A THUMPING APPROACH FOR CONTROLLING CONGESTION IN SMARTPHONE BASED MOBILE NETWORKS

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Abstarct: **Smartphone networks (SNs) is one of the type of delay tolerant networks (DTN). In DTNs the Smartphone mobile users transmit with each other through short distance and provide a device to device communication. The major provocation problem of Smartphone networks is to control the congestion. The main focus is to research the context information between mobile nodes to control congestion. To avoid a discontinuous connectivity and everlasting disconnection in smart phone networks for providing a complete path from source to destination. To determine the forwarding set by using the CRITIC method which includes those messages that cause the least congestion in network.**

I. INTRODUCTION

A mobile ad hoc network(MANET) is a self-governing collection of mobile devices (laptops, smart phones, sensors, etc.) that communicate with each other over wireless links and cooperate in a distributed manner in order to provide the necessary network functionality in the absence of a fixed infrastructure. This type of network, operating as a stand-alone network or with one or multiple points of attachment to cellular networks or the Internet, paves the way for numerous new and exciting applications [11]. A Smartphone is a mobile phone with more progressive facility and connectivity than the basic feature phones. As per Nielson's report: Smart phones is one of the fast growing mobile technology and becomes very popular among the mobile consumers [2]. Smartphone networks is one of the type of DTNs in which the mobile user who move around and transmit with each other through short distance which provide device-to-device (D2D) communications [2]. It undergoes discontinuous connectivity and ever - lasting disconnections due to state of motion of the mobile nodes.

In DTNs, usually there is no stationary end-to- end routes in SNs. Consequently, communication in such type of network gets a challenging issue. Conventional MANET routing protocols such as AODV, DSR, DSDV and LAR [12] are used to make supposition that the network graph is fully connected and fail to route messages if there is not a complete path from source to destination at the time of sending. Mobility-assisted routing consists of each node autonomously making forwarding resolution that take place when two nodes meet. Message gets forwarded to encountered nodes until it reaches its destination [11].The main focus is to address this challenge and various routing algorithm for SNs such as "Store-carry-and-forward" is used [3, 4].If no available connection at a particular time, DTN nodes can store and carry the data until it encounters the other nodes. The forwarding chance is to encountered all the nodes to post the data and the forwarding decision is made by the current mobile nodes based on the particular routing strategy [4] includes network resource available, estimated delay and current network congestion level. Though the nodes are constantly restricted by storage space. The intermedium nodes buffer stores the limited messages and their caches are strongly affected which cause congestion on networks. Therefore, message is replicated for improving the performance on the network, which produces the manifold copies of the identical messages and distribute them in the network. These copies can simply expand the network burden and produce severe congestion. Due to congestion on network which causes the packet loss, network bandwidth waste and message retransmission. Though, the congestion constantly produces serious issues and extreme results which reduce the network ability.

The main advantage of identifying the social ties is to bring the message delivery in SNs.The BUBBLE [5] combines the knowledge of community structure with the knowledge of node centrality to make forwarding decisions. It helps to achieve a 25 percent of delivery ratio by forwarding messages to the mobile nodes with increased centrality. Social-based routing protocols [9] have shown their promising capability to

improve the message delivery efficiency in Delay Tolerant Networks (DTNs). The efficiency greatly relies on the quality of the aggregated social graph that is determined by the metrics used to measure the strength of social connections. Social network analysis (SNA) is the study of connections between entities and on the patterns and involvement of these relationships [11]. Social-based routing is a particularly relevant solution for opportunistic networks with a social component like pocket switched and mobile peer-to-peer networks [12]. The congestion problem is addressed by using the social ties and improves the network performance and efficiency.

The two main congestion factors [1] include social-aware ones and social-oblivious one.Theforwarding set is determined by using the CRITIC method is accepted to define the weight of each congestion factor. The association of weights in multiple criteria problems is a critical stage of the whole decision making process by using the CRITIC method [7]. It provides the forwarding set in which the messages which cause the least congestion effect on network and improve the network efficiency.

II. NETWORK ANALYSIS

In network analysis, the Smartphone based mobile networks is analysed. Smartphone networks is one of the type of DTNs in which the mobile user who move around and transmit with each other through short distance which provide device-to-device (D2D) communications [4]. If they moved out of the coverage they will disconnect. Thus the network provides the social ties between the nodes are usually shows and pretend the motion of the nodes. Several pairs of nodes frequently appear in the similar places. For e.g., hospitals, organizations, friends. So the social ties between the nodes can be used to predict their come across chance.

In SNs, a node can concurrently service the message from source to destination. A message through the network is being transmit from one node to another till it attains its destination. In addition to all the nodes are with restricted storage space. When the amount of messages are created and cross a network in which the nodes are inclined to congestion. Since the buffers of the nodes are strongly affected by the other messages. Furthermore, the messages are created which having the particular time to live (TTL) and are dismissed when the TTL will decease.

III. CONGESTION APPEARANCE

The congestion on network causes the serious problems such as the packet loss, network bandwidth waste and message retransmission. Though, the congestion constantly produces serious issues and extreme results which reduce the network ability. To conquer communication challenges in SNs, some of the routing algorithms such as store-carry-and-forward schemes [4] are employed. The forwarding messages are temporarily stored in the intermediate nodes with the restricted storage buffer size. Intuitionally, one way to reduce total resource expenditure is to limit the maximum number of hops that a message can take, which also limits the average number of nodes exhibits to a message [11]. The buffer size restricts the amount of memory and network resources consumed through Epidemic Routing. In addition, most of the routing algorithm is used to exploit a message replication, in which the multiple copies of the same message is sprayed them into the network to improve the performance. These copies can easily affect the restricted buffer size of the node and causes the severe congestion. A node may accept or reject the incoming messages or drop the messages which are stored in the buffer. To overcome the network efficiency and performance and it is censorious to design a congestion controlling mechanism for SNs.

IV. CONGESTION KEY FACTORS

To determine the congestion factors including Social Intention, Message Length, and Free Buffer Size.

Social Intention: It refers to the social communication intention of none pairs in which establishes the contact number and average interaction duration. The mobility behaviour of the nodes can be avoided by identifying the social ties between the nodes. The nodes can frequently interact [1] with each other by means of stronger social intention. The local network information is considered instead of considering the entire network knowledge including node centrality and community. To evaluate the social intention between the nodes, contact number and average interaction duration is established. It provides the network with the occurrences of least congestion.

Message Length: If the length of the message is large then the nodes can store some of the messages. Therefore possibility of congestion will be incremented. Therefore, message length is taken into an account for designing the effective congestion control mechanism. The message length is a one-sided knowledge and it can be getting easily. The message with small length will be chosen which occupies a small space and consequently more messages will be stored and deliver by the intermediate nodes.

Free Buffer Size: A node with greater capacity buffer, it can store more messages and the possibility of congestion is reduced. The free buffer size can be avoided in which causing the congestion. The free buffer size is considered as a local knowledge which can be easily vested by interchange the information when a contact appears.

V. CONTEXT SENTITIVE CONGESTION CONTROL

Multiple criteria decision making (MCDM) [7] is affected with organizing and deciding the issues for involving an amount of criteria and making the best conclusion in a complicated surroundings. In DCDM it has two main parts namely:

1. Determining the weight of criteria
2. Produce the best decision

A CRITIC method [9] is a perfect and mature path to determine the best criteria weight and also encounter the criteria.

VI. CONCLUSION

The main aim is to utilize the context information of the network to address the congestion issues in SNs without getting any side effect to the network. The congestion control problem can be anatomized as a multiple criteria decision making (MCDM), in which the weight of each congestion factor is measured by the CRITIC method and the congestion effect of each message stored is estimated by metric gain. Context-Aware Congestion Control approach (CACC) is used to determine the forwarding set, including those messages that incur the least congestion on the network. CACC can effectively manage with congestion and improve network efficiency. In future, Cache Queue and Replication process is implemented to avoid the multiple copies of same messages as well as increase the network performance.

VII. REFERENCES

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