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Planning of Link Recovery in Wireless Mesh Network Using Resilience Scheme

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ABSTRACT: wireless mesh network(WMN) is a communication network. During their operating period, the wireless mesh network may suffer from frequent link failure which results in deficient performance of network. Hence, this paper proposes planning of link recovery in wireless mesh network using resilience. By integer linear programming, when primary link or path fail, transmit data to its backup link or path via node disjoint path. Because resilience provided by several alternate paths constructed with in the primary path. Resilience can be defined as "ability of the network to provide and maintain an acceptable level of service in any faults to normal operation". Simulation results shown.

KEYWORDS: Resilience, WMN, integer linear programming, node disjoint path.

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I. Introduction

Wireless mesh network (WMN) is one of the latest wireless communication technology. Because of their advantages over other wireless network, Wireless mesh network in which each node can communicate with one or more peer nodes. Because, it is also called mesh topology. it has two properties one is self -organized and second one is self-configured that means the network automatically establishing and maintaining mesh connectivity. They can support broadband and internet access, but now a day its most important features are provided reliable services, if any failure occurs in the network and also provide protection against any type of failure occur. One question has arisen how to protect any type of failure occurs in network. The term, resilience is provided protection an acceptable level of service in any error occur in normal operation [1,2]. It is also including survivability, fault tolerance, disruption tolerance, dependability and perform ability. Now a day internet plays significant role in society [2].

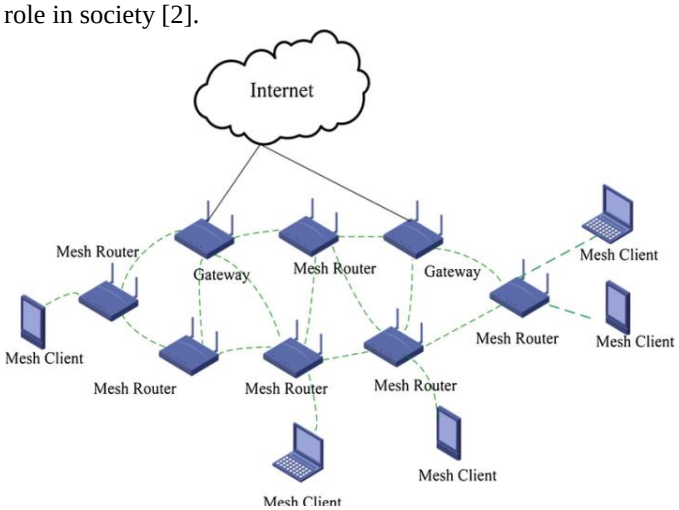

Fig.1. WMN architecture

II. Related work

In ref. [4], author has been proposed two algorithm one is Goemans-Williamson's maximum cut algorithm and other is brute-force for scheduling weighted links in Transmitter/Receiver WMNs, author design super frame and perform number of activated links. Both algorithm provide as on average links approaches respectively.

In ref. [5], author has been proposed particle swarm optimization (PSO) for adaptive placement of router, but gateway is fixed in wireless mesh network. The objective of this is, few-clients-covered by wireless routers, in order to get, apply a PSO with three local search operators and perform a Markov chain analysis.
In ref, [6] author has been proposed gateway placement for throughput optimization in multi-hop wireless mesh networks. In this paper, the optimization has been done by novel grid-based gateway deployment method using a cross-layer throughput optimization, in order to achieve improved throughput.
In ref. [7] author has proposed a social-based particle swarm optimization approach. In this paper, first determine an infrastructure where placed mesh router and mobile mesh client with different times. So that network connectivity and user coverage are maximized. Further, improvement of the network performance can be possible with the help of router placement in dynamically manner. In terms of reducing number of the un-served mesh clients and increasing network connectivity in dynamic social scenarios.
In ref. [8] author has proposed simulated annealing (SA) approach for placement of mesh router nodes in WMNs. In this paper, there are two objectives, first is the area of the giant component in random manner in network and second is user coverage capacity, with respect to achieve network connectivity in WMNs.
In ref. [9] author has proposed optimization models for planning Wireless Mesh Networks (WMNs), the aim of this paper to minimize the network installation cost. With respect to this increase the coverage for wireless mesh clients. Author also proposed mixed integer linear programming models for selecting the number and positions of mesh routers and access points. Which is provide optimal solutions for topology/coverage planning and channel assignment problems.
In [10], the author has proposed heuristic approach. Proactive network is used where locate access points in wireless neighborhood networks. Any interference occurs, when a traffic flow grows linearly with the number of wireless hops traversed. In that case apply lower bound algorithm and the coverage part is omitted.
In ref. [12], author has proposed Diversity Assignment Problem (DAP), the assignment of variants to nodes in a network, and in this paper, compute the optimal solution in medium-size networks. Also a greedy approximation to DAP has proposed. In this paper, show that a high level of overall network resiliency can be obtained.

III. Problem Domain

Figure 1 shows a structure of wireless access network. Nodes (mesh routers) serve as the function of bride between mesh clients and some Internet gateway, which provides access to the Internet. Each node (mesh router) is associated with a different-size coverage range. If a mesh client falls within some coverage of an Internet gateway (resp., mesh router), a link between the mesh client and the Internet gateway (resp., mesh router) is constructed. On the other hand, if coverage's of two nodes (or a mesh router and an Internet gateway) are interfered, means there is link or nodes fail. My focus on optimal placement of router to provide maximum coverage of the end user.

IV. Proposed Scheme

the step is following.
Step 1. Initially create network model by integer linear programming.
Step 2. Routers and users are distributed in random manner.
Step 3. This block performs two routing algorithms. One is node disjoint path and second is Dijkstra algorithm.
Step 4. Last block perform simulation by MATLAB, to get resilience network.

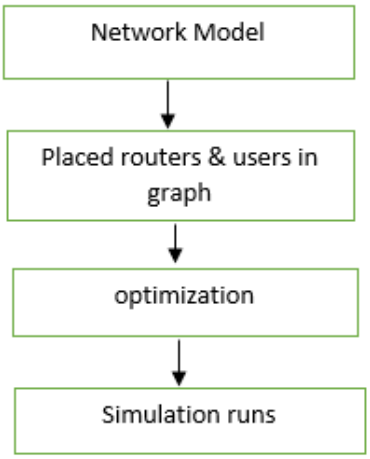

Fig.2 Working strategy of proposed scheme.

Algorithm. Deployment of routers and users

Input:
M = area
n = the number of routers.
u = the number of users.
output:
G= randomly deploy graph

1. Create M*M area
2. Initialize n
3. Initialize u
4. For i=0 to n
5. For j = 0 to u
6. Calculate random development
7. end
8. end

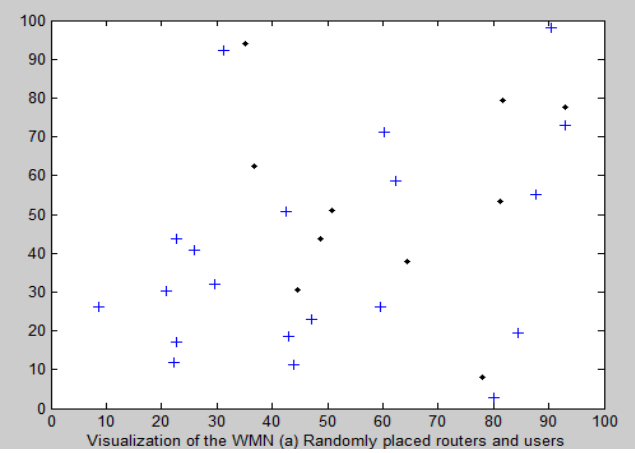

Fig.3 Random placed routers & users

V. Simulation Results

In this section we simulate WMN by MATLAB 8.3 version to deploy routers and users in random manner. The simulation environment is a 100*100m, where 10 routers and 20 users are randomly distributed, as shown on fig.3.

VI. Conclusion

This is the planning paper of link recovery in wireless mesh network using resilience scheme. We have proposed efficient protection scheme to enhance the resilience of wireless mesh network, first we apply random development algorithm. Which is shown in fig.2.

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