Volume 3, Issue 6, June 2013 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

An Agent Based PSO for Route Reconstruction in Mobile Network

JASHPAL JINDAL
Associate Professor (ECE Deptt.)
PIET, SAMALKHA, India

MANISH JINDAL
M.Tech. (student)
PIET, SAMALKHA, India

Abstract: . This paper presents optimize the routing process and to avoid rerouting in mobile network. The system will give an improved routing approach in terms of efficiency and reliability. The proposed work is about to identify the broken link problem in a Mobile Network. The Network can be Wired or the Wireless. But in both cases it should be dynamic in nature. The system will generate a new routing approach that will remove the broken link from the path and generate a new Compromising path dynamically. Here PSO based attack preventive path will be detected. Approach will improve the path as well as improve the security in case of bad node over the network.

Keywords: Particle Swarm Optimization (PSO),Path Selection Algorithm (PSA),Adhoc Network, Mobile adhoc network (MANET)

1. Introduction

A Wireless Mobile Network is the cooperative engagement of a collection of mobile nodes without the required intervention of any centralized access point or existing infrastructure. There is an increasing trend to adopt ad hoc networking for commercial uses; however, their main applications lie in military, tactical and other security-sensitive operations. In these and other applications of ad hoc networking, secure routing is an important issue. Designing a foolproof security for ad hoc network is a challenging task due to its unique characteristics such as, lack of central authority, frequent topology changes, rapid node mobility, shared radio channel and limited availability of resources The wireless networks use air through the operation of a communications protocol. For synchronization, wireless networks employ a carrier sense protocol similar to the common Ethernet standard. This protocol enables a group of wireless computers to share the same frequency and space

PSO:

Particle Swarm Optimization optimizes an objective function by undertaking a population – based search. The population consists of potential solutions, named particles, which are metaphor of birds in flocks. These particles are randomly initialized and freely fly across the multi dimensional search space. During flight, each particle updates its own velocity and position based on the best experience of its own and the entire population. The various steps involved in Particle Swarm Optimization Algorithm are as follows:

Step 1: The velocity and position of all particles are randomly set to within pre-defined ranges.

Step 2: Velocity updating – At each iteration, the velocities of all particles are updated according to,

$$v_i = v_i + c_1 R_1 (p_{i,best} - p_i) + c_2 R_2 (g_{i,best} - p_i)$$

where p_i and v_i are the position and velocity of particle i, respectively; $p_{i,best}$ and $g_{i,best}$ is the position with the 'best' objective value found so far by particle i and the entire population respectively; w is a parameter controlling the dynamics of flying; R_1 and R_2 are random variables in the range [0,1]; c_1 and c_2 are factors controlling the related weighting of corresponding terms. The random variables help the PSO with the ability of stochastic searching.

Step 3: Position updating – The positions of all particles are updated according to,

$$p_i = p_i + v_i$$

After updating, p_i should be checked and limited to the allowed range.

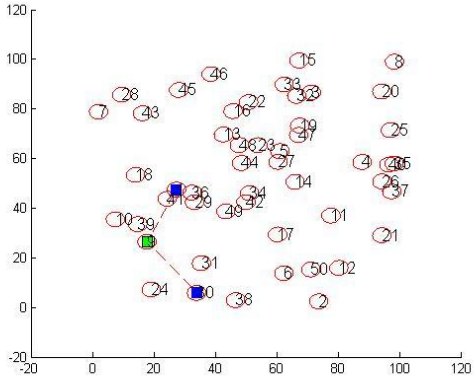
Step 4: Memory updating – Update $p_{i,best}$ and $g_{i,best}$ when condition is met,

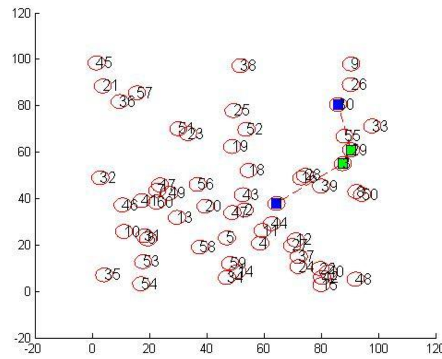
$$p_{i,best} = p_i \qquad if \;\; f(p_i) > f(p_{i,best})$$
$$g_{i,best} = g_i \qquad if \;\; f(g_i) > f(g_{i,best})$$

where f(x) is the objective function to be optimized.

Step 5: Stopping Condition – The algorithm repeats steps 2 to 4 until certain stopping conditions are met, such as a pre-defined number of iterations. Once stopped, the algorithm reports the values of g_{best} and $f(g_{best})$ as its solution.

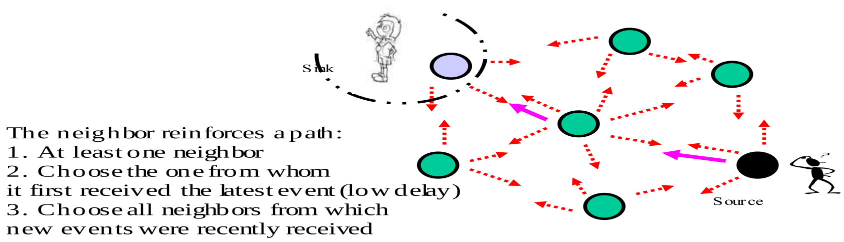
2. GRAPH OF EXISTING WORK:





1. Nodes =50 **2. Nodes =60 Research Design**

This approach of data transfer is very common in case of dynamic topology like the network. But as the intruder attacks according to the same approach it gives the very high chances of Data hack.



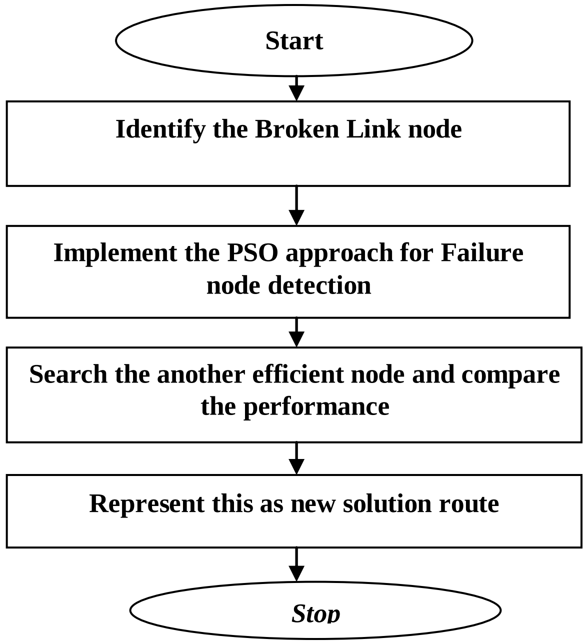
In this diagram, there are number of possible paths and as a reliable and fastest path, the client will always select the shortest path .But this approach has some problems based on security and reliability.some are as follows:

1. Select One Shortest path
   - Use of wireless links in shortest path susceptible to link attacks
   - Relatively poor protection as in Battlefields.
   - Passive eavesdropping
   - Attacks from compromised attacks.
2. MultiPath
   - Flooding: As an incoming packet is sent on all incoming links it limit the number of hops to avoid infinite loops or forward packets only once using a packet ID or only on selected links in the right direction
   - Multicasting: Terribly expensive in terms of resource utilization and results in minimum delay.

The proposed work is divided in Three phases

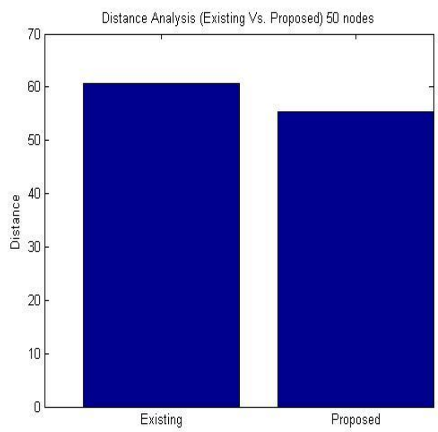
1. Locating the Milicious Node
2. Define it in the list of Block Nodes/Critical Node
3. Define some other path to transfer data from other node , if there is no such node introduce a new node dynamically, that can replace this node

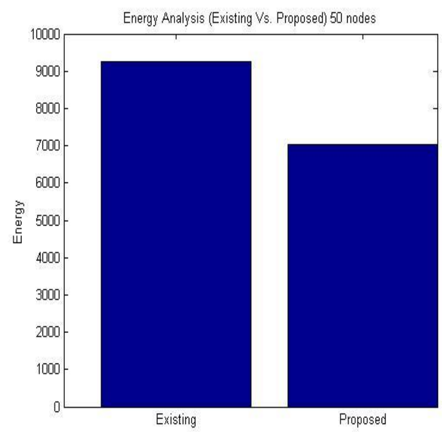
Now the proposed system will be represented as an approach or the framework as shown in fig 3 to resolve the above said problem. These steps are explained as:-



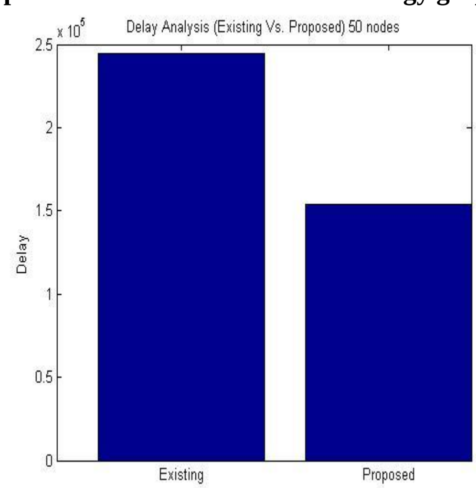
3. Proposed approach Results of the proposed work:

1.



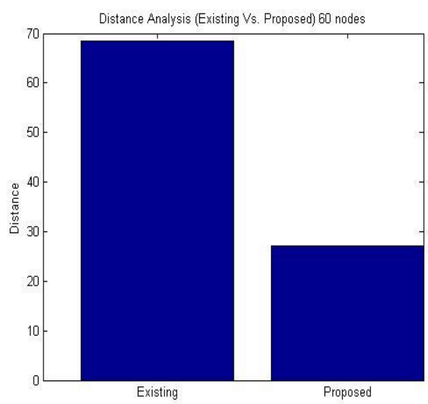


1. Distance graph for 50 nodes **energy graph for 50 nodes**

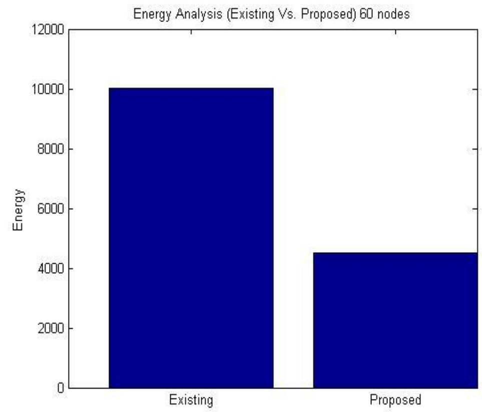


Delay graph for 50 nodes

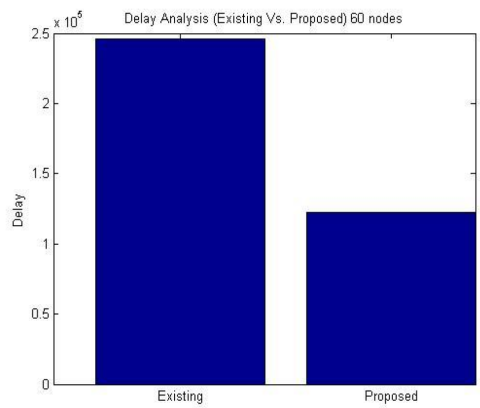
2.



Distance graph for 60 nodes



energy graph for 60 nodes



Delay graph of 60 nodes

4. CONCLUSION:.

In the existing work, the PSO is used over the network for the route optimization as the main and initial stage. But in this present work, the intial route will be identified by using the path selection algorithm and later on the optimization of the route will be done using PSO. The existing work is about the PSO for the route generation, But in this presented work, the PSO is used for the route re-construction. In the existing work, the broken links are not considered. But in this presented work, the agents are distributed over the network for the broken link identification. As the broken link will be identified, the PSO will be activate. The distance and energy is minimum in the proposed work.

References:.

[1] João Pedro,**" Distributed Routing Path Optimization for OBS Networks based on Ant Colony Optimization",** IEEE "GLOBECOM" 2009 978-1-4244-4148-8/09©2009

[2] Maumita Bandyopadhyay,**" Zone Based Ant Colony Routing In Mobile Ad-hoc Network",** 978-1-4244-5489-1/10© 2010 IEEE

[3] Ahmed A. A. Zakzouk**," An Ant Colony Optimization Approach for Solving Shortest Path Problem with Fuzzy Constraints".**

[4] Afshin Ghanizadeh**," A Fuzzy-Particle Swarm Optimization Based Algorithm for Solving Shortest Path Problem",** 978-1-4244-6349-7/10@ 2010 IEEE

[5] Michael Rinehart**," A Graph Reduction for Bounding the Value of Side Information in Shortest Path Optimization",** 2010 American Control Conference Marriott Waterfront, Baltimore 978-1-4244-7427-1/10©2010 AACC

[6] Michael Rinehart,**" The Value of Sequential Information in Shortest Path Optimization",** 2010 American Control Conference Marriott Waterfront, Baltimore 978-1-4244-7427-1/10©2010 AACC

[7] Yanfang Deng,**" Dynamic Shortest Path in Stochastic Traffic Networks Based on Fluid Neural Network and Particle Swarm Optimization",** 2010 Sixth International Conference on Natural Computation (ICNC 2010) 978-1-4244-5961-2/10©2010 IEEE

[8] Michael Rinehart**," The Value of Side Information in Shortest Path Optimization"**, IEEE TRANSACTIONS ON AUTOMATIC CONTROL 0018-9286© 2011 IEEE

[9] Marina Yusoff,**" A Discrete Particle Swarm Optimization with Random Selection Solution for the Shortest Path Problem",** 978-1-4244-7896-5/10@ 2010 IEEE

[10] Zhang Huidang**," The Particle Swarm Optimization with decaying ICMIC for Shortest Path Computation in Computer Networks",** 2010 International Conference on Computational Intelligence and Security 978-0-7695-4297-3/10© 2010 IEEE

[11] Je´ roˆme Berclaz,**" Multiple Object Tracking Using K-Shortest Paths Optimization"**, IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 0162-8828/11@ 2011 IEEE

[12] Kavitha Bhaskaran**," Dynamic Anycast Routing and Wavelength Assignment in WDM Networks Using Ant Colony Optimization (ACO)",** IEEE ICC 2011 978-1-61284-233-2/11©2011 IEEE

[13] **H.Kusetogullari," K- Shortest Path Network Problem Solution with a Hybrid Genetic Algorithm: Particle Swarm Optimization Algorithm",** ICTON 2011 978-1-4577-0882-4/11©2011 IEEE

