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"A Review on Performance Evaluation of Channel Assignment in Wireless Network Using Genetic Algorithm"

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Abstract— Resource allocation in wireless mesh network is very critical task. For the allocation of resource such as channel used various scheduling technique such as centralized and distributed. In centralized technique the channel allocations of resource share in single window process. For the improvement of the performance various authors used various optimization techniques such as DCF game theory and other heuristic function. In this dissertation used genetic algorithm for the selection of resource such as cannel in wireless mesh network. By the genetic algorithm the selection of channel is very fair and improved the channel capacity and decreases the value of degree of interference. The proposed system of channel selection simulate in MATLAB 7.8.0 software. This software is well known simulation software for the analysis of communication network. The experimental result of simulation shows that better in case of channel capacity and degree of interference. The proposed selection technique compare with game theory selection process.

Introduction

Resource allocation and resource utilization is important factor in wireless mesh network. In wireless mesh network faced a problem of traffic congestion and delay rate. Such type of event generated due to sharing of channel and limited number of channel. For the reduction of traffic congestion and delay various authors used optimization technique. In consequence of optimization technique one author are used game theory techniques. Game theory technique search number of available channel using Depth search technique and increase the rate of delay. Now in this dissertation used genetic algorithm for the selection of channel. Genetic algorithm is dynamic population based searching technique used for the process of resource optimization. The process of optimization finally gives the optimal list of channel for allocation [4], [5], [6].

Genetic Algorithm

Genetic algorithms are search algorithms based on the mechanics of natural selection and natural genetics. They combine survival of the fittest among string structures with a structured yet randomized information exchange to form a search algorithm with some innovative flair of human search. These algorithms are started with a set of random solution called initial population. Each member of this population is called a chromosome. In this problem, each chromosome of which consists of the string genes. The number of genes and their values in each chromosome depends on the population specification. In the algorithm, the number of genes of each chromosome is equal to the number of the nodes in the DGA and the gene values demonstrate the scheduling priority of the related task to the node, where the higher priority means that task must executed early. Set of chromosomes in each iteration of GA is called a generation, which are evaluated by their fitness functions. The new generation i.e., the offspring's are created by applying some operators on the current generation. These are called crossover which selects two chromosomes of the current population, combines them and generates a new child (offspring), and mutation which changes randomly some gene values of chromosomes and creates a new offspring. Then, the best

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offspring's are selected by evolutionary select operator according to their fitness values. The GA has four steps as shown below algorithms [1], [2], [3]:

Step 1: Read total channel (estimated completion time) and R values from file and get Np, Ng, Xr and Mr from the user where

Np → (initial population size),

Ng → (the number of generations),

Xr → (crossover probability),

Mr→ (mutation probability)

Step 2: Calculate the bottom-level and the top-level of each channel in total population;

Generate initial population (pi); Pcurrent ← Pi;

Schedules ← Decoding heuristic (Pcurrent); Best Schedule ← evaluate (schedules);

Step 3: while stop criterion not satisfied, do begin Pnew ← {};

3 – 1: repeat for (Np/2) times

Father ← select (Pcurrent , sum_of_fitness); Mother ← select (Pcurrent , sum_of_fitness);

Pnew ← Pnew Ů crossover (father, mother, child1, child2, Xr);

End repeat;

3 -2: for each chromosomes € Pnew do begin Mutate (chromosomes, Mr);

End for

3-3 :Pnew ← Pnew Ů {four best chromosomes of Pcurrent} Pcurrent ← Pnew;

Schedules ← decoding heuristic (Pcurrent); Best schedule ← evaluate (schedules); End while

Step 4: Repeat the best schedule

Proposed Algorithm

Using genetic selection approach, we can improve the efficiency of channel allocation in mesh network. In mesh network the total physical channel allocated as set of population for the processing of selection of resource.

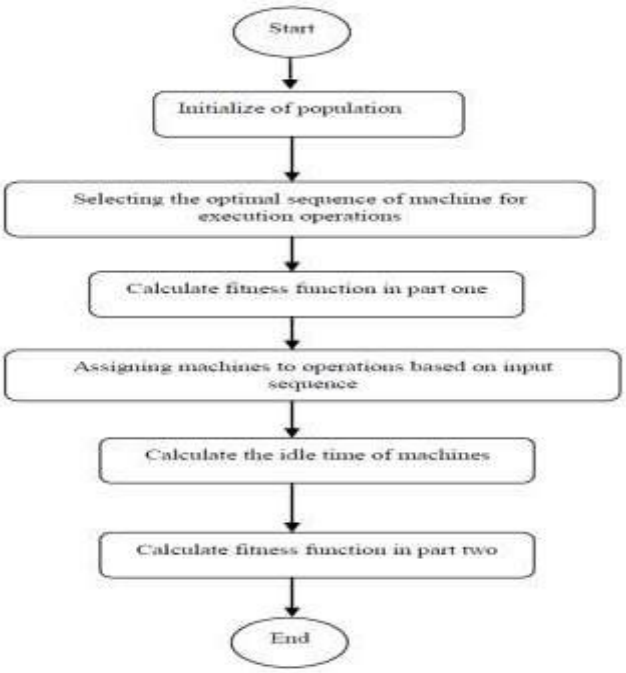

Figure shows that working process of genetic algorithm. [7], [8]

Proposed Algorithm:

- Let n is the no. of MR (j1, j2, and j3… jn).
- Let M is the no. of resource (r1,r2,.., rm)
- Compute the selection parameter indicator value.
- For each resource obtain the information like channel, computing capacity and current load of mesh network.
- For each MR obtain the MR size and the time needed to complete to complete the MR.
- Create grid matrix for the process and apply selection process.
- Generate the initial population of MR and apply the genetic selection mechanism to select the optimal MR from population. The selection of MR is done using fitness function evaluation.

F (xi) = Where f (xi) is the fitness of individual xi and F (xi) is the total pheromone of that individual MR selected. Here in the process of genetic algorithm crossover phase are not required. For the process of mutation we fixed the value of variable probability p=0.07. And finally gets the optimized set of MR for allocation. Calculate local pheromone and set process priority order for completion of MR. If selected MR priority is high, then execute the MR. Again select population and repeat the process until all MR are processed.

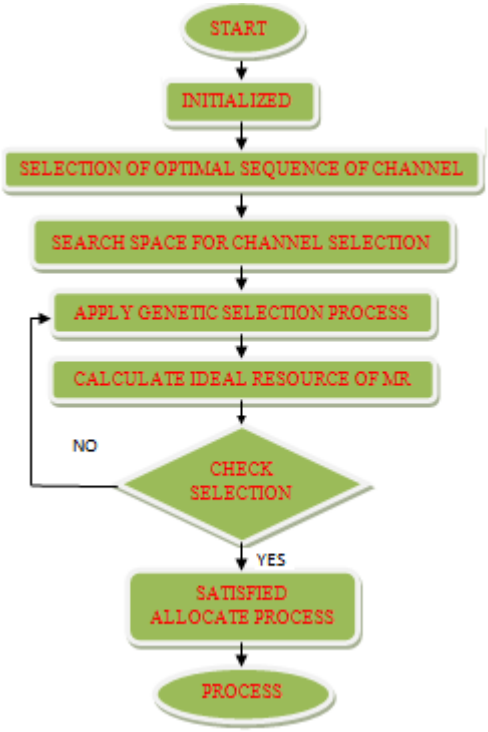

Figure 3.2: Proposed model

The key idea of selection operator is to give preference to better individuals by allowing them to the pass on their g e n e s to the next generation and prohibited the entrance of worst fit individuals into next generation; here we are using genetic approach to only select the channel for solution of mesh network.

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