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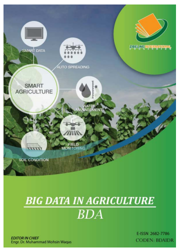

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REVIEW ARTICLE

ARTIFICIAL INTELLIGENCE BASED CONGESTION CONTROL MECHANISM VIA BAYESIAN NETWORKS UNDER OPPORTUNISTIC

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ABSTRACT

Nodes in Mobile Opportunistic Network (MON) must cache packets to deal with the key challenging issue of intermittent connection. Management strategy of handling buffer therefore plays a vital impact on the performance of MON, and it attracts more attention recently. Intermittent connection and lengthy postpone are the key challenges in such networks for this reason the internet congestion control mechanisms aren't suitable for DTNs. An inefficient buffer management strategy would badly affect the performance of such networks. In recent years, to handle congestion buffer manipulate strategies in MON are considered an active vicinity for research studies.

KEYWORDS

DTN, ICN, MON

1. INTRODUCTION

Opportunistic network belongs from the subclass of Delay Tolerant Network (DTNs) in which communication is established via irregular and dynamic contacts by finding a suitable opportunistic node as forwarder towards the destination. Routing of information to the end node becomes difficult in such networks [1]. Congestion can occur at both link and node level and it can cause different affects like packet drop, delay, less energy efficiency, QoS and throughput etc. Congestion issue should be handled in an effective and pre-active manner for both link and node level congestion issue [2].

As in recent few years with the introduction of new multimedia application bring out many new challenges in terms of Quality of service for any wireless networks [3]. Congestion in terms of quality of network with reliability and sustainability is a critical factor to deal. Packet failure particularly in multimedia transmission in MANETs or opportunistic network is caused due to mobility, limited bandwidth, limited battery life and irregular contacts so if a congestion not handled effectively in proactive manner it would cause many drawbacks like Extensive delay, more overhead, heavy packet loss in efficiency of such networks [4].

Congestion Avoidance in Mobile Ad-Hoc Networks, through Cooperative AODV routing has been proposed by enhancing CORMAN algorithm in a form of CARMAN algorithm by using AODV protocol instead of DSDV. Number of hop counts and threshold calculation issue has been addressed and minimizes via this technique. Packet delivery ratio and Averaged end-to-end delay is being used as performance metrics. Drawback is that simulation results have not been added in this paper [5]. Reputation Based Opportunistic Ad-Hoc Routing being proposed to provide efficient and trusted routing by calculating a best forwarding node in the network on the basis of trust characteristics metric in addition the selection will be done for the node having high trust value and moving in same direction towards destination. Congestion Control in Mobile Ad-Hoc Networks has addressed the issue of handling scheduling and congestion issue togethered. They have preseneted a model to handle congestion and accessing media access control (MAC) via a bounds applying on the queue limits [6]. A new RREQ Message Forwarding Technique based on Bayesian Probability Theory being compared based on parameters like consumed power, Throughput, MAC load congestion with 05 of the following existing protocols (AODV-Ext, AODV, DSDV, DSR,OLSR) and performed better [7].

Following research gap being identified after extensive literature review: Protocols other than Cooperative AODV protocol should also be tested in MANETS for congestion avoidance like [DSDV, OLSR and DSR etc.]. Self-intelligence node capability to find congested link and node could add efficiency in finding optimal route if added in Reputation Based Opportunistic Ad-Hoc Routing with Bayesian network. Uniformity in number of replicas which can exist in a dynamic enviornment and adding a proper energy saving model with the solution is still needed to be addressed in Congestion Control in Mobile Ad-Hoc Networks. Probability based other techniques like Monte Carlo algorithm could be also tested on route request mechanism in A new RREQ Message Forwarding Technique based on Bayesian Probability Theory.

2. CONCEPTUAL STATEMENT

Techniques, Models, Protocols, Architectures presented by different researchers based on either (End-system flow control), (Network Congestion Control), (Network Based Congestion Avoidance) (Resource Allocation) which address congestion control issue in a Pro-Active manner to (Detect, Notify and then Avoid) both link and node level congestion to cope separately. There is strong need of improvement to handle congestion control issue effectively by proposing some technique which could address both node; (Sender, Intermediate Nodes) & link level congestion simultaneously in a Pre-Active manner. The following questions are arising here:

1) How congestion can be control in Real Time Multimedia traffic?
2) How a node becomes self-aware if the link becomes congested on transmitted/selected path?
3) How node can select the next optimum path if the selected path becomes congested without exchanging route establishing packet?

The aim of the study would be to explore how congestion control can be reduced both at link and at intermediate node level in opportunistic networks so that the problem of packet loss or packet delay, retransmission can be reduced. The objectives of the research would be to exploring a Bayesian networks and estimation theory in details and then proposing a new method, technique, model or algorithm based on Bayesian theory and networks which can handle congestion issue with minimum delay and packet loss in best manner with good time and throughput at node level.

3. PROPOSED SOLUTION

In this research work Artificial Intelligence based Congestion Control Mechanism (AIbCCM) has been proposed by creating a Bayesian networks. This technique will target uncertain domains like one could be found in opportunistic networks. In opportunistic networks with self-intelligence capability if somehow incorporated in a node to decide, calculate best optimum route for traffic dissemination on a congestion free links. Nodes identified in the network by archiving information of the other nodes in the network to cope with node and link level congestion issue via end-to-end and hop-by-hop congestion control mechanisms.

4. EXPECTED RESULTS

“A Model to Overcome Node Level Congestion in Opportunistic Networks” being proposed and validated in my Independent study 02 at SZABIST in my PhD studies. Model was simulated based on only IFQ and TTL parameters of packet droop along with a load balancing technique but after completion of this research study with the induction of artificial intelligence by creating We assume that the results after creating Bayesian networks will be much better in terms of packet loss, delay and throughput in comparison with results produced in independent study 02 and also results found in recent research work been done in handling congestion issue as found in literature review.

5. CONCLUSION

This research study will be focusing on that how artificial intelligence technique based on estimation/ probability theory could be helpful in achieving a better performance in terms of quality of service keeping in mind with less delay and droop rate could be achieved by forming a Bayesian networks so that congestion issue in opportunistic networks / (MANETs) could be handle efficiently and effectively in a pre-active manner.

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