Survey on Various Algorithms of Ad Hoc Networking

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Abstract- *A wireless sensor network (WSN) consists of 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. 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. The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from a few to hundreds of dollars, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and communications bandwidth. The topology of the WSNs can vary from a simple star network to an advanced multi-hop wireless mesh network. To overcome the problems of WSN, we will design an Energy efficient algorithm for Wireless Sensor Networks using layered chain approach and Wireless Sensor Network should is not mobile and heterogeneous.*

I. INTRODUCTION

A wireless sensor network (WSN) consists of 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. 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.

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II. LITERATURE SURVEY

Research Paper on EASPRP(2012)

Wireless Sensor Networks (WSNs) consists of many sensors which are densely deployed to get the necessary information. They are constraint in many resources such as energy, memory, computational speed and communications bandwidth etc. Power and energy are the two major issues in WSNs. To use the available power judiciary, uniformly, multiple paths in load balancing fashion and multiple events simultaneously in any direction need to be addressed. Here, we are proposing a new approach which is based on prim's approach. EASPRP, new routing mechanism for wireless environment has been designed and proposed which is inspired from a shortest path using Prim's algorithm. The prim's approach more efficient then Dijkstra's as the complexity reduces to O((n+e) log n). In Wireless Sensor Networks domain like energy level status, damage of some node accidently/ intensely, loop free routing has been considered and bypass to such occurrence has been integrated in the proposed solution.

Shortest Path Algorithm

The Prim's algorithm is use to calculate the shortest pathbetween the source and the sink.
B. EASPRP Packet Format (4 Bytes)
EASPRP include energy-status single bit information along with hop counts to make routing decisions locally.The EASPRP has 4-byte packet format as shown below:

Prim (G: weighted connected graph with n vertices)
T:= 0 minimum- weight edge
for i = 1 to n-2
begin
e:= an edge of minimum weight incident to a
vertex in T and not forming a circuit in T
if added to T
T:= T with e addedend
return (T)

Research Paper on Cost-Efficient Routing

In this paper, an energy-efficient strategy is proposed for tracking a moving target in a mobile sensor network. The energy expenditure of the sensors in the network is assumed to be due to communication, sensing and movement. First, the target area is divided into a grid of sufficiently small rectangular cells in order to search for near optimal locations for the sensors in different time instants. The grid is then converted to a graph with properly weighted edges. A shortestpath algorithm is subsequently used to route information from target to destination by a subset of sensors.

III. PROBLEM STATEMENT

Consider a group of *n* mobile sensors *S*1, . . . ,*Sn*aimed to track a moving target. The sensors are distributed in a field where the target moves, and their mission is to preserve connectivity between target and destination (a fixed location). The problem of finding a proper route and selecting the corresponding sensor locations for an energy-efficient tracking is translated to the wellknown shortest path problem. This is carried out by partitioning the field into Voronoi polygons and investigating different scenarios in terms of network configuration. Simulations demonstrate the efficacy of the proposed tracking strategy.

Research Paper on EESPRP

Wireless Sensor Networks (WSNs) have become oneof the emerging trends of the modern communication systems. Routing plays a vital role in the design of a WSNs as normal IP based routing will not suffice. Design issues for a routing protocol involve various key parameters like energy awareness, security, QoS requirement etc. Energy awareness is one of the vital parameters, as the batteries used in sensor nodes cannot be recharged often. Many energy aware protocols were proposed in the literature. In this paper, we propose a new Energy Efficient Shortest Path (EESP) algorithm for WSNs, which manages uniform load distribution amongst the paths so as to improve the network performance as compared to the traditional shortest path routing strategy.

Energy Model:-

The radio model is used as the energy model for the proposed algorithm. The energy required for the transmission of a packet for distance d is given by,

$$ET (d) = Ect+ \varepsilon dn \quad (1)$$

Where Ect is the energy consumed by the circuitry at theTransmitter ε is the energy dissipated in the transmitter amplifier n is a design parameter which can be either 2 or 4. Also the power consumed in receiving is given by
ER (d)= Ecr (2)

where Ecr is the energy consumed by the circuitry at the receiver As intermediate nodes need to receive and forward the packets, the energy consumed by them will be the sum of the expressions (1) and (2).

Research Paper on EESR with Scalability in WSN

Energy efficiency, low latency, scalability are important requirements for wireless sensor networks. Specially, because sensor nodes are usually battery powered, and highly resource constrained, energyefficient routing sensor routing scheme with low latency, scalability in wireless sensor networks is very important. In this paper, we present a sensor routing scheme, EESR (Energy-Efficient Sensor Routing) that provides energy-efficient data delivery from sensors to the base station. The proposed scheme divides the area into sectors and locates a manager node to each sector. The manager node receives collected data from sensor devices in its corresponding sector and then transfersthe data to the base station through the shortest path of the 2-dimensional (x, y) coordinates. In this process, we use relative direction based routing in the 2- dimensional (x, y) coordinates in wireless sensor networks. Via analysis and simulation, we show that the proposed scheme achieve significant energy savings and outperform idealized transitional schemes (e.g., broadcasting, directed diffusion, clustering) under the investigated scenarios.

Energy Efficient Sensor Routing:-

When a sensor node firstly detects an event, it investigates the sector IDs of all neighbor nodes within 1-hop in the EESR table to select the next node that will deliver the event. If there is a manager node within 1-hop distance,that node is selected as the next node to deliver theevent. Otherwise, if nodes in the same sector exist within1-hop distance, one of them is randomly selected as the next node. Otherwise, a neighbor node with the smallest sector number is selected as the next node because it is closest to the base station. If more than one node have the same smallest sector number, nodes in the same quadrant are preferred to prevent the event from going far to the other region. After the event node selects one of the neighbors within 1- hop distance, it sends the event only to the selected sensor node

Research Paper on SPRP for Data Centric WSN

Wireless Sensor Networks (WSNs) are composed of many sensors which are densely or sparsely deployed to get the necessary information. They are constraint on resources such as energy, memory, computational speed and communications bandwidth. Particularly power is anothermajor issue in WSNs, therefore main stress has been given to minimize the number of transmission to extend sensor service time in the network and support to discover multiple paths and multiple events simultaneously in any direction. Here we are proposing a new approach "Shortest Path Routing Protocol for Highly Data Centric Wireless Sensor Networks (SPRP)" which is based on the best part of protocols used for wired network i.e. TCPIIP. SPRP a new routing mechanism for wireless environment has been designed and proposed which is inspired from various routing like RIP, OSPF and a shortest path usingDijkstra's algorithm. Possible unforeseen scenarios in Wireless Sensor Networks domain like energy level status, damage of some node accidently/intensely has been considered and bypass to such occurrence has been integrated in the proposed solution.

THE SPRP PROTOCOL:-

The SPRP has been influenced by the simplicity off loading, better efficiency of routingtable in TCP/IP model and Dijkstra's algorithm [9] to discover shortest path. SPRP include energy-status single bit infonnation along with hop counts to make routing decisions locally. The SPRP has 4byte packet fonnat. A. SPRP Packet Format (4 Bytes)

- Originating node id : 10 bit unique id to support 210nodes in the network
- Energy threshold bit : 1 bit 1/0 to indicate that originating node energy is below/above threshold.
- Hop count to Sink : 16 bit; start with 0 and will be incremented by one after every transmission/hop.
- TOS: 4 bit Type of Service; control packet, data packet; out-of-service packet.

Research Paper on SPRP for Mobile WSN

A Mobile Wireless Sensor Network consisting of a large amount of tiny sensors with low-power can be an effective tool for gathering data in a variety of environments. The data collected by each sensor is transmitted to a single processing center that uses all data to determine characteristics of the environment. Sensors deployed in all kinds of areas on a large scale can move with wind and water. Defining different sensor nodes and routing protocols, we simplify sensor complexity, reduce network cost, and update network topology with low energy consumption. In this paper, we design a three-layer mobile node architecture to organize all the sensors in mobile wireless sensor networks. Based on the new architecture, we propose SP(Shortest Path) routing protocol to adapt sensors to update the network topology. Simulations show that SP performs as well as LEACH in small-scale wireless sensor networks, however, greatly outperforms in large-scale ones. In addition, SP provides an elegant solution to node movement in multi-layer mobile wireless sensor networks we simulated**.**

We have designed a three-layer mobile node architecture in order to reduce the complexity of sensors and the cost of construction of wireless sensor networks. Based on the new architecture, we've proposed a shortest path routing protocol to save energy of nodes.

Energy Aware Routing Algorithm Based on Layered Chain inWireless Sensor Network

In this paper, a new load balance and energyefficient routing algorithm (LBEERA), LBEERA iscentralized controlled by BS and utilizes the structure of layered chain. LBEERA divides the whole network into several equal clusters and every cluster works as PEGASIS To reduce energy consumption, a new algorithm to construct the lower chain in each cluster is proposed. A key factor of energy consumption for data communication is the transmission distance. The proposed algorithm is effective to avoid the formation of Long Link (LL) between neighboring nodes and therefore outperforms the existing chain construction algorithm protocols. Also, LBEERA selects leader for each lower chain according to the remaining energy of nodes and chooses super leader among all leaders for higher chain according to the residual energy of leader and the distance between leader and the BS. In order to reduce the overhead of reelect leader and super leader, we prefer to select leader and super leader every several rounds rather than each round. All nodes in each cluster will be grouped as a lower chain by our proposed algorithm. One leader for each lower chain will be elected based on the remaining energy of nodes. One higher chain including 5 leaders will be constructed as well.

Then, one super leader will be elected based on both the residual energy of leader and the distance between leader and the BS.

An energy efficient cluster-chain based routing protocol for time critical applications in wireless sensor networks

This paper, has propose an Energy Efficient Cluster-Chain based Protocol for Time Critical applications (ECCPTC) in wireless sensor networks to maximize network lifetime and minimize energy consumption and transmission delay of time critical data. ECCPTC considers higher priority for time critical data than non-time critical data so that time critical data are immediately transmitted to the base station. ECCPTC uses a threshold value for reducing transmission delay of time critical data. ECCPTC organizes sensor nodes into clusters and forms a chain among the sensor nodes within cluster so that each sensor node receives from a previous neighbor and transmits to a next neighbor. Cluster heads are elected based on residual energy of nodes, distance from neighbors and the number of the neighbors of nodes. ECCPTC also adopts a chain based data transmission mechanism for sending data packets from the cluster heads to the base station. Through simulation contrasted with previous works, we show that our proposed protocol can outperform in network lifetime, stability period, energy consumption, the total number of data received at base station, transmission delay of time critical data and communication overheads Radio energy dissipiation model is used based on which cluster head are elected for a cluster.

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