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One Kind of Redundant Reliability Wireless from Network Algorithm Research Based on Advanced Version DV-HOP Route Agreement

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Abstract: Wireless ad-hoc network has occupied important content in the field of broadband wireless network. Traditional wireless ad-hoc network using conventional peer node, without a central controller, multiparty routing technology in the current application of pumping has been a huge success. But this kind of network is widespread shortcomings with poor reliability. In order to solve this problem, we creatively put forward a kind of based on the modified DV - HOP routing protocol the high reliability of the wireless ad-hoc network is proposed. In the protocol algorithm used for heterogeneous network integration technology is terminal technology. Through this algorithm's computer simulation and actual environment performance and function test, proved this algorithm is compared with traditional wireless ad-hoc network routing protocol algorithm has higher reliability, and it can than the current wireless ad-hoc network has an average of 500 hours continuous trouble-free working time up to 600 hours. So you can argue that this algorithm has high practical value and is worth popularizing in the field. *Copyright © 2013 IFSA.*

Keywords: AD – HOC, Routing protocol, DV – HOP, Protocol algorithm.

1. Introduction

Due to the dynamic mobile wireless AD hoc network itself is changing, often because the host mobility and energy limited (range) and size lead to changes in the network topology, so the routing protocols for wireless ad-hoc network and algorithm research is particularly important. Moreover, with the development and popularization of multimedia application, puts forward a lot of requirements of wireless network technology, such as visual telephone, video on demand, video conference, multimedia business, they are compared with the general business, has a large amount of data, time delay sensitivity is strong and long time all can't be ignored, so make sure the wireless AD hoc network Quality of Service (Quality of Service, QoS) is also very important and urgent to ensure network Quality of Service has become one of the important research topic in the field of the system. And multicast routing technology is the key to solve the problem of wireless network in order to ensure the quality of service technology. Wireless ad-hoc network QoS multicast routing problem is a constraint problem meet, is also a NP - complete problems, traditional routing algorithm is difficult to effectively solve. In this article is aimed at wireless ad-hoc network QoS multicast routing problem for research and discussion.

Wireless sensor nodes deployment process is controlled, the node working area is often human doesn't fit into the area, in this case, the sensor node is need through the aircraft scatters, the location of the sensor node has randomness and uncertainty. In most application areas, such as in the military field, the location of the node information is the key to the battle command, without the support of location information, the tactical information there will be no meaning; In earthquake, forest fire monitoring, if there is no accurate to obtain the region of node information, such as temperature, magnetic field intensity, the pressure, can bring unexpected disasters; In medical care, accurate access to nodes to perceive the information such as the patient's body temperature, blood pressure, heart rate, can real-time monitor the patient's condition, the condition to carry on the comprehensive evaluation; In aquaculture, if cannot be accurately measured in the area of chemical concentration, temperature and so on node information, may bring great harm to breeding users. In other words, there is no location information monitoring news often is meaningless, only clear the location of the information, can for the subsequent processing to provide complete decision support system.

Sensor node location information to the other layer of wireless network protocol design and optimization provides the same support. Such as know the location of the node information can assist routing technology to improve the efficiency of routing; Can achieve network load equalization and topological structure of the management, use the location of the sensor node back to the information to build network topology, real-time statistics of network coverage, in view of the low density of beacon node area to take necessary measures, and then make optimization of routing algorithms.

At present we most commonly used localization algorithm in energy consumption, cost, and adopted a compromise deal with positioning accuracy, but because the application of different occasions, also takes different conditions, there is no a localization algorithm can generally suitable for a variety of different applications. Node positioning problem, therefore, has become a wireless AD hoc sensor network is an important research direction, should according to different applications, comprehensive consideration to choose the most suitable localization algorithm.

This paper's main work is summarized to solve wireless ad-hoc network multicast routing problems of various methods, introduces the basic principle of DV - HOP algorithm and evolutionary algorithm, the characteristics of the DV - HOP algorithm and evolutionary algorithm was analyzed, and the improvement of DV - HOP fusion algorithm in the evolutionary algorithm, using the evolutionary algorithm is robust, parallel search and excellent group found and improvement of DV - HOP algorithm optimization ability and to solve in wireless ad-hoc network QoS multicast routing problem, and will it into the algorithm is compared with basic DV - HOP algorithm, for solving the QoS multicast routing in wireless ad-hoc network issue verified is feasibility. This article, we creatively put forward a kind of based on the modified DV - HOP routing protocol the high reliability of the wireless ad-hoc network is proposed. Through this algorithm's computer simulation and actual environment performance and function test, proved this algorithm is compared with traditional wireless ad-hoc network routing protocol algorithm has a higher reliability.

2. Ad-hoc Network Routing Protocol

Wireless ad-hoc network is a set of nodes through the organization form of no center network, the network does not rely on the default of the infrastructure, network nodes use their wireless transceiver interactive information, not in each other's communication coverage when communication node, with the help of other nodes relaying to implement the data grouping of multiple hops. In the research literature about wireless ad-hoc Network, the following English name often appears: Ad hoc Network, Multi - hop Network, Self - organizing Network, Infrastructure less Network, Packet Radio Network. The network name from different sides reflects the nature of the wireless ad-hoc network is different from other online features: temporary, existing in the network multiple hops, self-organization, does not depend on infrastructure, packet radio forwarding, etc. At present the most commonly used is the Ad hoc Network. Ad hoc is a word comes from Latin, literal meaning includes two meanings: 1, special formed for a particular purpose or associated with a particular purpose; 2, impromptu, impromptu, are usually not prepared. The Fig.1 shows as jump more wireless network without infrastructure.

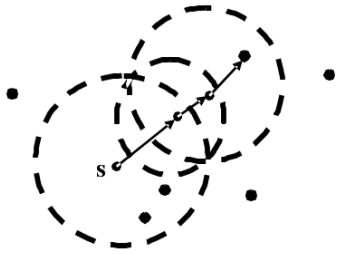

Fig. 1. Jump more wireless network without infrastructure.

At present, the commonly used typical node includes the Berkeley Motes, Sensoria WINS, MIT mu AMPs, Intel iMote, Intel XScale wasn't entirely nodes, CSRIO laboratory CSRIO nodes, Tmote, ShockFish TinyNode, XYZ node of Yale university, smart - its BTNodes, etc. Domestic also appeared a lot of research and development platform suite, including the calculations of the Chinese academy

EASI series, software of Chinese academy of sciences, Tsinghai university, Zhong Ke Da, Harbin institute of technology, Dalian maritime university and other units have also developed a node platform support network research and application development. Although at present there have been a variety of types of sensor nodes, but these nodes are basically just experiment system, is used in the research and the secondary development platform, there is no systematic and standardization of industrial design. On the technical maturity and there are big gap on the function, cost also is higher, from the real practical applications need to have very big disparity.

In general the existing wireless sensor network node the following constraints:

1) The sensor node energy limited.

Sensor node is a tiny embedded devices, through carry energy limited battery power, and the sensor node work area is usually a human does not fit into the area, so can't through the way of artificial replacement battery powered, so energy saving is particularly important. Communication module working state of the wireless AD hoc sensor networks have send, receive, idle and sleep four. Four kinds of state of the energy consumption each are not identical, delivery status consumption; most sleep the least energy consumption. Therefore, in the future design of wireless AD hoc sensor networks module work, want to consider these factors, avoid unnecessary forwarding and receiving, enter sleep state when don't need communication, can save the unnecessary energy consumption.

2) The sensor node communication ability is limited.

3) The sensor node's computing and storage capacity is limited.

Sensor node is a tiny embedded device, in order to reduce power consumption, lower the price, it must demand the computing and storage capacity is relatively weak. Therefore, how to reduce the computational cost and storage cost under the condition of implementing node positioning accuracy become one of the main problems in today's wireless sensor network research. For wireless AD hoc sensor network, the network topology control has a great influence on the network performance, network mode to a certain extent, determines the overall topology of network. Good topology can improve the efficiency of routing protocol and MAC protocol, for data fusion, time synchronization and target positioning, and provides the foundation, reduce communication interference, etc many aspects is helpful to prolong survival time of the whole network.

At present, the main topology control technology can be divided into time control, space control and logical control. Time control by controlling each node sleep, work duty ratio, adjust the sleep time between nodes, nodes to work alternately, to achieve the purpose of save money; Space control by controlling node sends power to change the connected area, make the network presents different connecting forms, control energy consumption, improve the effect of the network capacity; Logic control is will not be "ideal" nodes, forming a more robust, reliable topology control. Wireless network topology structure is usually divided into star topology and tree topology and mesh topology, as shown in Fig. 2.

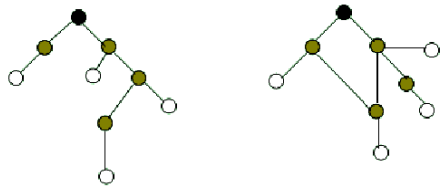

Fig. 2. A wireless network topology.

Star shaped mesh network topology is the simplest, is the structure of single jump, two-way communication directly with the base station, terminal node does not establish a connection between each other. Due to node must send data with high power, too much redundant information in the network, it will significantly increase network load, and the transmission distance is limited, so the structure of sensor networks are not suitable for. In order to solve this problem, puts forward the concept of the tree topology, its principle is added in the network routing node, distance increased routing node to node of data transmission. So, to high requirement of reliability of the wireless network is not applicable to the tree topology, network topology structure can avoid this problem. Structure of the mesh net is more jump between nodes can communicate with each other, through a certain routing algorithm for multiple hops data transmission, network malfunction repair ability is stronger. But, because of the large size of sensor nodes distributed randomly, for multiple hops routing lookup, maintenance and repair will be very difficult. In order to establish the route and transmit data effectively, node must also monitor network status changes at any time, will significantly increase system energy losses. Now more commonly used is a hierarchical network structure, it belongs to the mixed net is one of the typical, more suitable for the application of wireless sensor network.

A wireless ad-hoc network routing protocol algorithm classification:

1. Based on the distance measuring and positioning algorithm based on range distance

Wireless AD hoc sensor network, whether according to the positioning process by physical measurement to obtain the absolute distance or Angle information between nodes, the algorithm is divided into: no (range - free) location algorithm based on distance measurement and based on the range (the range - -based) positioning.

Don't need to know (1) the Range - free algorithm measuring absolute distance or location between the

nodes, use only the connectivity between nodes and multiple hops routing information exchange method to estimate distance calculation node location. Classical localization algorithm based on distance measurement, there are DV - Hop, Amorphous, APIT, centered algorithm, etc. Centurion algorithm is first and foremost by Miriam Bulrush put forward. Algorithm is the central idea is: all the beacon nodes broadcast a packet, the packet including beacon nodes in their ids and location information, the unknown node receives from adjacent beacon node sends a packet, when the number of packets received after more than a set value in advance, the calculation of the beacon nodes of polygon centurion, and use it for their own position is determined. Censored localization algorithm has the advantage of easy implementation, computation quantity is small, completely based on the network connectivity, but the algorithm need more beacon nodes. DV - Hop algorithm is by the D. N coalesce and B.N lath the, put forward the calculation method of unknown node position is divided into three stages: packet radio beacon node contains its own position, all nodes receiving and forwarding packets, at the same time record the minimum Hop count to the beacon node; Beacon nodes in the network average hop distance, then in the form of packet broadcast to the network, the unknown node according to the received the average hop distance information calculation to the anchor node and the hop distance; Unknown nodes using the second phase of each beacon node distance jump distance, the trilateral measurement method or maximum likelihood estimation method to calculate its own position. DV - Hop algorithm use the jump section instead of the actual distance of sensor node hardware requirements low, implementation is simple. Its disadvantage is that the average every hop distance calculation error is bigger, directly affect the positioning accuracy of unknown nodes. The first stage and the DV - Hop algorithm is the same. Radius of the second stage, the assumption that the network communication under the same conditions, the average every hop distance as the communication radius, when calculating the unknown node to each beacon node distance jump section number. APIT algorithm principle is, first of all nodes with multiple unknown triangle area is determined, and then the triangle area of a polygon centered as the location of the unknown node. APIT algorithm is the theoretical basis of PIT test. If M point along A direction can at the same time close to or far away from the triangle vertices A, B, C, then you can judge M point located in the delta ABC outside; otherwise, the M point located in the delta ABC internal. According to measuring node distance or position adopted by the method, can be divided into: Time of Arrival (TOA), Time Difference of concatenated (TDOA), Radio Signal Strength (DV - HOP) and Angle of Arrival (AOA), etc. Based on the signal of Angle of arrival Angle (AOA) positioning principle is the receiving node through multiple ultrasonic receiver nodes to sense or antenna array launch signal do, so as to estimate the relative orientation between nodes receiving and launch or Angle information, through triangulation method is used to calculate the position of the node. Weakness is AOA influenced by external environment, and the need for additional hardware (and ultrasonic receiver antenna array), and is not suitable for large-scale wireless AD hoc sensor networks. Based on Signal receiving Strength (DV - HOP, a Received Signal Strength Indicator) ranging principle launch of node is known Signal Strength, the receiving node according to the Strength of the Received Signal, calculates the Signal in the transmission loss, and then using the theory and experience of Signal propagation loss into distance information transmission model, reuse of the existing localization algorithm to calculate the unknown node location. The technology is a kind of low power consumption

Cheap technology, simple implementation, conform to the trend of the development of wireless sensor network (WSN), has been widely used. But in practice the DV - HOP positioning technology are susceptible to temperature, obstacles, such as propagation model, the influence of error can cause the receiver to produce eyes, so it still need further improvement.

2. The centralized and distributed positioning

Centralized algorithm (Centralized Computation) is refers to the required information is transmitted to a central node, through the calculation of center node to node localization algorithm. Of centralized algorithm is its overall planning from the global Angle, the position of the node positioning accuracy is relatively high, but the disadvantages are obviously include poor system scalability, when adding new nodes or node failure, the location of the need to recalculate all the nodes in this system, increased the network energy consumption, led to the center node and the network communication interrupt, unable to realize positioning. Distributed computing (Distributed Computation) is to point to each node through the exchange of information between nodes and coordination, calculated by the node itself, the positioning of the way. The advantages of this algorithm is to change the network topology structure has a strong adaptability, without support of center node, is conducive to the expansion of the system.

3. The Tightly Coupled and Loosely Coupled

Tight coupling is refers to the anchor node positioning algorithm through cable medium to connect to the controller at the centre of the localization algorithm; Loose coupling is refers to the node positioning algorithm adopts a distributed localization algorithm of wireless coordination center controller. Such as Cricket, Haloes is loose coupling location algorithm proposed in recent years. Such localization algorithm relies on coordination and exchange of information between nodes to achieve

localization, adopt the way of information exchange to obtain its own location information, so will interfere with each other for competitive channel between the nodes, the positioning accuracy is not high, and does not apply to large-scale sensor networks.

Due to traditional DV - Hop algorithm, DV - HOC after a period of time after searching for size, information content will cause some path than other path of information content, so that you can fall into local convergence condition. The algorithm increases the mutation operator is 0 q in order to avoid the DV - HOC search early in hysteretic phenomenon. When the random number 0 q or less, DV - HOC choice is according to the formula 1 to select next.

$$s = \max\left\{[\tau(r,u)]^{\alpha}[\eta(r,u)]^{\beta}\right\} \quad (1)$$

Which u ∈ {neighbors (r)}. If on the contrary, if random number q is greater than the q0, then choose the next step in the following formula.

$$p_i(r,s) = \begin{cases} \dfrac{[\tau(r,s)]^{\alpha}[\eta(r,s)]^{\beta}}{\sum_{u \in J_k}[\tau(r,u)]^{\alpha}[\eta(r,u)]^{\beta}}, & s \in J_k(r) \\ 0, \quad otherwise \end{cases} \quad (2)$$

The algorithm in addition to joining a mutation operator, also for DV - HOC adopted a strategy rewards and punishment, to reach the destination node is the ultimate endpoint of DV - HOC punishment strategy. When the DV - HOC search path after the search, eventually to the node is not the purpose of what we need, that the DV - HOC search path search task is failed, so the DV - HOC failure, in order to avoid the back of the DV - HOC also make the mistake, the algorithm for this DV - HOC passes through in the process of searching path to punish residual information on hormone levels, as far as possible to make the probability of this path is selected is very low, the efficiency of the algorithm.

The algorithm and general DV - Hop algorithm has a difference, is the algorithm better or residual pheromone on the path to relatively poor are global adjustment. On the optimal path to global pheromone update is the cause of, is to be able to make the best path can be a better choice, through strengthen the information content of these elite path, the DV - HOC rev to an exciting role, lead to DV - HOC tend to be the best path. Instead, also the pheromone on the path of the poor is also the cause of the global adjustment, also is to let DV - HOC give up to search on these paths, turned to the other without being search path, to increase the diversity of choice. The strategies to strengthen the optimization ability of the algorithm at the same time guarantee the results of optimization.

In DV - Hop localization algorithm, the first use of unknown node distance vector exchange protocol to calculate the minimum Hop count of the unknown node and beacon node, on the basis of the existing formula and then estimate the distance of every jump, use the minimum Hop count multiplied by the average every Hop distance and estimated distance between the unknown node and beacon node, reuse the trilateral measurement method or maximum likelihood estimation method to calculate the coordinates of the unknown nodes. Generally divided into three stages:

Phase 1: first, using the distance vector exchange routing protocol, to obtain the unknown node and the minimum hop count each beacon nodes. In order to get to the hop count between nodes, a beacon node contains its location information (the initial value of 0) and the hop broadcast packets to all neighbors node. Document with the receiving node to each beacon nodes, the minimum hop count from same beacon nodes (ignoring the larger hop), then jump number plus one, continue to forward to its neighbor node (in addition to the source direction), the process continue, until the network each node for each beacon node location information and the corresponding numerical.

Phase 2: according to record information in phase 1, can be obtained and other beacon nodes are jump distance apart, and then calculates the average according to the type of the actual distance to phase 3: using the distance values obtained from the phase 2 of the, the trilateral measurement method or maximum likelihood estimation method to estimate its position. Algorithm examples such as Fig. 3:

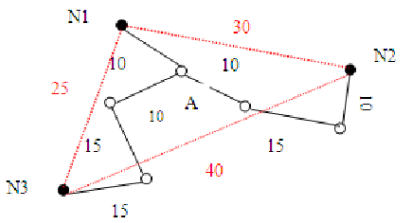

Fig. 3. Schematic Fig. 3 DV - Hop algorithm.

Assuming N1, N2, N3 for beacon nodes, node A is the need to position of unknown node, N1, N2, N3 three beacon node knows the distance between each other, 30, 25, and 40 respectively. Actual distance of 10 A to N1, hop count to 1; A to the actual distance of N2 10 + 15 + 15, hop count to 3; A to N3 actual distance of 10 + 10 + 15, hop count to 3. DV - Hop algorithm is as follows:

1) The N1, N2, N3 broadcast packets contain their position, accept points recorded N1, N2, and N3, the minimum hop count and forward.

2) The N1, N2, N3 according to record information on other beacon nodes and hop count, estimated network every jump distance: N1: (25 + 30)/(4 + 4) = 6.9; N2: (30 + 40)/(4 + 6) = 7; N3 (25 + 40)/(4 + 6) = 6.5, then the N1, N2, and N3 will broadcast to the network, the network average jump distance 6.9, 7, 6.5, respectively, A record only

received the first average jump distance, because it is A to the distance of the N1, therefore the first to receive A 6.9 average jump distance as A network. Finally A calculation to N1, N2, N3, respectively from N1:6.9 * 1 = 7.5; From the N2:6.9 * 3 = 20.7; N3 distance: 6.9 * 3 = 20.7.

3) The trilateral measurement method is used to estimate the position of itself

A to N1 the actual distance is 10, but through the DV - Hop algorithm to estimate the distance of 6.9, error obviously increases, which leads to A unknown through the trilateral measurement method to estimate its position deviation is larger.

The algorithm for multicast routing in Ad Hoc network on the implementation of the steps:

1) For each node in the network, each link set good QoS value. At the same time constraints of a given bandwidth, delay, delay jitter value, will not meet the constraints in the network link delete, to get a network topology structure, and then routed to the new network topology search.

2) Will be initialized pheromone in the network topology, at the same time set is the same, to set an initial value taut (r, s). Set a maximum cycle number N, for the first time cycles were initialized to 0. DV - HOC search at the beginning, let to DV - HOC before part starting from the source point, for each of the former to the DV - HOC has generated a taboo list, the source node is in the table.

4) Each of the former to the DV - HOC choose search path using the state transition of the algorithm formula, once after the search loop, the DV - HOC announced failure, some after the DV - HOC, at this time of DV - HOC searches, prior to the path of the information content of local adjustment.

5) For DV - Hop repeat step (4), wait for DV - HOC are finished their diameter and local pheromone update after.

6 out of DV - Hop search path, the path of the selected optimal and worst, according to the global updating rule on the path.

Update global pheromone adjustment.

If 7 cycles maximum c, the termination of the algorithm, and find out the best path, if not reached maximum cycle times, continues from step 3. Start again. By the algorithm and basic DV - Hop algorithm of simulation experiment show that this algorithm can quickly find the best path (or better), make the cost of the routing cost table, at the same time greatly reduced the search time of routing, to a certain extent, also try to meet the QoS constraints are put forward.

IEAMRA fusion is the basic ideas of evolutionary algorithm and improve the DV - Hop algorithm, the advantages of network topology on wireless ad-hoc network, first of all, according to the evolutionary algorithm to produce in advance some relatively optimal routing, and then based on the evolutionary algorithm to seek out a better solution, based on the use of DV - Hop algorithm to search again. Which on the evolutionary algorithm to search a better routing assignment first pheromones, another way to avoid premature convergence is also based on the Max - min DV - HOC algorithm to set initial pheromone values, and then on the basic framework, with improved way of path and pheromone update strategy to solve QoS in wireless ad-hoc network constrained multicast routing problem. IEAMRA algorithm in the adaptive value function is used to judge the individual standard, usually in the form of objective function or cost function, combined with wireless ad-hoc network itself in terms of QoS multicast routing problem, this paper algorithm of the adaptive value function of target function meet the QoS constraints are used to indicate that the objective function F is represented as:

$$F = f_c(Af_d + Cf_b) \tag{3}$$

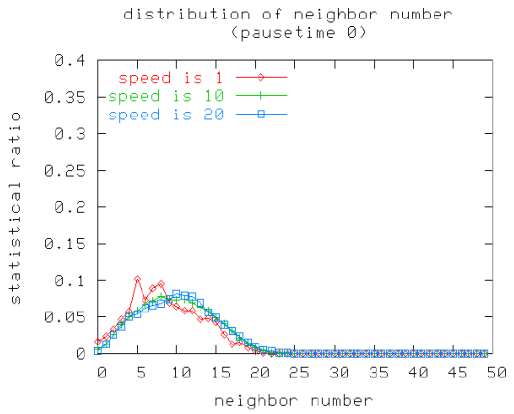

Fig. 4. As the change of number of iterations delay change curve.

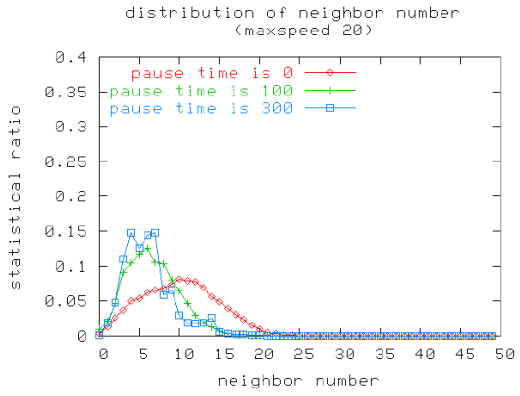

Fig. 5. Network cost along with the change of destination node.

In the type, the alpha is A positive real coefficients, A and C, respectively for df and bf is weighted coefficient, representing the proportion of latency and bandwidth occupied. Bits of d (Z) refers to the delay of QoS measurement of penalty function, (Z) b bits is referring to the bandwidth of the penalty function, as above mentioned, when multicast routing satisfy the constraint conditions, their value is 1,

otherwise the value for the Dr, br. Dr, ∈ (0, 1) br, usually in the algorithm are generally value is 0.5, so the algorithm in this paper also put them at 0.5, s d in this paper, the improved evolutionary DV - Hop algorithm (IEAMRA) wireless ad-hoc network QoS multicast routing problem implementation steps of the following 6 steps:

Steps (1) based on the wireless ad-hoc network itself, to simplify the network topology, the randomly generated the value of the QoS constraints based on the constraint value, will not meet the conditions of nodes and between nodes connected to the delete link. To get a new network topology structure, and then search the routing in the topology of process;

Step (2) randomly generates a set of real number encoding, set one of the biggest circulation iterations cN;

Step (3) on the new network topology structure, evolution algorithm is adopted to improve the route search in advance, according to a given objective function F, to generate a new set of network pheromone setting, on this basis to further improve DV - Hop algorithm of path search;

Step (4) according to the formula for the initial pheromone distribution network path, and then USES the DV - Hop algorithm to improve search path, will only m DV - HOC released at the same time from the source node, DV - HOC basis formula 2 to choose the next step in the direction of the state transition;

In step (5) for DV - HOC network topology on the completion of a traversal, statistics of DV - Hop search path length, record the best and worst of DV - HOC. Only for best DV - HOC search to the path of the global pheromone updating according to equation 5.4 adjustment principles;

Step 6 if maximum cycle N, then determine the loop terminates, record and output, the optimal solution, or it will continue to repeat step (4) to (5), until to the maximum cycle times.

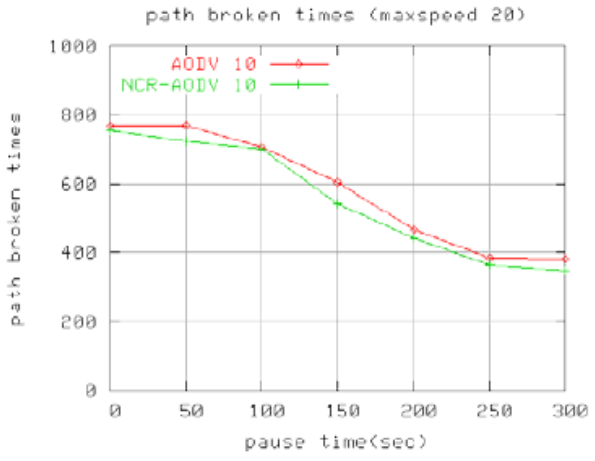

Fig. 6. A wireless ad-hoc network node movement in packet delivery rate change under different running speed curve.

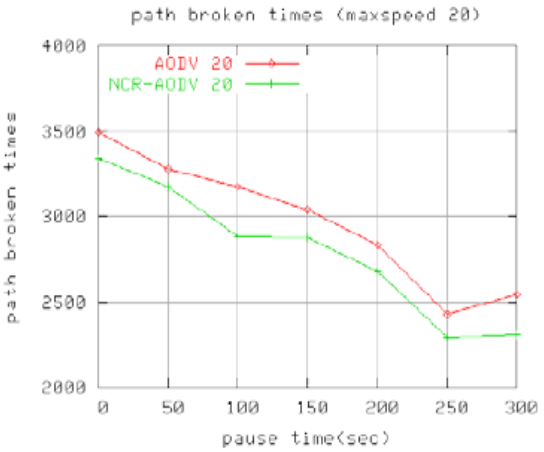

Fig. 7. To 20 CBR stream.

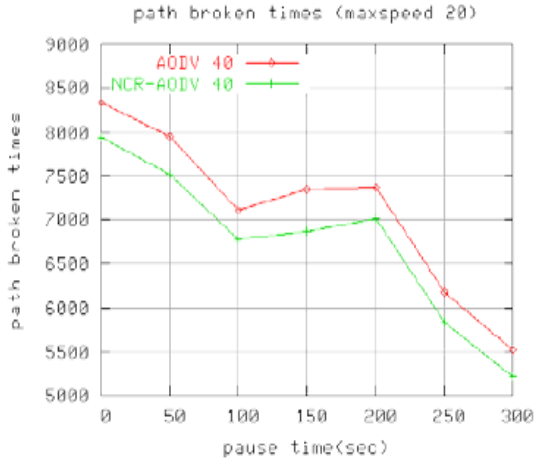

Fig. 8. To 40 CBR stream.

IEAMRA algorithm and basic genetic DV - Hop algorithm (GAAC) the movement of nodes at time 0 ~ 500 s in the end to end delay comparison results between the figure, the abscissa of the residence time is refers to the movement of the nodes in the wireless self-organized network pause time, is relative to the movement of nodes to stay longer that the topology of the network structure is more stable. Can be seen from the diagram and the pause time within 0 ~ 100 s, this thesis IEAMRA the average latency than GAAC, movement speed, at first, this is because the node routing reconstruction, frequent IEAMRA USES the most stable route for transmission, routing reconstruction of frequency decrease a lot. As the residence time is more and more long, the delay of the two algorithms gap is gradually reduced, thereby indicating IEAMRA more adapted to the dynamic wireless ad-hoc network environment. Mobile area is 1500 meters by 900 meters, the total number of nodes is 50, 50 by the mobile node and 10 static nodes. 50 mobile node in mobile area according to the Random Waypoint movement model, the dead time is 0 seconds, top speed is set to 0, 5, 10, 15, 20 m/s, has set up five mobile scenarios. 10 the stationary node as CBR stream source node or the destination node, placed at the edge of the rectangular area, in

the process of simulation always remain static. Each of the CBR stream data packet from the source node to destination node, on average, need eight to jump. For each mobile scenarios, respectively set up three traffic scene: the first scenario only a CBR is established between two stationary node flow, the second scenario three CBR is established between 6 stationary node flow, and the third scenario in ten five CBR stream between stationary node. CBR packet size of 512 bytes, transmission speed for 4 group/SEC. The simulation time is 900 seconds, random repeat 5 times for each simulation scene, and average as the final test results.

4. Conclusions

DV - HOP localization algorithm as the research basis, first of all, from the overall analysis of the traditional DV - HOP algorithm positioning principle and problems of the algorithm, and made some improvements aiming at the shortcomings of the existed. Experiment firstly, conform to the practical application of signal propagation model, and then choose higher precision triangle censored algorithm. Through the simulation experiment of the improved method was compared, the results concluded that the improved algorithm has obvious advantage in location accuracy and reliability. This algorithm is compared with traditional wireless ad-hoc network routing protocol algorithm has higher reliability, and it can than the current wireless ad-hoc network has an average of 500 hours continuous trouble-free working time up to 600 hours.

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