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Novel Technique of Clustering Based Reac-In Routing with Probabilistic Approach

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Abstract The study shows that, to save energy and improve bandwidth efficient cluster-based topology, and scalability of the network, but difficult to balance the network after the running of the period of time, the remaining energy of all nodes. In addition, with increasing WSN sensor nodes, the path of the search space to increase exponentially therefore seek effective heuristic algorithm to solve the clustering and routing in WSN is very important. Probabilistic approach in Reac-In algorithm is a new kind of optimization algorithm, which draws on the principles of Iterative change the cluster size and cluster head by optimization method.(1) broad access to information at home and abroad, an overview of the wireless sensor networks and its characteristics, summed up the WSN routing features and design requirements, analysis of current major the strengths and weaknesses of the routing protocols, and pointed out that the current research hotspots and unresolved problems. (2) We were studied on how to dynamically determine the optimal number of clusters, to analyze the factors affecting the optimal number of clusters. Simulations results show that Reac-In improve the optimal number of clusters compared to the life cycle of the network to be extended. (3) considering the degree of energy balance remaining node residual energy and network energy consumption is proposed based on the right to non-linear decreasing Presented with energy inspired based the priority encoding PSO routing algorithm to reduce the probability of an invalid path and improve the reliability of the network routing to provide new ideas for WSN routing optimization.

Keywords:- WSN, Energy, Dead Nodes , Optimization.

I. INTRODUCTION

A typical wireless sensor network (WNS) consist of sensor nodes and data processing section. Various applications of sensor nodes are industrial, military transport, traffic monitoring, environmental monitoring, smart office and agricultural. The consumption of energy is the most critical problem in this automated environment.

WNSs has many energy-efficient relay strategies like for scalability, cluster relay based indicators are used. A group comprises a group with at least one group of customers (CH). Nodes in your group is managed by CHS and also sometimes sends the full facts in the remote database (sic). CHS nodes are served with high residual energy in the course of regular re-clustering.

WNS is a collection of wireless nodes that can be mobile or stationary which limits the energy capacity. For efficient delivery of packet to the destination, routing strategy is the necessary concern. In such network, less energy usage while routing strategy implementation and greater network lifetime needs to be ensured.

First WNS set was framed in the middle of the defence industry 70 by military and was used during the Vietnam War for the search of enemy in remote forest area. However have the limitations of network capacity because of the large size of sensor and damage including implementation energy. Since then, because of various application with different needs there has been evolvement on a broad type of system of WNS. For data efficient delivery in WNS, various energy-efficient routing protocols are designed.

Sensor is a small device, which detects the amount of physical parameters, or an event occurring, or measures the presence of an object; then, it converts the electrical signal value; finally, if important, it actuates a process using electrical actuators [5, 6].

Features of WNS:

- infra-low.
- a public address often.
- Many small sensor consists of nodes (small in size, cheap and low-power).
- distribution node with high-density in the work environment.
- Application-based.
- distinct communication models.
- limited resources (radio range of indicators, bandwidth, energy, memory).

Advantages of WNS:

- Network setup can be done without permanent framework.
- Ideal for the non-accessible places such as the sea, the mountains, across the rural areas or deep forest.
- Ad-hoc when the situation requires additional workstation, if it is flexible.
- Apply the cost cheaper.

Limitations of WNS:

- Hackers can get access point home, because all the information is safe.
- Low speed than a wired network.
- More complex to configure than a wired network.
- the impact of easy atmosphere.
- works in a communication range, consumes a lot of power.
- very low storage capacity of successor - a few hundred kilobytes.

For prolonged network lifetime, there are various energy efficient protocols:

- Hardwiring, short distance range, high energy costs and the need for efficiency.
- May help WSN disaster alarm system.
- Sometimes it is impossible to install the equipment in some areas due to lack of access to power.
- Monitor weather conditions, changes in environmental parameters such as temperature, humidity, etc.
- Heavy detected movement in the soil.

Each sensor node microcomputer, transceiver, and is equipped with a transducer and a power source. Transducer generates electrical signal based on the feeling the physical belongings and phenomena. Depending on the application of the design of WSN (Wireless Sensor Network) and factors such as environment, process design objectives, system and cost restrictions. One can easily monitor their values with reliability using WSN [8].

WNS architecture consist of three main elements:

- Nodes
- Gateway
- Software

Measurement of spatially distributed sensors to monitor node interface property. That the data cable is the gateway to work independently or as a host system where you can connect to analyze, can work together, and transmits to present their measurement data using software. Measurement router nodes, which are a special kind of node anyone can use to extend WSN range and reliability. [3].

Components of WNS architectures:

- A combination of points (cluster head)
- Base station (central server or sink)
- Network manager
- Security manger
- User interface

II. TYPES OF WNS ARCHITECTURE

Direct Communication Architecture

- Every sensor node sinks negotiations directly. Therefore, it is not scalable and appropriate for WNS architecture.

Multi-hop and Peer-to-Peer Architecture

- Sensor nodes have routing abilities.
- Since this architecture is not scalable, it was known that the sensor node are using to another node, and sync, general packet routing between; If so, WSN wide traffic increase node; Consequently, their energy consumption and waste will be completed; So they go out of WSN;

Multi-hop Based on Clustering Architecture

- Sensor nodes create a clustering frame;
- Select a cluster-head for any cluster; for directly communication of every cluster head is set; Therefore, collected data is send from cluster head of each cluster node;
- The problem is the cluster-head weak capacity or homogeneous WNS is the weakness of its architecture for all communication operations are cluster-head; Therefore, less energy will be utilized and destroyed as it was on a different node;
- The solution is to change the role of the cluster-head between the corresponding cluster nodes, the unstable; Or strong and ; access to heterogeneous cluster-head

Multi-hop, Clustering and Dynamic Cluster-Heads Architecture

- This architecture solves change the role of the cluster head node relative weakness among the cluster of previous architecture dynamically.

Comparison of WSNs And Wireless Ad-hoc Network

- **Network Size**: WSNs node can be transform few hundred nodes to thousands of nodes, but WANETs have restricted number of nodes that is few hundred number of nodes.
- N**etwork density**: Network density in WSNs are mostly high, with large amounts of nodes are close to each other, but much less in the case of a node WANET close to each other. Euro coin WANET nodes as most laptops, palmtops, cellular phones, etc.
- **Node failure Proneness**: WSNs nodes are placed in isolated areas like inaccessible areas or forest or disaster area. Nodes are very difficult to change once deployed in the region. Node can be a power drain, or they can be damaged. MANETS rechargeable battery in your node. These nodes are not under difficult environmental conditions that can harm.
- **Change the frequency of policy**: Due to environmental interface in WNS with the node moving higher, there is a policy change frequency node failure. Policy may change in a few milli seconds in WSNs. WANETs, connects to the network after the requesting node and then never leave less than a minute after that network.
- **Communication example job:** In order to communicate with other nodes, broadcasting method is used in WNSs, but WANETs uses peer-to-peer communication.
- **Using the source node:** WSN nodes cannot be the energy source replenished so uses WNSs rechargeable battery and are deployed in a single node environment, they cannot be it, or change. WSNs few kilobytes gigabytes that WANETs. Some processors are used in WSNs MHz, but GHz WANETS.
- **Node ID**: in WNSs node identification in the global identity not always possible. Very high node in WSNs and a likely node can often be very close network. Like unique identifier (IP node) in WANETs (Internet Protocol) address.

Clustering in WNSs:

Clustering cluster grouping and a cluster head node (CH) [49, 15] option has been added,

- CH directly to members of a cluster or you can contact the multi-hop;
- CH CHS or immersion in the way is the integrated data;

The main objective of network clustering focuses on these parameters; load balancing, fault tolerance, increased contact and reducing delay a satellite link, CHCs, minimum number of cluster and maximum network length.

Advantages of clustering are combination of data and reduce the volume of the transmitted data, energy efficiency and distributed, lack of communication and data overhead, stability of the network topology and delay reduction. Also have some drawbacks like message overhead, node status and appreciation of local information and Dynamic Clustering and CHS selection parameter.

Cluster based Routing Protocol

Review of cluster based routing protocols.

1. REACH-IN

The method for WSNs with new regional energy-aware clustering separate nodes, regional energy called clustering familiar with node (REAC-IN). Based on LEACH concept, REAC-IN among all nodes CH Rotate role enables each node to uniform energy consumption. REAC-IN, LEACH chooses CHS evenly based on the threshold until it chooses CHS based on the threshold include regional average energy of all indicators in every index of energy balance and each cluster to try to distribute CHS only a predetermined potential consider. REAC-IN a rotating mold epoch of every node to the problem of energy and tell node isolation. Has been improperly can cause them to become isolated from the distributed clustering algorithms node CHS. Such contact sync nodes alone consume an additional amount of energy. Moreover, in a separate node in the last round to find the average distance between the regional energy and sensor sync and sync or a CH Node is used that sent the data [21].

2. Low Energy Adaptive Clustering Hierarchy (LEACH)

LEACH: This series was one of the earliest clustering protocols in order to extend the life of the network. Protocol sensor node itself LEACH cluster. LEACH protocol consists of round. CH Acts of a cluster node (Cluster head) and the rest as a member node of the cluster nodes. CHs can straight communicate to BS and CHs use as an interface router to communicate with BS.CHs gathered all data from its member nodes and complete addition and then forward data to base station. In addition, responsibility CHS energy dissipates more rapidly than other nodes and if CHS remains forever, as in the case of stable clustering die more quickly. So, LEACH has adopted random rotation of CHS to save the node's battery. Less than LEACH network with this way of life and it will be to compress the data before sending energy [13].

Drawbacks of LEACH protocol:

Cluster Head are randomly selected, the optimal number and could not be sure the distribution of cluster head. Discover node with the rest of Energy High Energy node CH and is likely to be. So if the node CH with less energy. The node will die very soon, as selected. Lifetime of the network will be degraded. LEACH can be used for large networks.

3. DEEC

DEEC, a possibility of cluster-heads are chosen based on the ratio between the average energy of the residual energy and network of each node. According to rotate epoch of round number example, the initial and residual energy range is different for every node, DEEC adapt its energy to rotate each node era. With high initial and residual energy node opportunities will have to be cluster-head over the low-power node. DEEC network lifetime, especially in a period of stability, heterogeneous-aware clustering algorithms can be postponed. Copy DEEC now that the network lifetime and receive messages more effective than other classical clustering algorithms in the two-level, heterogeneous environment. In addition, DEEC also fit for multiple heterogeneous networks and September while working under a two-level heterogeneous network [50].

4. Energy Efficient Clustering Protocol (EECPL)

It is EECPL routing protocol indicator to increase the lifespan of the network. EECPL cluster send and elects the head of a cluster for every cluster. Cluster is responsible for creating for every node in the cluster and send cluster and send TDMA distribution takes data from the sensor nodes and then adding and then forward to the base station. EECPL a network cluster. Cluster chooses and send a cluster head and cluster. Each ring in a cluster has been formed, each node sends the data to a single neighbour and that only one neighbour. When the cluster is fully forwarding data from sensor nodes then transmit this to BS directly [17].

5. HEED

It is a large selection of clustering protocol CHS when energy and Communication considers a hybrid. Only the sensor is a high residual energy, which can be CHS. Each node in a careful map and a cluster directly CH you can contact. Algorithm is divided into three stages [15]:

1. Initiation phase: algorithm sets an initial percentage of first among all indicators CHS. Each sensor then a CH based on the current energy and more energy in the index be calculated its potential and is not allowed to fall below a certain threshold.

2. Repetition stage: a CH until all indicators that it goes through several used finds can transmit to the power of the minimum transmission. Any CH If does not listen, the index itself elects a CH and neighbours to inform change its status. Finally, each index CH Expected value doubles and went on to the next phase of this stage. CH 1 reaches possibility.

3. Completion phase: During this phase, each on its status indicators final decision and any minimum cost CH Packet or CH Declared yourself. Copy the life of the network that has shown better than LEACH in prolonging time. It is because the final CHS are chosen such that they are properly distributed across the network area and communications rate is minimized.

III. LITERATURE REVIEW

[6] This sensor network paper describes micro electro- mechanical system technology, the concept of wireless communications which made possible the transfer of digital electronics. In this paper, consciousness, potential sensor network applications, and the design of the sensor network is a reviewed and explored. Then, sensor communication architecture for network operations, and

algorithms are posted and ready for each layer in the protocol literature. Sensors are discussed realization of the open research issues for the network.

[8] Wireless Sensor comprehensive utilization of networks (WSNs) has been hindered by limited severely restricted energy of sensor nodes. This is the reason why there is an emphasis on the development of a large part of the energy efficient routing protocol in WSNs. In this paper, on the back of a new protocol called the equality cluster head Routing Protocol (ECHERP), energy conservation through balanced clustering is proposed. ECHERP performance evaluation simulation is carried out by the test, which compared against the protocol of the effects of Evince other well-known protocol as the network energy efficiency.

[13] Distributed wireless micro sensor systems will enable reliable monitoring of a different variety of environments for both civil and military applications. In this paper, we look at Will can have a significant effect on the network's overall energy, communications protocol. Copy that LEACH can achieve as much as a factor of traditional routing will lack energy compared with Protocol 8. To distribute its will, LEACH sensor evenly energy network, we can double the useful life system for simulated.

[15] Indicator control policy in a sensor network balances load on the node, and increased network scalability and lifespan. Sensor node clustering is an effective access control topology. Clustering approach distributed a novel for a long time ad hoc sensor networks. Our proposed approach does not make any assumptions about the basic or node capacity, the presence of more than the availability of various power levels in the sensor node. We have a protocol (Hybrid Energy-Efficient Distributed clustering), which randomly selects its close neighbours or cluster head node as a hybrid node and a secondary parameter of residual energy, the node's degree. Simulation results show that it is effective in supporting our proposed access network lifetime prolonging and scalable data integration.

[19] Recent progress of wireless sensor network is settled in a main part of one's daily life and has gained attention from both the research community and the actual user. Imposed a wireless sensor network is an important consideration in the energy things and we know it is designed for the many new protocol specific sensor network. Most rank, the paper So we challenge routing and design issues including wireless sensor due to the scalability analysis and overall functioning of LEACH protocol in the network series clustering based routing protocol and its simulation .In and it shows not only the performance of the index is a measure for the network calculation, but also while preparing the new protocol for wireless sensor networks, provides a guideline.

[26] The growing rate in the field of Wireless Sensor Networks (WSNs) in the previous year. The energy of the main issues of WSNs is the evolvement of efficient routing protocols. Clustering is an effective way to incline energy efficiency. Here, clusters are chosen on the basis of the level of residual energy node (CHS). Simulation consequences show that it is better than the current clustering protocols in heterogeneous WSNs. Our protocol stability, and distributed energy efficient clustering (DEEC) more effective messages, developed DEEC (DDEEC) and improve DEEC (EDEEC).

[30] Communication and enable the development of small and multifunctional sensor nodes in the selection of a wireless sensor network, low-power, the size of the recent technological advances in computing. Radio broadcasts and because a lot of consumption, wireless sensors have restricted battery power within a network sensor node of the important issues in the network to achieve energy. Therefore, important parameters in the algorithms designed to extend the life of the battery's power network node. In this paper, the concentrate is mainly characterized by the series of energy-efficient cluster survey-based routings available for Wireless Sensor Network.

[50] Clustering algorithm, the key is a type of technology used to decline energy utilization. This can incline the lifetime of scalability and network. Energy-efficient clustering protocol heterogeneous should be prepared for the quality of the wireless sensor network. DEEC, a possibility of cluster-heads are chosen based on the ratio between the average energy of the residual energy and network of each node. Epochs of cluster head node are different according to their initial and residual energy. With high initial and residual energy node opportunities will have to be cluster-head node with low energy. Finally, the simulation results that DEEC age around now and get the message more effective than the current main clustering protocols in heterogeneous environments.

[46] Wireless Sensor Network communication and computation, where a node can be self-powered and specific node type of intelligence and expertise Interconnect. Thus, the sensor is limited battery power, energy efficient routing necessary. In this report, we see new index routing scheme LEACH [1], which pounded see DIR [3] protocol and clustering model in LEACH protocol. Quadrant based directional routing protocol (Q-DIR) is that location-based ways by routing, limited flood connected. Sa DIR a bottom, where the destination node and the source node sited margins broadcast area. Leach is one of the clustering technology, the energy consumption can be used to distribute hampers and data gathering that series is the basic protocol in routing protocols. Observed by referring the report to verify the results of this protocol concluded will be expelled.

[47] A wireless sensor network (WSN) low-power sensor nodes are multi-hundreds of thousands, including operating in an automated environment, awareness, and communication capabilities. The sensor node is limited due to the restricted energy storage capacity and computing power. Other data using various routing protocols are routed to a node. A number of routing protocol for wireless sensor networks. In this review article, we describe the different routing protocols with the important concept.

IV. METHODOLOGY

A. PROBLEM FORMULATION

Problem faced in previous work are:

1. In previous work, is not identifying the isolated nodes by clustering method.
2. Secondly, the stability will not increase because network life time is very less.
3. Thirdly, cluster head is defined on the energy and distance which increase the number of dead nodes and last problem is predictions of cluster are not depending on the previous performance of nodes in cluster.

B. OBJECTIVES

1. To study the LEACH, HEED, DEFC protocol using based stations (Sink).
2. To propose and implement enhanced REACH-IN using probabilistic approach for the selection of cluster head.
3. To compare the existing protocol with enhanced REACH-IN based on following energy and time.

C. PROPOSED WORK

Main challenge is the energy reduction in wireless sensor. For the proposed work, steps are given below:

1. Deploy the wireless sensor network.
2. Generate a random cluster without using any parameter.
3. Apply reach-in for the creation of random cluster by distance and energy parameter.
4. Generate the cluster on the bases of energy and distance by using probabilistic method, which use optimize parameters.
5. Parameter is initialized and generate the cluster, if parameter is optimize then it goes to next step otherwise, it back to step 4.
6. Analyse dead nodes and energy.

V. RESULT AND DISCUSSION

In figure 1,2,3, and 4 show the different simulation step fig1 show simulation start the increase the packet reduce the energy of cluster head according to Reach-in prediction and in fig 4. Show the maximum dead node.

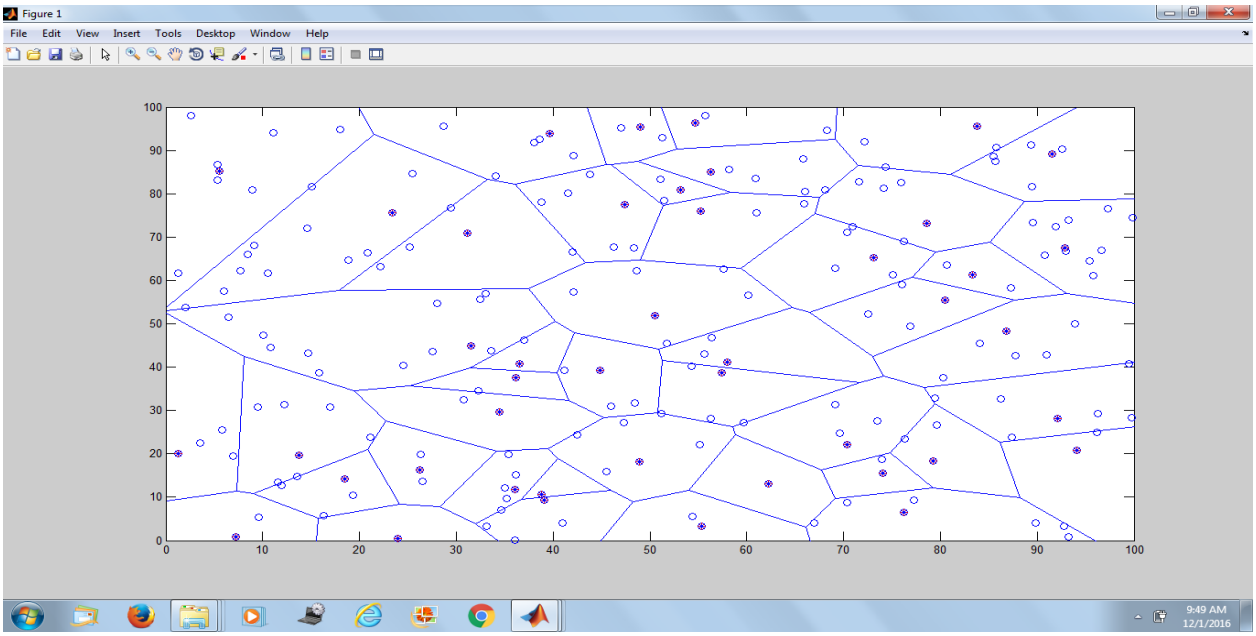

Fig 1

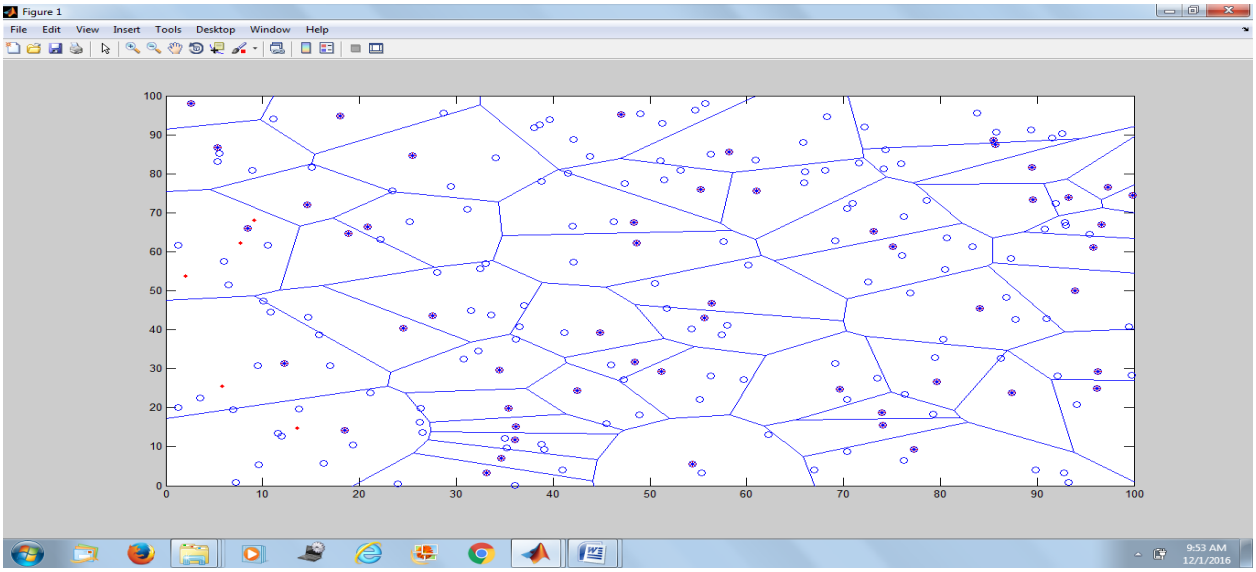

Fig2

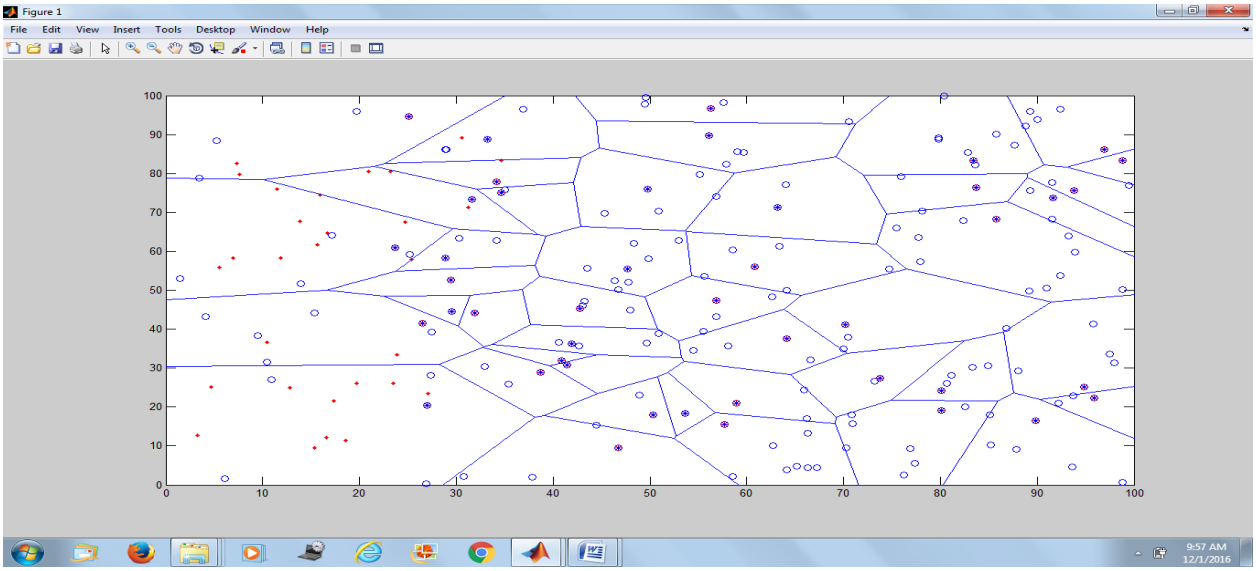

Fig3:

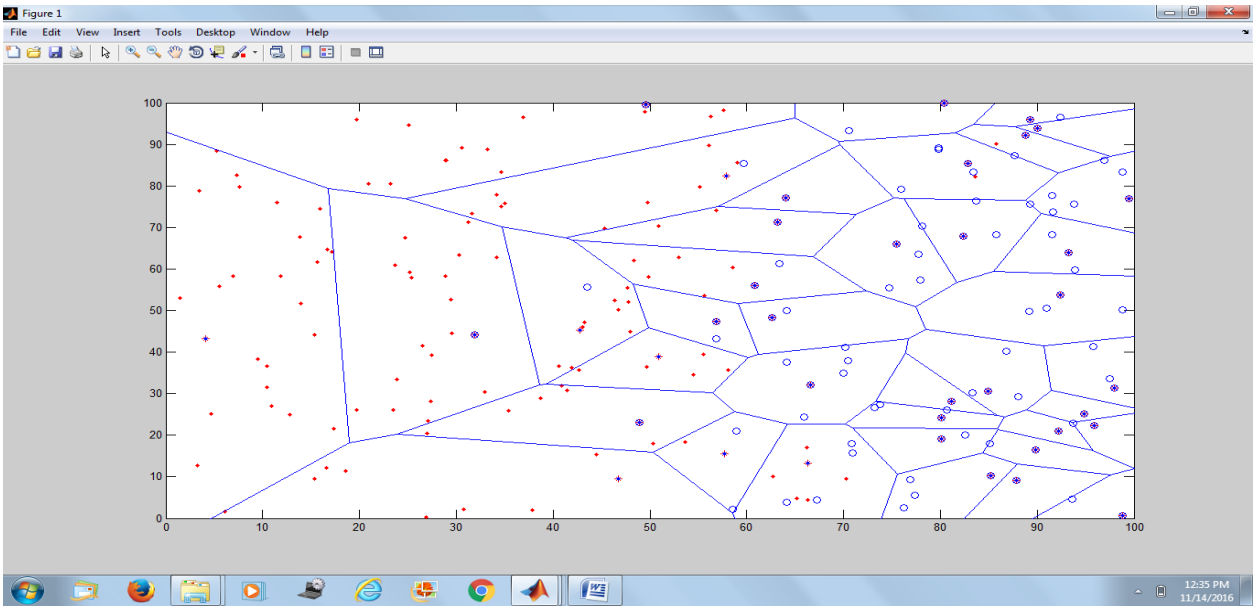

Fig4:

Simulation graphs of Reac-in by using probabilistic approach (proposed approach):

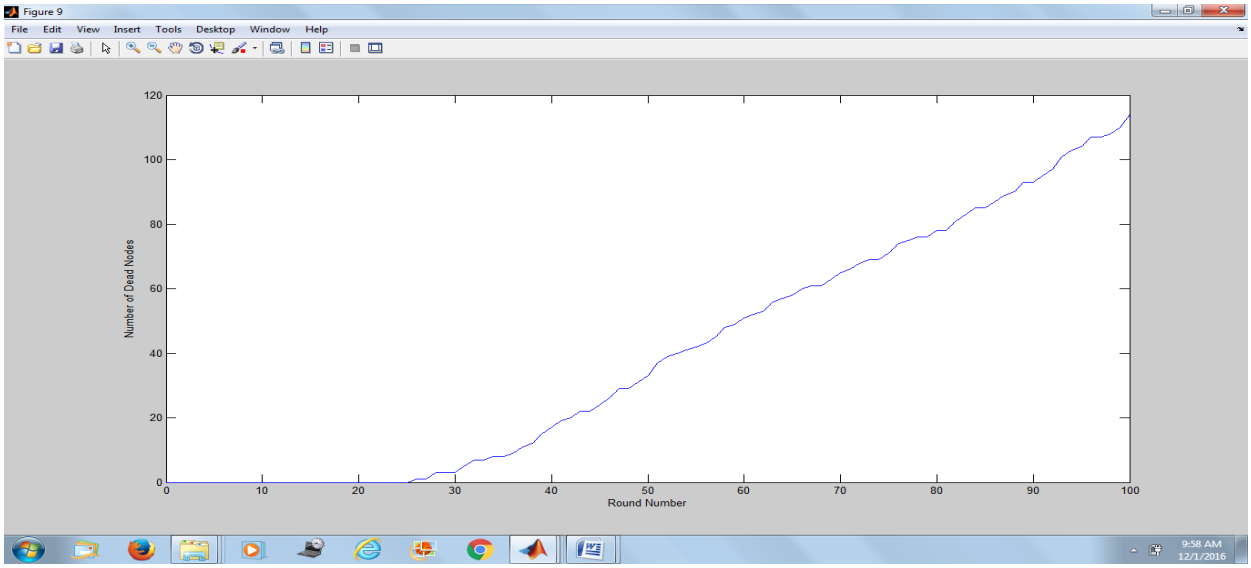

Fig -5 No. of dead nodes on 100 rounds

Comparison graphs: simulation graphs of reach-in with reach-in using probabilistic approach

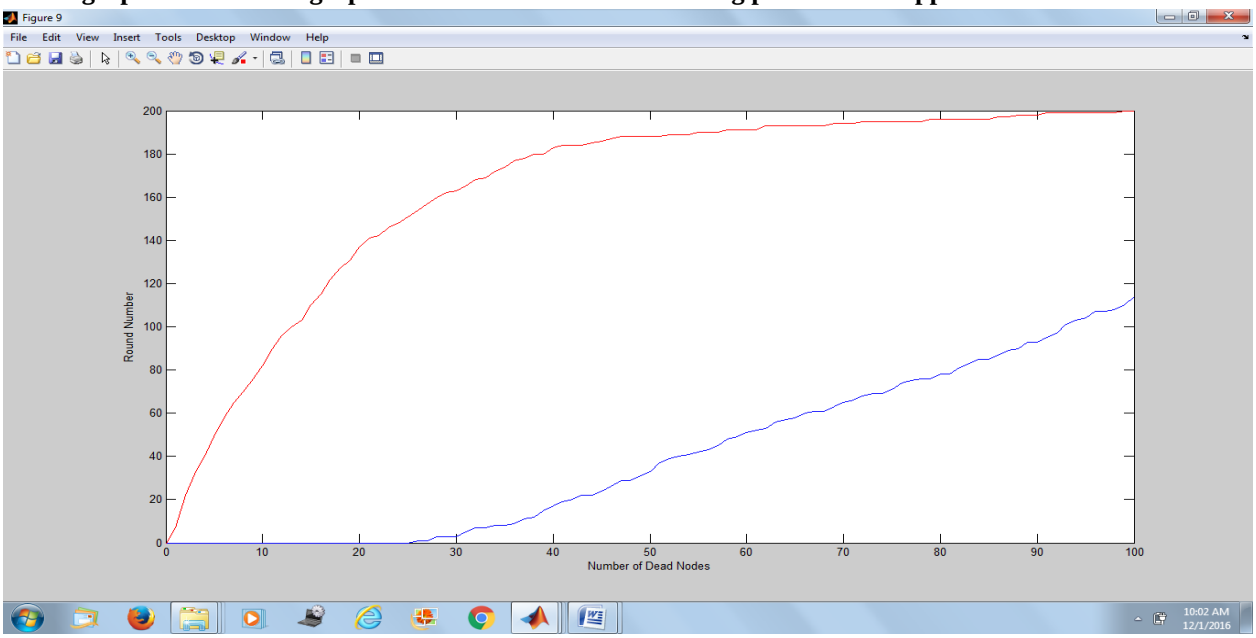

Fig-6 No. of Dead nodes on 100 rounds:

CONCLUSIONS

WSN has high research value and broad application prospect. In recent years has become a hot area of research which adds a great importance in the field of education and industry. But the critical issue in the WNS is that how to gather information and transmitted to the base station in the energy efficient way because of the limited energy of sensor nodes, storage, computing and communication capabilities. As sensor network architecture poses serious issues on the performance of the network. The unattended low-powered sensor nodes can decline their energy fast resulting in a short network lifetime. To solve this problem, routing protocols that are based on clustering can be used.

Many cluster routing protocols have been proposed for WNSs. REACH-IN and probabilistic shows significance difference between energy delay and number of dead nodes.

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