian network, multi-path routing, wireless sensor network

**EXISTING SYSTEM:**

The LEACH protocol is the first proposed clustering protocol. The main idea is to choose the CH in a clustered manner at each round and then have the nodes join the closest CH to form a dynamic cluster. This network topology is built on the chosen CHs, which is inefficient due to the lack of consideration for node residual energy.  Furthermore, prioritising CH selection results in the forming of complex clusters at each round, resulting in an increase in energy overhead due to cluster formation after each re-selection phase for CHs .A LEACH-centralized protocol (LEACH-C) is another variant of the protocol in which the optimum number of clusters K is calculated using a statistical model. In comparison to LEACH, Base Station BS is in charge of CH selection and cluster creation by the use of the simulated annealing optimization procedure, in which nodes with more than the average energy send their information to the BS at the end of each round.

**DISADVANTAGES:**

1. LEACH does not give any idea about the number of cluster heads in the network.

2. One of the biggest disadvantage of LEACH is that when due to any reason Cluster head dies, the cluster will become useless because the data gathered by the cluster nodes would never reach its destination i.e. Base Station.

3. Some cluster heads at the centre of the cluster and some cluster heads may be in the edge of the cluster; this phenomenon can cause an increase in energy consumption and have great impact on the performance of the entire network.

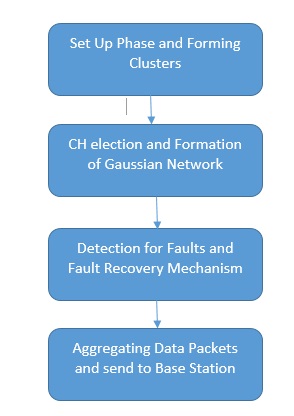
4. CH selection is the most difficult part of dynamic clustering.

5. Inaccurate determination of the optimal number of clusters when using current mathematical models because the distance to the CH has not been estimated correctly.

6. In LEACH-C nodes, energy overhead persists, and the round trip is time-consuming throughout the CH selection process. The main disadvantage in existing method is the unbalanced energy consumption

**PROPOSED METHOD:**

In this study, we are implementing a new grouping algorithm which is Error-Resistant Grouping through Gaussian Network for Wireless Sensor Network. Initially, the nodes are clustered through their distances from the Base Station (BS). The nodes which are closer to each other are clustered into a cluster. Later, an election will be held for electing the Cluster Head (CH). There exists a number of clusters and each contains a Cluster Head (CH). All these CHs are connected to each other forming a Gaussian Network. Error, any sudden changes that leads to errors in the network. For that, an Error Mechanism will be implemented for making the network error resistant. The Error Mechanism involves Error detection, Error diagnosis and a Fault recovery phases which makes the WSN Error resistant.



**Block diagram of proposed method**

**ADVANTAGES:**

1. Error mechanism has not been implemented in any of the existing protocols.
2. Errors detection and recovery is a whole new implementation.
3. Gaussian Network makes the system more reliable in routing.
4. Error mechanism makes the protocol even more robust.

**APPLICATIONS:**

1. Industrial control

2. Environmental monitoring,

3. Military surveillance,

4. Intelligent transportation systems and medical field.

5. Furthermore, it can function independently in harsh or high-risk places where human presence is not possible

6. Disaster relief operations.

7. Biodiversity mapping

8. Monitoring of temperature, pressure, and humidity

**Software & Hardware Requirements:**

**Software:** Matlab R2018a.

**Hardware:**

**Operating Systems:**

• Windows 10

• Windows 7 Service Pack 1

• Windows Server 2019

• Windows Server 2016

**Processors:**

Minimum: Any Intel or AMD x86-64 processor

Recommended: Any Intel or AMD x86-64 processor with four logical cores and AVX2 instruction set support

**Disk:**

Minimum: 2.9 GB of HDD space for MATLAB only, 5-8 GB for a typical installation

Recommended: An SSD is recommended a full installation of all Math Works products may take up to 29 GB of disk space

**RAM:**

Minimum: 4 GB

Recommended: 8