Enhanced Opportunistic Network Parameters

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ABSTRACT

In Last few years we have seen the drastic increase in use of mobile devices. Along with increase of these devices the data generated is massive. These data are also shared between them. Many protocols are used for Data sharing. System parameters assume a critical part in productive working of it. Additionally these parameters are firmly identified with each other. Opportunistic sharing is that these devices have an opportunity to share data. When the data is shared all the nodes are active during transmission.These causes organize blockage and activity and influence the execution of system. This article includes two methods of selecting only one node for transmission instead of all nodes being active. After analysing these methods, network parameters are improved. Detection of network is done on Depending on number of nodes in network, if it is Sparse or dense is the first method. Hop limits, lifetime are also crucial in network and considered in second method.Parcel Delivery proportion, throughput, vitality and overhead are the parameters considered in this paper.

Keywords—*Opportunistic, dense and sparse, throughput, overhead,PDR*

I. INTRODUCTION

There is immense addition being used of cell phones in late couple of years. As the quantity of customers of advanced cell is expanding, the movement substance produced are additionally extending (Suzan et. al.,) Many methodologies of looking information are utilized. Albeit social-based methodologies can be utilized to address the issue, most existing plans utilize the multi bounce worldview and forget the extreme asset limitation in organize. (Hyytia E et al.,). Alongside the system comes in parallel with different parameters like overhead, delay, throughput, jitter, dropping proportion, vitality, bundle postpone proportion (PDR), and so on. These parameters choose the adaptability and lifetime of the system. Opportunistic network is unconstrained communication between the clients of digital pockets and Personal Digital Assistance (PDA). Wi-Fi and Bluetooth are some of methods of sharing data. Obtaining relevant data becomes difficult with increasing the amount of information. Crafty system makes the cell phone mindful of essence of other cell phone and can find each and share the information with each other. In communication system the data accessed from internet are shared in packets. These packets are combined from small number of pieces.Switch chooses the way of information from source to goal and changes the course or connection if the connection is fizzled. Hence the versatile hubs comprise of source, switch and goal (Fan j et al,).The advancements in WSNs and the rapid increase of wireless devices necessitate an efficient data search system for a large-scale, highly mobile and dense wireless network (Yang W et al.). Mobiles, I-phones and computers are the devices which are used on very large scale. Query statistics, including query length, query classification, and query distributions, for our three interfaces described above are different. It shows that our sample of mobile queries exhibits similar characteristics to recently published large scale studies of mobile search behavior (Shen H et al.,). System gives a stage to applications in conditions where end-to-end ways might be exceptionally temperamental or don't exist by any means. Distinctive calculations are assessed for sending and ending seek inquiries, utilizing recreations with various classes of DTN steering conventions for various portability situations (Kamwar M et al,). Content Centric Networking, which has straightforward information conveyance techniques without utilizing IP addresses, can enhance content spread in wired systems and remote Mobile Ad Hoc Networks (MANETs). In any case, the execution of CCN can be obliged in MANETs because of communicate raging amid content dispersal. In addition, numerous substance suppliers existing in MANET increment content declaration overhead (Jaebeom Kim et al.,).

II. OBJECTIVE AND SCOPE

Opportunistic routing is based on broadcast till message reaches destination node. Each node need to discover the route to find the destination node. It may cause many issues in Mobile ad-hoc network (MANET) like clashing in routing table, tolerance in node discovery and establishment etc. In a roundabout way, opportunistic routing depends on concept of pure wireless communication however the gathering of message is probabilistic. In this system, every single node is dynamic amid sharing and recovering the information. All nodes that are around will receive the query message (Suzan et. al,). Thus we propose two methods for selecting a particular node among the nodes which creates response id.

A. To achieve minimal network congestion

B. To achieve maximize Throughput

C. To achieve high Packet Delay Ratio

D. To achieve minimum End to end Delay

E. To achieve minimal routing overhead

In existing method every node will participate in each transaction. So the network congestion increases. So there is the scope of increasing these parameters. In our proposed methods, we will select only one node for sharing the data. In method 1, detection of type of network is considered. In method 2, hop limit and lifetime is calculated and query message is send to only that node.

III. METHODOLOGY

The general method of sharing data is as shown in figure (Suzan et .al,) 1. Node A generates a query message which is in search of data about a particular data named kalio festival. This query message is forwarded to neighboring nodes.The Node which has the information produces the reaction message and advances the information to the hub which requires it. Information is exchanged to hub with one or various jumps.

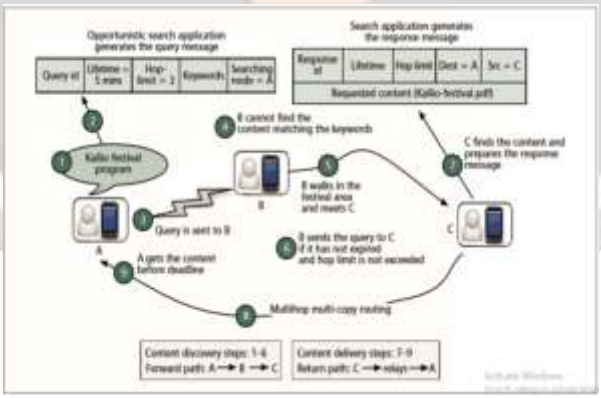

Figure 1: General method of sharing data in opportunistic network

Following are the flaws of existing system:

Consider that there is more than Node C which are generating response message and sending the data to Node A. This can create traffic, network congestion and reduce lifetime of the network.

1. Opportunistic routing is based on broadcast concept, so every node will participate in every transaction. This will lead to increase in overhead.

2. Continuously working nodes may increase energy consumptions and further minimizes the network lifetime.

3. Network congestion also increases.

Methodology

Thus two methods are proposed in order to achieve the objectives.

1. On the basis of detecting type of network.
2. On basis of updating Query id by calculating hop limit and lifetime/ Improved Opportunistic Network.

1. On the basis of detecting type of network.

In the first method we propose that out of the total nodes having data, we will select only one node for message transmission depending on density of network (thick or scanty). By and large, thick system comprise of most extreme number of hubs while scanty system comprise of less number of hubs.If the network is sparse (number of nodes less than 3) then conventional opportunistic method of sharing data is used. High energy and less speed nodes are selected after checking the conditions. If the network is dense (number of nodes more than 5) then Energy of these nodes are checked (more than 50J). If the energy node count greater than 50J is equal to 0 then node having next second low energy can also broadcast. Next step is to check the speed in concern of mobility(less than 3m/s). Node selected by detecting type of network is used for broadcasting. Flowchart of this technique is appeared in figure 2. Calculation of strategy 1 is given underneath.

Algorithm for method 1

If network is dense then

ONLY STABLE & HIGHER ENERGY NODES can broadcast

Else

ONLY HIGHER ENERGY NODES can broadcast

If count (HIGHER_ENERGY_NODES=0)

SECOND_LOW_ENRGY_NODE can broadcast

Every node will periodically send energy, speed, and geographical information to neighbor nodes

Dense & Sparse nodes can be identified using no of neighbor's criteria

2. On basis of updating Query id by calculating hop limit and lifetime/Opportunistic Network.

After analyzing figure 1 of sharing data, Node B, Node C and Node D in the network, who generates the response message. Query id is send to only that node whose hop limit and lifetime are satisfied by QoS table. Query is send to either node B, C or D. Node A creates the Query message. Hop limit and lifetime updates the QoS value and it further updates routing table for each node. When the Query is send to only Node then only that node will generate response message. This will improve the parameters of the network. Flowchart of this strategy is appeared in figure 3. Square Diagram for proposed framework is appeared in figure 4.Query id is generated by source and response id is generated by destination. Response id is created by multiple receiver of Query id. Every node selects the routing path according to its QoS table. Location updates, number of hops, lifetime, energy and transmission time) updates QoS table for routing updates. Fundamentally the system topology demonstrates the quantity of hubs in the territory or versatile hub arrange. The development of the hubs is arbitrary. Query id is generated by source node and response id is generated by receiver. But if there are multiple receivers then each will generated response id and there will be network congestion and reduce the lifetime. So in the process obstruct, as far as possible, lifetimes are considered for every hub. Every hub will refresh the directing table for each steering way. This method is defined as improved Opportunistic Algorithm which gives better results.

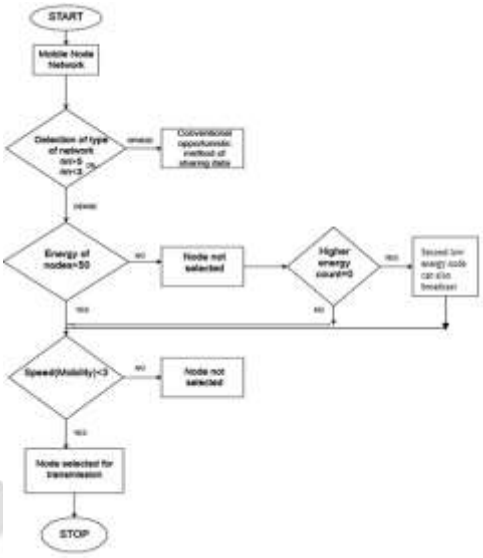

Figure 2: Flow chart On the basis of detecting type of network.

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Figure 3: Flow chart of on basis of updating Query id by calculating hop limit and lifetime/Opportunistic Network.

Algorithm for method 2 is shown below

Step 1: Start

Step2: Node A creates Query message

Step3: Check conditions of nodes having data

Step 4: Check hop limit of lifetime of nodes

If Node B is reliable

Then transmit query message to Node B

Else Go to Node C

If Node C is reliable

Then transmit query message to Node C

Else Go to Node D

Step 5: Update routing table

Step 6: Send query message

Step7: Data delivered to Node A

Step7: Stop

Figure 4: Block diagram for on basis of updating Query id by calculating hop limit and lifetime/Opportunistic Network.

IV. RESULTS

From these two methods we analyze the nature of network parameters of opportunistic network. The following graphs explains the performance of opportunistic network

A. Results for method 1: On the basis of detecting type of network.

NAM window is shown in figure 5 for first method described. Mobile Network with 20 nodes is created. The dense nodes are identified and are blue colored and the list of nodes displayed. Random movement of these nodes is assigned and movements, time and other parameter are calculated to display the graphs. Among these hubs just a single hub is chosen which is having greatest vitality and low speed. Detection of type of network by dividing it into dense or sparse and High energy and minimum speed (mobility) of mobile nodes we apply four scenarios. Types of networks are as follows:

1) Detecting if network is Sparse or dense.
2) Detecting if network is Sparse or dense and low speed(mobility)/stable of mobile nodes
3) Detecting if network is Sparse or dense and high energy of mobile nodes
4) Detecting if network is Sparse or dense with high energy and low speed (mobility)/stable of mobile nodes

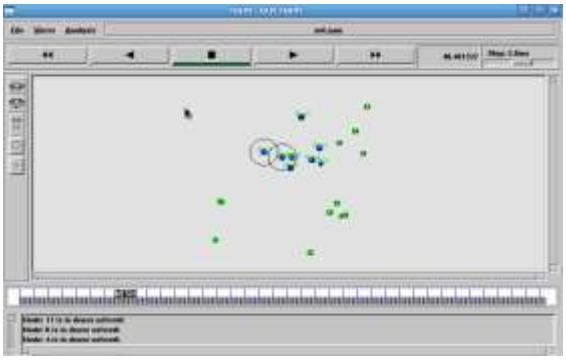

Figure 5: Output window for method 1 On the basis of detecting type of network.

Throughput: The Number of action executed or packets received at destination per time. The measure of activity a system can convey is meausured as throughput, generally in wording, for example, kilobits every second (kbps). Throughput is practically equivalent to the quantity of paths on an expressway, while inactivity is undifferentiated from its speed restrict.

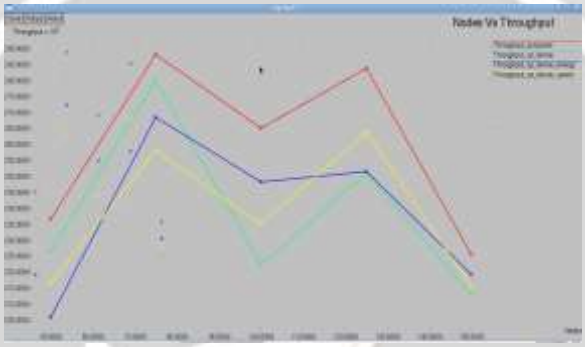

Figure 6: Analyzing number of nodes against Throughput

After comparing four scenarios, it is observed that by detecting type of network, if it is Sparse or dense with high energy and low speed (mobility) of nodes (indicated by red color shows) maximum throughput.

Energy consumption: Total average energy required for nodes in a network to be active. Initially energy is low and increases with simulation time and number of nodes

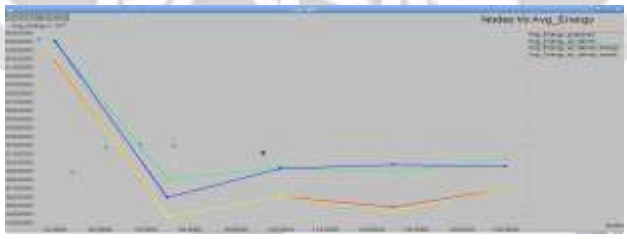

Figure 7: Analyzing number of nodes against Average energy

Average energy consumption required for scenario of type of network with detecting if it is Sparse or dense with high energy and low speed (mobility) of nodes (indicated by red color) is low compared to other three schemes.

Packet delivery Ratio: The parcel conveyance proportion (PDR) is the aggregate number of bundles got by the goal hubs to the aggregate number of bundles sent by the source hubs.PDR must be maximum for better performance.

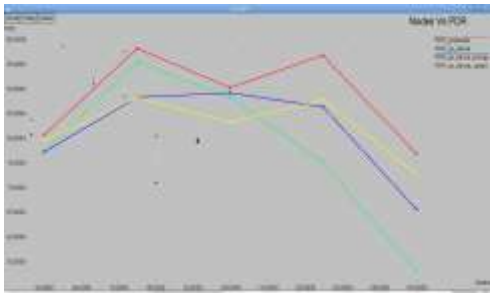

Figure 8: Analyzing number of nodes against PDR

PDR (Packet Delivery Ratio): After comparing four scenarios (indicated by red color), it is observed that detecting type of network, if it is Sparse or dense with high energy and low speed (mobility) of nodes gives maximum throughput.

Delay: Ordinary Delay is the time taken for a message to reach from source to objective

Delay (ms) $=\Sigma \frac{(Delay\ of\ each\ entities\ data)}{(Total\ number\ of\ delivered\ packets)}$

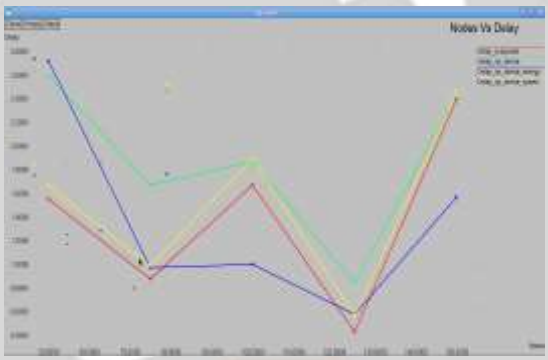

Figure 9: Analyzing number of nodes against Delay

Average delay for scenario (indicated by red color) detecting type of network, if it is Sparse or dense with high energy and low speed (mobility) of nodes is low compared to other three schemes.

B. Results for method 2: On basis of updating Query id by calculating hop limit and lifetime/ Improved Opportunistic Network.

NAM window shows the multiple (3) receivers in figure 9.Inquiry id is transmitted from Node A to Node B, C and D. Thus the Node A decides the routing updates for Node B, C, and D according to lifetime, hop limit and QoS values.

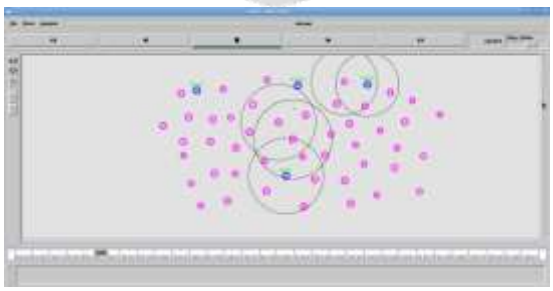

Figure 10: Output window for method2 on basis of updating Query id by calculating hop limit and lifetime/ Improved Opportunistic Network.

1. Throughput

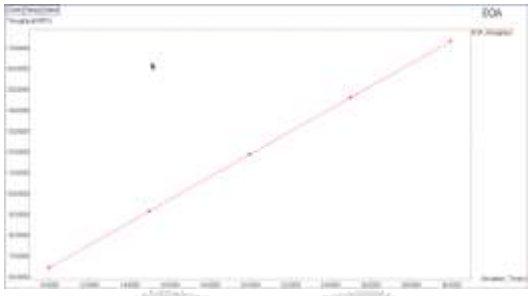

Fig.11: GRAPH- Analyzing Control Throughput against simulation Time

Throughput of the network increase by applying Proposed Opportunistic Algorithm.

2. Energy consumption

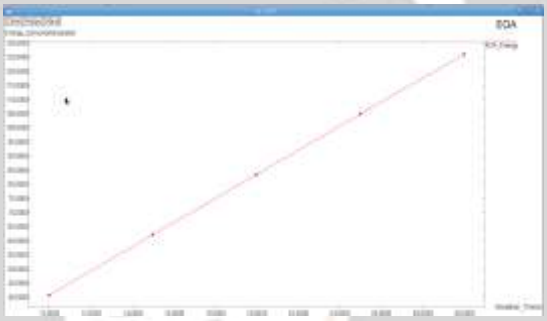

Fig. 12: GRAPH- Analyzing Energy consumption against time

Energy of the network increase in simulation time

3. Packet delivery ratio (PDR)

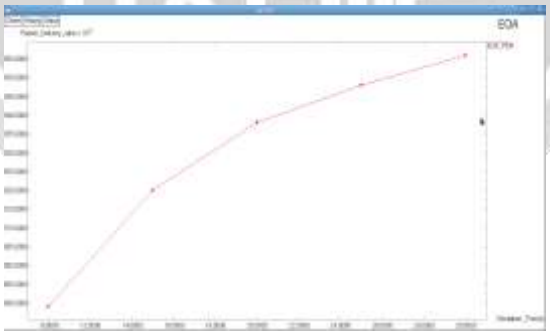

Fig. 13: GRAPH- PDR against number of node

PDR of the network increases by applying proposed Opportunistic Algorithm. Network parameter is enhanced or improved in this method

4. Delay

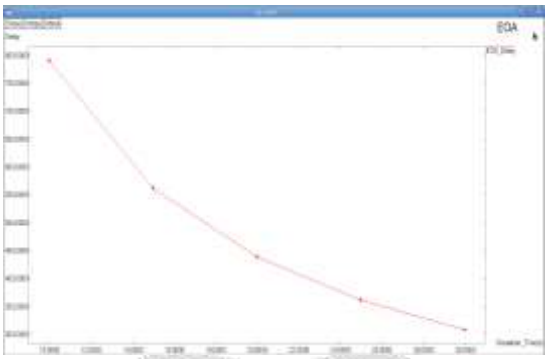

Fig.14: GRAPH- Analyzing Delay against Simulation time

Delay of the network decreased by applying Proposed Opportunistic Algorithm. Network parameter is enhanced in this method.

5. Overhead Ratio

Overhead is load occurred in the network also called as network load. The number of messages passed in the network is routing overhead (ROH). Precautions taken to for controlling the overhead is control overhead (COH). Overhead must be low for better network.

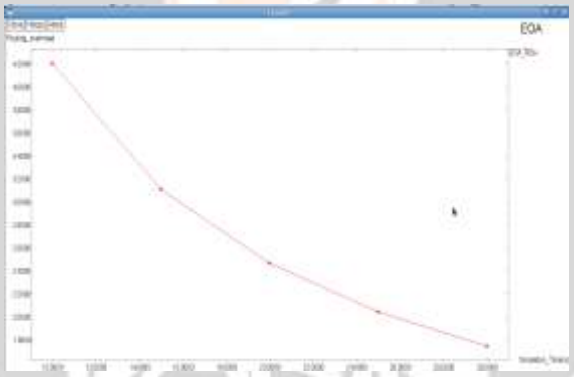

Fig.15: GRAPH- Routing overhead consumption against simulation time

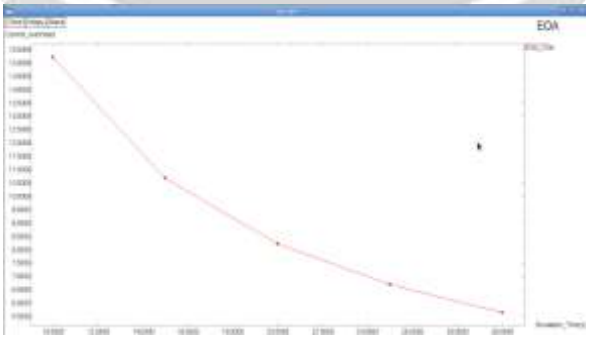

Fig. 16: GRAPH- Analyzing control overhead against time

Control overhead and routing overhead of the network are decreased by applying Proposed Opportunistic Algorithm. Network parameter is enhanced in this method.

By comparing these results with existing method, we observe that proposed method gives better results in terms of Packet Delivery Ratio (Success ratio). Also execution of different parameters, for example, end to end delay, vitality utilization, throughput and overhead are made strides.

V. CONCLUSION AND FUTURE SCOPE

Opportunistic search is crucial for retrieving remote content efficiently and adapting to the content-centric use of the Internet. The first method concludes that method of dividing the network into dense and sparse and analyzing its speed and energy will increase the performance of network.Throughput, Packet Delivery Ratio of system increments. Postponement and overhead of system is limited. The second method is by updating of routing method in which hop limit and lifetime is calculated. We can achieve maximum throughput, Packet delivery ratio by using this method and reduce delay and overhead.

1. Security issues

When the data is shared between two nodes, these nodes are unknown to each other. For secure communication, authentication of these nodes is necessary.

2. Unstable connectivity

Even if content providers are known by each requester, it may be challenging to reach these destinations using connection-oriented protocols

VI. APPLICATION

Crafty Network is worried about IPN i.e. interplanetary application conventions yet it is likewise utilized as a part of military and insight, business, open administration and security, individual utilize, ecological.

1. Space Agencies: International Space Station correspondence (as of now operational for examine), interplanetary correspondence, future space-flotsam and jetsam observing.

2. Military and Intelligence: Mobile specially appointed systems (MA-NETs) for remote correspondence and observing, load following, hunt and save correspondence

3. Commercial: Cargo and vehicle following (by street, rail, ocean, and air), in-store and in-distribution center resource following, information exchanges (e.g., money related, reservations), horticultural harvest checking, preparing plant observing, correspondence in underground mines.

4. Public Service and Safety: Security and debacle communication, pursuit and safeguard correspondence, helpful alleviation observing, savvy city occasion reaction, shrewd transportation systems, keen electric-control systems, worldwide air terminal activity control, framework honesty checking, unmanned flying vehicle (UAV) correspondence and control, remote learning.

5. Personal Use: Personal monitoring and communication in wilderness and urban areas, fire-and-forget text messaging.

6. Environmental Monitoring: Animal migration, soil properties and stability, atmospheric and oceanographic conditions, seismological events.

7. Engineering and Scientific Research: Network subject-matter experts, academic research by faculty and students

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