SPATIAL TEMPORAL DATA ADVERSE ROUTING TO ENHANCE QUALITY OF SERVICE FACTORS IN DISRUPTION TOLERANT NETWORKS

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Abstract

In Disruption Tolerant Network the nodes are randomly deployed in the network. Due to the random deployment of nodes, enhancing the Quality of Service of the network becomes more difficult. The disconnectivity problem in the network also becomes an issue due to the movement of the nodes To overcome all the above issues, Spatial Temporal Data Adverse Routing is used. The Spatial Temporal Data Adverse Routing enhances Quality of Service by handling the fault in the Disruption Tolerant Network. The Deployment model helps in ranking the nodes and enables in handling the nodes for data transmission and thereby increases the performance of the network. Source Encoding is done to provide Lossless Compression in the network. Data Anonymization is proposed to overcome the security issues and by proposing all the methods, the Quality of Service factors are satisfied in the network.

I.INTRODUCTION:

Store-Carry-Forward method is implemented where the data is stored in the buffer and then carried around until it gets contacted with another node and finally it forwards the data when the node comes in contact with another node. Due to the frequent disconnections between the node, it is a challenging task to design an efficient routing protocol.Various protocols have been proposed in improving the Quality of Service in the DTN network.

Spatial Temporal Data Adverse Routing:

Disruption Tolerant Networks consists of nodes whose topology and parameters changes with time. They are more important because their applications are used in traffic planning and finding the route. In Disruption Tolerant Networks various old routing techniques have been proposed to improve the Quality of Service of the network and they are not applicable due to the challenging issues in DTN. When compared to the other routing techniques the proposed Spatial Temporal routing technique is based on the clustering method that saves the energy efficiently in DTN networks since the nodes in the DTN are energy consuming.

II. Issues in enhancing Quality of Service in DTN Networks-Existing Work

A. Disconnectivity problem:

Due to the failure of routing capability of the node in the DTN Network, the coverage problem arises that leads to disconnectivity between the nodes. The nodes then become the fault nodes. Optimization of Network configuration and deployment model is being done to handle the fault nodes. Though the model gives us a solution, it has few drawbacks that includes packet loss, network overhead and throughput and the Quality of Service constraint becomes the major problem.

B. Fault node problem: The nodes in the network becomes fault node due to the routing problems that does not allow data transmission and becomes the failure node in the network.

C. Packet loss:

Due to the entries of malicious nodes in the network, nodes tend to loss the data transmitted by the previous nodes. The loss of data leads to the decrease in packet delivery ratio and Quality of service is not guaranteed in the network.

Resource constraint:

When more is the data transmission rate, the energy consumption becomes more. The energy required for communication is high when compared to processing the data. Data Aggregation helps in reducing the communication process.

III. Methods to increase the Quality of Service factors in DTN Networks:

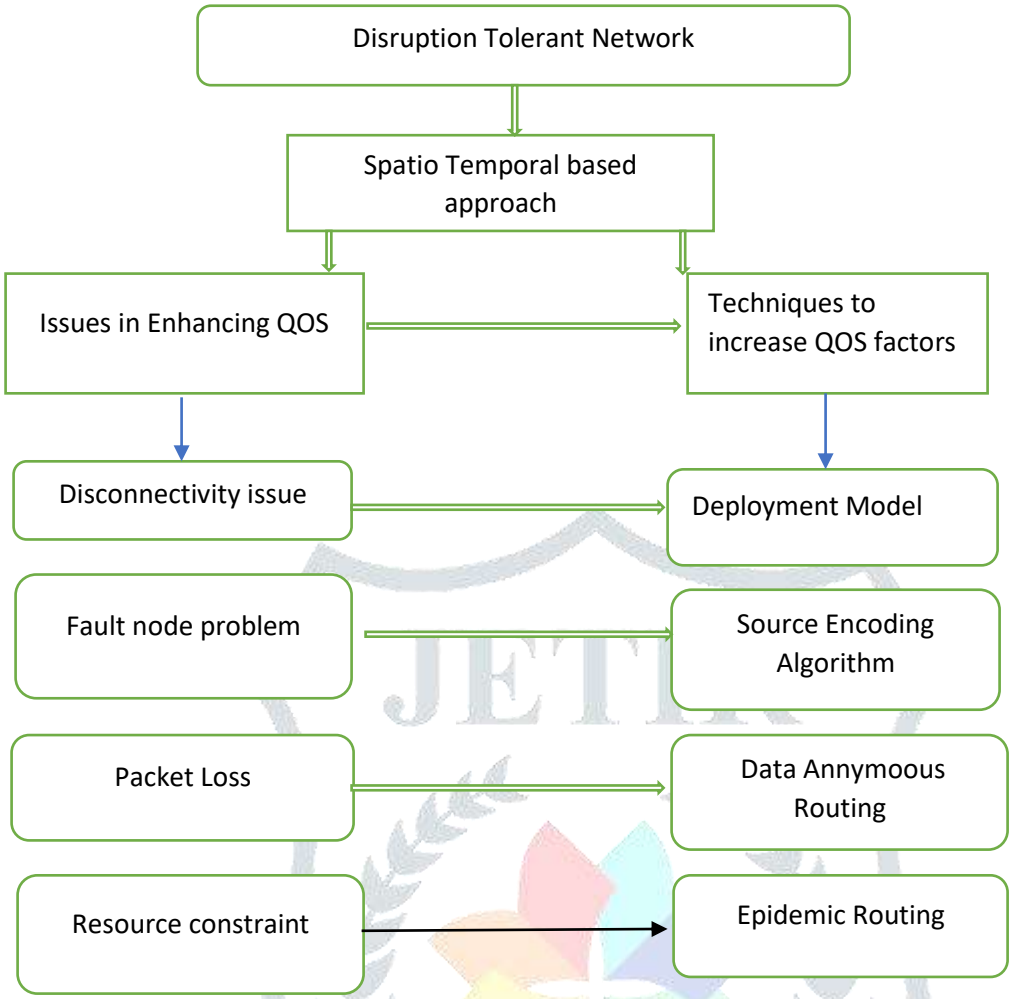

Figure 1. Enhancing Quality of Service factors in Disruption Tolerant Networks

A. Deployment Model:

The divide and conquer deployment model help in solving the coverage problem in the social networks. The model provides us a sufficient sensing of the coverage issues. When the nodes undergo deployment mode, high degree of node capabilities arises and due to the high data traffic rate and also due to the interference each node undergoes exhaustion of energy. In order to overcome the issues in deployment model the routing strategies are invoked in the Disruption Tolerant Networks that tends to improve QOS constraints.

B. Node Spacing:

The nodes are being clustered based on their density and space of the node in order to balance the traffic using spatial and temporal data. To handle the fault node in the network, cooperative caching of the node information is enabled and thereby the density of the node is calculated in the Disruption Tolerant Networks by increasing the Quality of Service.

C. Source Encoding Algorithm:

By calculating the density of the node alone cannot improve the network efficiency due to the presence of malicious nodes in the network. It is important to rank the nodes based on calculation of node density and thereby the data can be transmitted effectively. The malicious nodes can be avoided by using Source Encoding Algorithm that compresses the data transmitted and provide a lossless compression by eliminating the space and time complexity in the network. The redundant bits in the data are transmitted due to the lossless compression and therefore the QOS Constraint is enhanced in the network.

D. Data anonymous routing method:

The compressed data is encrypted using the Puzzle based Data anonymous routing in order to transmit the data securely by encoding them and thereby avoiding packet loss and data compression attack without disturbing the routing

E. Epidemic routing:

The most frequently used mechanism for fault tolerance is the Epidemic routing. Many optimization techniques are carried out in Epidemic routing to monitor the nodes in the network for high data delivery by reducing the communication cost. The nodes are selected based on the density of the nodes.

IV. Conclusion

The Spatial Temporal data model is designed in such a way that various Quality of Service factors are considered. The node is estimated by calculating the node density based on number of connections and ranking the nodes based on Prioritization for efficiently transmitting the data. Data compression is also achieved by Source Encoding which provides a lossless Compression. Finally the data is provided with security through Data Anonymization which tends to improve the Quality of Service factors that includes the node energy, Packet loss, Handling Fault Nodes and disconnectivity issues in Disruption Tolerant Networks.

V. Reference

[1] R. Lu, X. Lin, H. Zhu, and X. Shen, "Pi: A Practical Incentive Protocol for Delay Tolerant Networks," IEEE Trans. Wireless Comm., vol. 9, no. 4, pp. 1483-1493, Apr. 2010.

[2] F. Li, A. Srinivasan, and J. Wu, "Thwarting Blackhole Attacks in Disruption-Tolerant Networks Using Encounter Tickets," Proc.IEEE INFOCOM '09, 2009.

[3] Y.-K. Ip, W.-C. Lau, and O.-C. Yue, "Forwarding and replication strategies for DTN with resource constraints," in Proc. IEEE VTC,April 2007.

[4] S. Marti, T.J. Giuli, K. Lai, and M. Baker, "Mitigating Routing Misbehavior in Mobile Ad Hoc Networks," Proc. ACM MobiCom '00, 2000.

[5] P. Costa, C. Mascolo,M.Musolesi, and G. P. Picco, "Socially-aware routing for publish-subscribe in delay-tolerant mobile ad hoc networks," IEEE J. Sel. Areas Commun., vol. 26, no. 5, pp. 748–760, Jun. 2008.

[6] S. Ioannidis, A. Chaintreau, and L. Massoulié, "Optimal and scalable distribution of content updates over a mobile social network," in Proc. IEEE INFOCOM, Rio de Janeiro, Brazil, Apr. 2009, pp. 1422–1430.