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A NEW APPROACH TO IMPROVE GRID BASED NETWORK USING ENERGY OPTIMAL ROUTING IN WIRELESS SENSOR NETWORK

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Abstract: ***A wireless sensor network (WSN) consists of a large number of sensor nodes which are deployed over an area to perform local computations based on information gathered from the surroundings. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on.***

I. Introduction:

A wireless sensor network (WSN) (sometimes called a wireless sensor and actor network (WSAN)) are spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity.

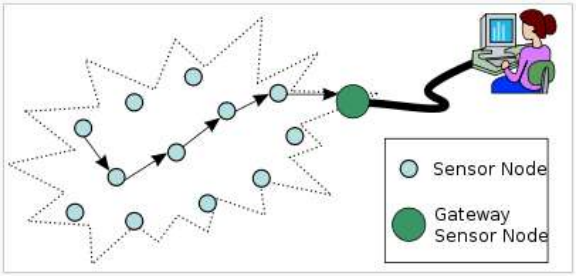


Fig. 1

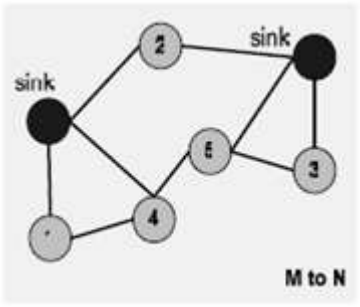
In the field of wireless networking there is another form of networking which is called as wireless sensor network.
A type of wireless networking (Fig.2) which is comprised on number of numerous sensors and they are interlinked or connected with each other for performing the same function collectively or cooperatively for the sake of checking and balancing the environmental factors. This type of networking is called as Wireless sensor networking.

II. Wireless Sensor Network Architectures

Wireless sensor network architectures can be classified into flat and hierarchical .

FLAT WSNs Architectures:-

Flat WSN architectures are composed of homogenous sensor nodes in terms of resources to collect data and send them to a more resourceful sink node . In this kind of architecture, many to one (M:1) or many-to-many (M:N) communication is possible as shown in Figure 1-1. In M:1 scenario, sensor nodes send data to a single sink node, for example, a tire pressure monitoring system, where the sensor nodes report the pressure of the respective tires to a central monitor.



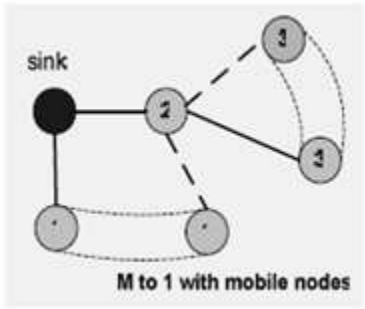
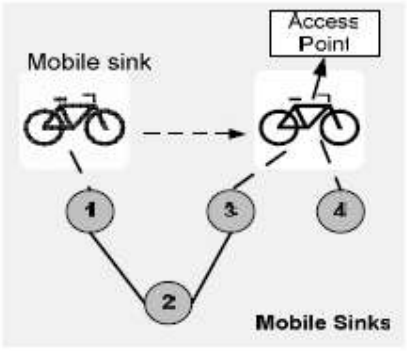


Fig 2: Flat WSN architectures

Hierarchical WSNs Architectures:-

Hierarchical network architectures may include a third tier in the form of an access point.

Mobile sinks collect the data from the sensor nodes, buffer that data, and then deliver them to a more powerful device for further processing.



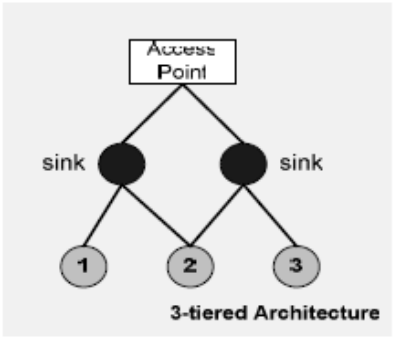


Fig 3:-Hierarchical wireless sensor network architectures

For example, a mobile sink (e.g., a police car) travels across the city, and collects data about traffic conditions and traffic irregularities that were recorded by fixed sensor points at different locations. discusses a three tiered architecture, in which sensor nodes collect the data and forward them to the sink node (forwarding nodes), which in turn forward the data to access point for further processing. The architecture has attained network performance at the cost of increasing the infrastructure cost. Container tracking and monitoring application is also based on three tier architecture, where sink node collects data from sensor nodes within a container, and forward data to a more powerful node which in turn forwards them to the end system.

III. SIMULATION OF EXISTING WORK

The author implements the flooding algorithm and simulate it with NS2. Figure9 shows the grid network having 25 nodes from 0 to 24 This network is a 5x5 matrix.

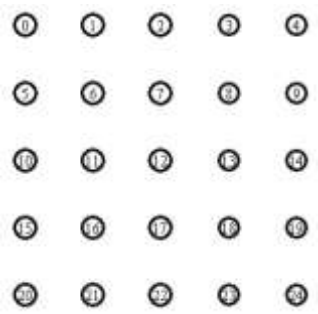


Fig 4. Starting of network

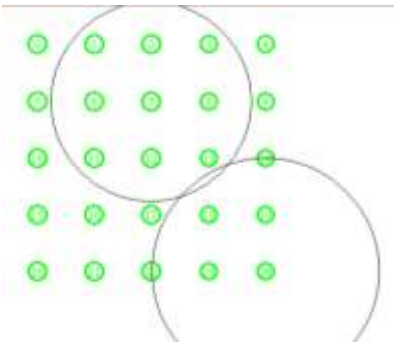


Fig 5. Broadcasting

The above Figure 5.2 shows that nodes are hoping i.e they are searching nodes for transmitting data. The circle in the Figure5.2 shows the coverage area of nodes. After finding the nodes, the nodes started transmitting data as shown in Figure5.3. After some time a node color is changed green to red this shows the flooding of data at that node and this node started dropping of packets. Flooding is happened because of overloading of data.

IV. PROPOSED ALGORITHM:-

The proposed algorithm we will use for improving the performance of grid network using energy optimal routing with square matrix in wireless sensor network. In this algorithm we follow the following step:-

Algorithm(Network,Source,Destination,N)

/* Network define a Grid Network of N*N Grids from Source to Destination*/

- c(0) to c(N) :- refers to the compromising nodes i.e. neighbor nodes

1) For node(i)=source to destination
2) If node(i)=center node

Then identify the load on center node

3) Find list of neighbours node from c(0) to c(N).
4) If load(center node)<c(i)

Then load(center node)++;

else
load(c(i))++;
5) Exit.

V. SIMULATION OF PROPOSED WORK

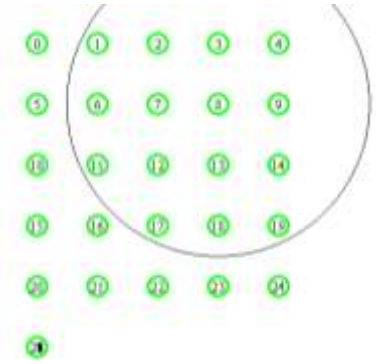


Fig. 6

Hoping of nodes In the above Figure, the author stimulates its proposed algorithm with the help of NS2. There are 30 nodes some are at fixed position and some are in moving position. The movement of nodes shown in Figure 8. In Figure 7 nodes started sending of data to nodes which are in coverage area of a node. After some time the color of nodes is changed to red because of the flooding of data, shown in Figure 8. Now the node which is turned red start searching of non-overloaded nodes for distributing its load and save energy. For this we use yellow color for those node which are searched by the overloaded nodes, shown in figure 9. After this overloaded node starts sending data to other nodes and color become red as shown in Figure 10. Load is distributed among nodes as shown in Figure11. This saves energy as well as reduce the load and decreases the packets lost and time delay in sending packets.

Fig.7: Sending of data

Fig.8 Moving nodes and flooding of data

Fig.9 Searching for the non-overload nodes

Fig 10:Start sending data

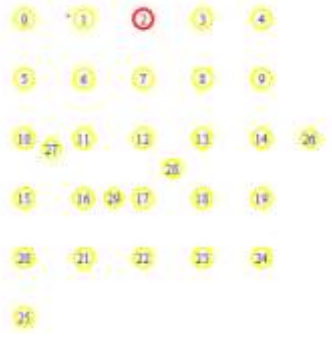


Fig.11: Start distributing the load

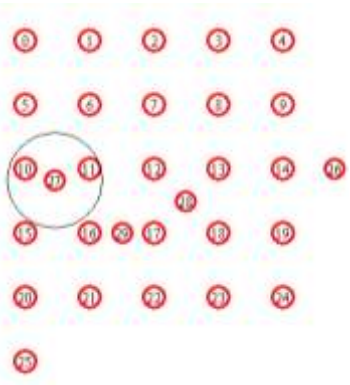


Fig.12 Load distributed

Experimental Results

In this section, the author gives the graphs of both existing and proposed algorithm.

The graphs are:

1. Total no. of packets sent for both existing and proposed algorithm.
2. Total no. of packets received for both existing and proposed algorithm.
3. Total no. of lost packets for both existing and proposed algorithm.
4. Time delay for both existing and proposed algorithm.

VI. CONCLUSION

Purpose of research is to design a energy efficient secure routing algorithm which provide a secure path for transmission. In this work there are number of possible approaches of routing. One of such approach is Horizontal-Vertical Mapping. In this, first move one step horizontally and the one step node vertically. Because of this approach the load on the centralized node increased. This problem is resolved by energy efficient secure routing algorithm.

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