IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 2 Issue 4, April 2015.
www.ijiset.com
ISSN 2348 – 7968

A comparison of two optimal approaches for the MCOP problem

Foucia PM Geelani,
PG Scholar, Master of Computer Application,
Francis Xavier Engineering College, Vannarpettai.

D.Louisa Mary MCA.,M.Phil.,M.Tech.,
Assistent Professor, Master of Computer Application,
Francis Xavier Engineering College, Vannarpettai.

Abstract

The main objective of this project is to compare two optimal algorithms called as BB and EBFA. The Branch & bound (BB) algorithm is based on the state-space tree, that is used to find the optimal solution. The feasible path must be found, and also must satisfy k path constraints.By this the problem called MCOP is avoided.(ie) multiple constrained optimal path problem.

1.Introduction

The operation research, computer science along with the telecommunication has attracted considerable attention for constrained shortest path problem from different research committees. The biggest deal of emphasis is the need to design communication protocols that deliver certain performance guarantee,which has created a interest from the telecommunications community. The wide bandwidth real time applications results as an high growth which require the QoS guarantees. The Telecommunication network has got that much importance only because of this CSP problem.

Optimal path selection subject to multiple constraints is an NP-hard problem, this can be only addressed using heuristics and approximation algorithms. Previously proposed algorithms suffer from excessive computational complexities and/or low performance. The Branch and bound (BB) is an algorithm and paradigm for discrete and combinatorial optimization problems. This has a set of candidate solutions for systematic enumeration by the use of state space search: the set of candidate solutions is mostly like forming a rooted tree with the full set at the root. The algorithm searches each and every branches of this tree, which represents the subsets of the solution set,all the branches are checked against upper and lower estimated bounds.

The MCOP Problem

Consider a network that is designed by a directed graph G(V,E) where V denotes the set of nodes and E denotes the set of links.Each link (v, u) ∈ E is associated with K positive additive QoS parameters: $w_i(u,v)$, $i = 0, 1, ...,(K-1)$.For a link e from node u to node v, the notation $w(u, v) = w(e)=(w_0(e), w_1(e), ..., w_{K-1}(e))$

represents K QoS parameters assigned on link e.In addition, for a path P and a QoS parameter i , the path weight Wi(P) is defined as the summation of wi(e) on every link e along the path P . Given K constraints Ci, $0 \leq i \leq (K - 1)$, and a pair of nodes S and T representing the source node and destination node respectively, the goal of our MCP problem is to find a path P from S to T such that $Wi(P) \leq Ci$.

2. Related Work

Ariel Orda "A Scalable Approach to the Partition of QoS Requirements in Unicast and Multicast"This paper present a novel solution technique to the QoS partition problem(s), based on a "divide-and-conquer" scheme. As the optimal solution is not achieved in the solutions of verified papers, we reduce the all sorts of complexities in terms of dependence on network size; moreover, it enables the development of Hence,it provides a technique for a scalable approach to the QoS partition problem, for the both unicast and the multicast. In addition, our algorithms readily generalize to support QoS routing in typical settings of bigger-network scales. Danny Raz "Optimal Partition of QoS Requirements with Discrete Cost Functions"In this paper we studied QoS partition and routing problems.We concentrate also on discrete functions of cost, that are both theoreticly interesting and have practical applications in the IP networks. Dean H. Lorenz "Optimal Partition of QoSRequirements for Many-to-Many Connections"In this paper we provide exact and approximated solutions for different cases.Initially we present a pseudo polynomial solution that uses dynamic programming to find the best partition of the tree. We then describe a set of steps that allow us to use this algorithm in order to derive a polynomial approximation algorithm for the problem. Then deal with specific cost-delay function

which are of practical importance. These include discrete cost functions (which reflect the current DiffServearchitecture and a specific case of a convex cost function that is often used in this context. For the latter, we present a remarkably efficient linear algorithm that finds the best partition of the delay along a given tree.

In existing many optimal algorithms are used.In multimedia application the Qos is one of the best requirement.To support QoS-based services, an optimal path combinatorial problem, that narrates the features to select a feasible end-to-end path to simultaneously satisfy multiple QoS constraints? It is less efficient. To avoid the MCOP problem this project proposed two optimal algorithms BB and EBFA. This project proposed compare the above two optimal algorithms.Based on different network topologies and different number of QoS constraints, a number of experiments are designed to study the performance of these two algorithms.

3. Methodology

3.1 System Architecture

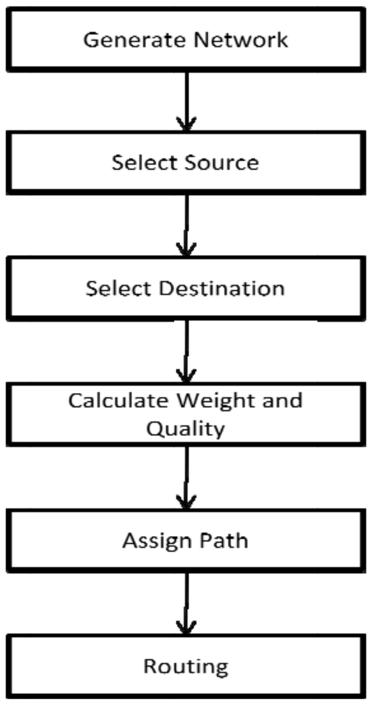


Fig: 1 Block Diagram

3.2 Modules

1.Generate Network

In network generation, generate the network based on set of nodes. A node network is a series of two or more connected nodes. When the connection has been started between two or more nodes are explained, all searches produce listings of configured users and resources from both local and remote nodes. This basic information is maintained on each computer in the node network. All sort of the data for every user and resource, but it is present only on the local node of each entity, and neglecting the search and consistency problems created by databases replicated that ar. All exchanges of this information between nodes are done in real-time,scheduling meetings with people or resources on remote nodes completely transparent to the user. When setting up a node it is important to note that the node ID cannot be changed once the node has been created. The node can be created with its node type, size and properties. Created node can be located in the network.

2. Select Source

After network generation to send data so this is used to select source. The user to select the source node for data transmission.

3. Select Destination

The user to select the destination to data to be reach.After the node creation the user to select source and destination node data transmission.

4. Calculate Weight and quality

The weight to be calculated using the minimum bandwidth in QoS. The larger the weight value, the rounding error or quantization error there is higher when QoS Packet Scheduler partitions the bandwidth among workloads. Some times the weight to be calculated to choose the random numbers.

5. Assign Path

There are various paths are available to send the data to destination from source. But to select the one and best path for data transmission.This path selection based on weight and quality.

6. Routing

After assign path send data to this path. The BB algorithm is used for routing. The following algorithm shows the routing.

The process of state-space tree construction:

The state-space tree is constructed in the following ways.

- The source node of network G is the root of the state-space tree.In the state-space tree,for each state node, two labels mark it: one is the node number in the original network and the other one is an attribute vector.
- Assume the path from root to state node.
- By applying the branching process recursively, the entire state-space tree is then obtained for the MCOP problem.
- In order to find optimal path,If all the feasible paths in the state space tree are considered it would cause the time complexity.

The process of selecting the next branching node

- The selection process of next branching node has two determination rules.
- The first rule is determined by the QoS constraints in an attribute vector.
- Second is The branching-status of a state node is marked as 'NO', if any of QoS constraint is violated.
- After the first feasible path is computed and the value of 'Best_cost' is marked as 'NO', when the branching of new state node is greater for "Best cost" is set.

Algorithm

Let s denote the source node and t denote the destination node;

Let cij=the (j+1)th constraint, 0<=j<=(k-1)

Let wij(u,v)=the vlue of Qos parameter k on link(u,v);

S->branch=YES

S->path=si->path+(u,v)

If(v==t ahd n <est_cost)

{

Best_cost=n;

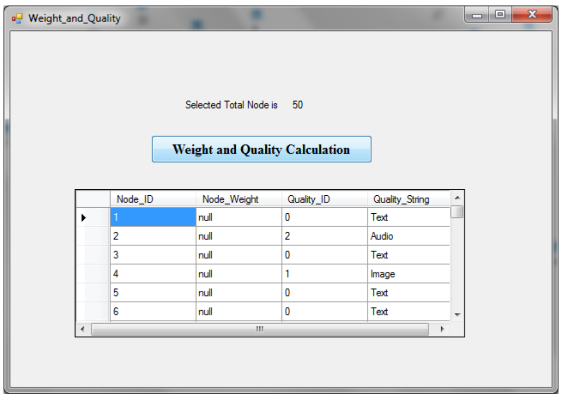
}

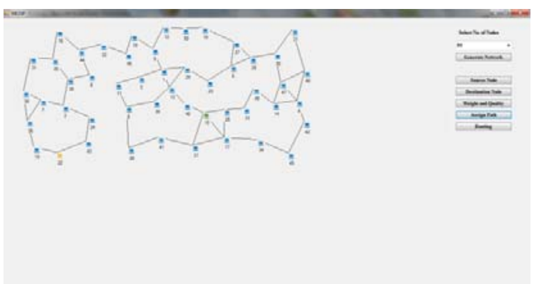
Output Best_cost and the original path

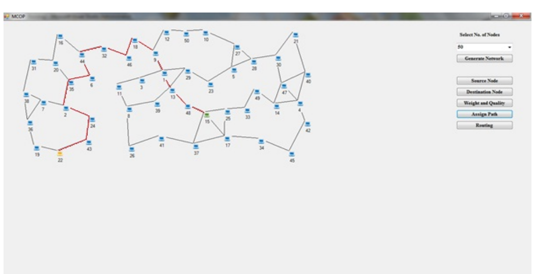
4. Experimental Results

This project is implemented and following results shows the performance.

ISSN 2348 – 7968







5. Conclusion

This project proposed to avoid the MCOP problem using the BB algorithm. The above chapters are explained the methods and algorithms in detail. The results shows the performance of proposed system. The system we have proposed is more efficient and also it avoids the problem of MCOP.

Reference:

[1] Ariel Orda, and Alexander Sprintson "A Scalable Approach to the Partition of QoS Requirements in Unicast and Multicast" IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 13, NO. 5, OCTOBER 2005

[2] Danny Raz Yuval Shavitt "Optimal Partition of QoS Requirements with Discrete Cost Functions"

[3] Dean H. Lorenz□ Ariel Orda "Optimal Partition of QoS Requirements for Many-to-Many Connections"

[4] Wen-Lin Yang "Exact and Heuristic Algorithms for Multi-constrained Path Selection Problem"

[5] F.A. Kuipers "Overview of Constraint-Based Path Selection Algorithms for QoS Routing"