Implementing an optimal technique, an equitable network for maximum capacity of networks in tree structures

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Abstract
One of the most crucial data structures for systems decision-making is a tree. A non-linear data structure is a tree. Optimizing non-linear functions of variables known as objective functions is required for a tree issue. The overall outflow from source node to sink node is maximized by the goal function. Using tree structures, we shall demonstrate a network's maximum capacity.
Keywords – capacity, Network, Tree, Source Node, Sink Node

INTRODUCTION

A Flow Network is a basic linked, weighted, Directed Graph G. if every Directed edge in G has a weight that is a non-negative value. This quantity, which is labeled as Cij for the edge directed from vertex I to vertex j, in a flow network reflects the edge's capacity. A highly useful and natural tool in combinatorial operations research is the tree. In such a flow network, the main challenge is to either maximize flow or reduce the cost of a prescribed flow. The maximum flow minimum-cut theorem applies to a flow network with a single source and one drain, as stated. A rooted tree is a tree in which one vertex can be distinguished from every other vertex.

RELATED WORK

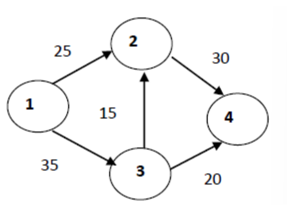

Fig. 1. Weighted Graph

A partition of the node into two sets S and T. The origin node must be in S and the Destination node must be in T.

Cut 1:
Where S 1 = {1} and T 1 = { 2,3,4}
S 1 X T 1 = {(1,2) + (1,3) + (1,4)}
= 60
Cut 2:
Where S 2 = {1,2} and T 2 = {3,4}
S 2 X T 2 = {(1,3) + (1,4) + (2,3) + (2,4)}
= 50
Cut 3:
Where S 3 = {1,2,3} and T 3 = {4}

S 3 X T 3 = {(1,4) + (2,4) + (3,4)}
= 50
Capacity = Maximum (Cut 1, Cut 2, Cut 3)
= Maximum (60, 50, 50)
= 60

PROPOSED ALGORITHM

Step 1: Find the Network is balanced or unbalanced using In-degree and Out-degree.
Step 2: If the Network is balanced then the Network is tree structure otherwise is not tree structure.
Step 3: If the Network is tree structure then find the Maximum capacity value using Arc and Distance.
Step 4: Consider the weighted graph, select the Arc and Distance.
Step 5: Sort by the distance and connect all the vertices one by one.
Step 6: Finally, the tree structure is given and the sum of the edges value is in maximum capacity Network value.

MAXIMUM CAPACITY NETWORK EXAMPLE

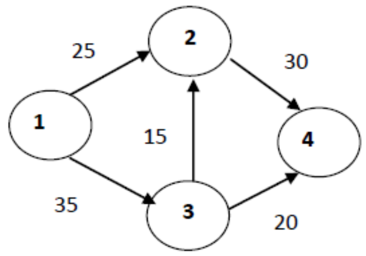

Fig. 2. Weighted Network diagram

Step 1: Find the Network is balanced or unbalanced.

Table 1: Indegree and Outdegree value

Node	Indegree	Outdegree
1	0	60
2	40	30
3	35	35
4	50	0
TOTAL	125	125

Step 2: Find the Arc and Distance using weighted graph.

Table 2: Arc and Distance value

Node	Arc	Distance
1	1->2 1->3	25 35
2	2->4	30
3	3->4 3->2	20 15

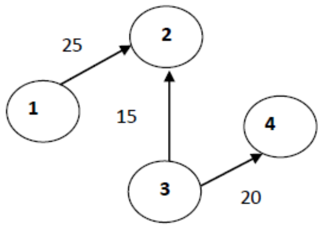

Fig. 3. Maximum Capacity Diagram

Step 3 : Sorting by the Distance

Table 3: Sorting by Distance value

Node	Arc	Distance
3	3->2 3->4	15 20
1	1->2	25
2	2->4	30
1	1->3	35

RESULT AND DISCUSSION

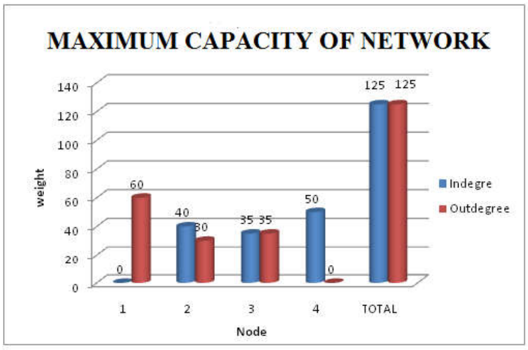

Fig. 4. Maximum Capacity of Network Diagram

The sum of the edges value is in maximum capacity Network value is 60.

CONCLUSION

There is at least one spanning Tree in every linked Graph. If and only if a graph is minimally linked, it qualifies as a tree. A tree is any linked graph that has n vertices and n-1 edges. An n-vertex tree has n-1 edges. The formulation of a set of nodes that any maximum routing solution can satisfy every non-degenerate network can support its full capacity.

FUTURE WORK

Every network has a balanced maximum capacity, and any non-degenerate network may be solved. To get the flow value, mathematical optimization techniques are employed to determine the maximum capacity. Any node in a directed tree with out-degree 0 is referred to as a terminal node. Branch nodes are all other nodes. Any node's level is determined by how far it is from the root. Each node in a directed tree must exist. A directed tree can also have an isolated node. We shall briefly discuss some of the Distributive Lattice Method's algorithms.

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