Improved Transmission In 5G Wireless Network Communication With Tail Theft Concept

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Abstract. 5G technique has inspired a wide collection of high band width applications on advanced mobile phones, for example, video spilling and content-rich web browsing. Although having those applications portable is very engaging, high information rate transmission likewise presents enormous need for power. It has been uncovered that the tail impact in 5G radio activity brings about huge vitality channel on advanced mobile phones. Recent quick dormancy method can be used to expel tails be that as it may, without care, can decrease consumer’s experience. Implementation of Tail Theft in the Network Simulator with a model for computing vitality utilization that depends on parameters estimated from cell phones. Already when the applications are running in the background there is a delay for a couple of seconds acceptable, because of this reason the energy can be saved in large amount about 62 percentage and 75 percentage, then 71 percentage. The amplified delays decrease the state switches number to be equal in present networks.

Keywords. 5th Generation, Tail Theft, Latency, Communication, Wireless Sensor Networks.

1. Introduction

The development of the mobile communication network is impacted basically by uninterrupted growth in mobile gadgets, data utilization, and the requirement for a good quality experience. Above 50 billion devices which are connected and to use the network facilities by the year end 2020. As because of this reason the telecommunications is considered as one of the well developed technology. Wireless communication reaches its 4th generation and they added 5th generation finally. In first generation devices are developed by using voice communication, while the next second generation increase the capability of the devices and increase the coverage area of the mobile devices. In the 3rd generation the speed of the data can be increased with broad band concept. In fourth generation of mobile development various special features are added like high speed of the data, broad band service facilities, high quality multimedia facilities, various graphical features etc.

5G technology has been used in a wide range of high band width applications on smart devices such as multimedia streaming and rich content of web browsing. It has been exposed that the tail effect in 5G radio operation results in significant energy drain on smart phones. The latest technology now a days in this fifth generation or 5G which is of wireless network, which improves the network speed and reaction of wireless communication. In 5G network, information transmitted through broadband links at speed as 20 Gbps. In 5G technique the latency is 1 ms or lower than that value. The 5G network also improves the amount information transmitted through wireless communication because of the availability of more bandwidth and improved antenna technology. 5G technology highlights the important properties of the communication network. It is the user centric data i.e., it provides 24 x 7 connectivity and continuous communication network, and a good consumer service. 5G network is also a provider centric. This network provides services for sensors and continuous monitoring and...
identifying various services. 5G network highlights network centric services like low cost, secure link structure, constant monitoring and programmable services. The fourth generation techniques are the substitutes of the wireless fourth generation network. Advanced cell communication framework is relied upon to provide secure services with data transfer capacity higher than 100 Mbps, and also it is enough to transfer to high quality multimedia data. Because of the increases number of users gradually the data traffic is also increased.

\[ T = T_{Radio} + T_{Backhaul} + T_{Core} + T_{Transport} \]  \hspace{1cm} (1)

Here
- \( T_{Radio} \) is represented as the time of packet transmission
- \( T_{Backhaul} \) is represents the time taken for constructing connections
- \( T_{Core} \) is represents processing time used by the core link
- \( T_{Transport} \) represented as the delay time of the communication between the core link and Internet

\( T_{Radio} \) for a user is represented by the equation 2

\[ T_{Radio} = t_Q + t_{FA} + t_{tx} + t_{bsp} + t_{mpt} \] \hspace{1cm} (2)

- \( t_Q \) means queuing delay
- \( t_{FA} \) describes the delay time due to the alignment of frame
- \( t_{tx} \) represents the processing time
- \( t_{bsp} \) means base station delay time
- \( t_{mpt} \) represents the delay of the user system

The scope of this current works to reduce the energy consumption and reduces the time to delay and also decreases the traffic intensity with good and advanced traffic information. With the help of carrier nodes it maintains the connectivity in a constant manner.

### 1.1. Features Of 5G

Some of the important features of 5G are as follows
1. It has good speed which is sufficient to download a movie with a in few seconds.
2. 5G has more capacity that is of 1,000 times more than the capacity of 4G
3. The wireless network of 5G has the ability to decrease the value of latency.
4. This network supply higher resolution data and more bandwidth.
5. It assemble entire network on one single common place
6. The consumptions battery power is e less.
7. The wireless 5G connections offer the uninterrupted and constant connectivity.
8. It also allows the parallel connections can process jointly

### 2. Literature Review

Mehdi Bennis et al., focuses the attention of communication with low latency. Based upon this concept the authors selected their applications and use cases. The final result shows the wireless network with less low latency [1].

Guangyi Liu et al., attain the best services of 5G technology. This 5G technique provides the facility access the data with less latency value with less cost and improved energy consumption [2]. Imtiaz Parvez et al., conducted a survey about current communication
technology to assure low latency value considers RAN value, communication and buffering. The authors also presented the overview of 5G networks with their properties like SDN, NFV, buffering and edge computing to meet the requirements [3]. Sofana Reka. S et al., analyses the vision of 5G network. They discussed about the current communication technologies and the framework changes of the wireless devices. Here the authors analyzed 5G framework with the perspective of their grid. In this current work 5G network status and the efficiency of the network also evaluated. They focused mainly the grid network and its future challenges [4]. Shunqing Zhang et al., says that 5G network concepts are used in wide range of applications line person-to-person communication, person-to-machine communication or even machine-to-machine communication types. Here the authors surveyed various requirements and fundamental problems among the performance of 3D data. This study highlights the features of 5G concepts in terms of energy consumption, latency level and the reliability of the network [11,12]. Arun Kumar Tripathi et al., discussed about the development of communication technology. Mobile devices are occupying the important place in every human life. Due to this reason amount of data on internet can also increased. So, data traffic is the major issued in the communication world. 5G technology provides constant and uninterrupted services to the user with less latency and high data rate. This work the authors deals with generation of wireless communication and discussed various issues in the development of 5G technique and the uses of 5G concepts [13,14].

### 3. Proposed System

When the user travelled on the highway road that are not able to down load various files like audio, video and large data files. The main disadvantages of the existing networks are the data price is high; users need to buy a new gadget to support the 4G network and make changes in the current devices. This proposed system uses Ad-hoc multipath On-Demand Distance Vector protocol to originate route finding task when the source node is required. Here the source node transfers the RREQ message to the neighbor nodes if it is not having the knowledge about the destination node system. The nearest nodes are again transfer the message when they not have a specific path. Each and every node contains RREQ-ID number and Sequence Number. If the sending RREP message is not having the concern route it transfer the message into the reverse route. The following figure 1 shows the architecture of proposed system.

#### 3.1 System Implementation

The proposed system can be divided into three phases. They are as follows:

**3.1.1 Tail Theft provides a customized application programming Phase:**
Here tail theft concept issues a personalized interface for the specific applications. Through this interface only the user can communicate to the particular applications. Here an application represents the various types of requests from the user, delayed time or action type with deadline concepts.

**3.1.2 Virtual tail time Phase:**
In this phase measure the time for pre fetching and batching process. Here the tail time is used to transmit the data, inactivity timers α and β are reset. To finish the state transitions actually triggered by timers α and β. Tail Theft initiates two timers, γ and θ, to exchange the
task of $\alpha$ and $\beta$ in the UE as well as to find the time that can be used for batching task and pre-fetching task.

![System Flow Diagram](image)

**Figure 1 System Flow Diagram**

### 3.1.3 To schedule all requests under their constraints Phase:

Here to schedule all the requests based on their conditions. Dual queue scheduling technique can be proposed to maintain for data requests. Pre-fetched request and delay tolerant request are used in real-time. Here delay-tolerant requests and previous attempts are referred as tail theft requests. Whenever the request is joined to the tail theft request queue, it begins the timer variable $\theta$, and the timeout data of which is the final deadline of all the requests in the particular queue. Timer $\theta$ provides the assurance that all delayed requests are processed before the particular deadline.

### 4. Proposed AODV Algorithm

AODV (Adhoc on-demand Distance Vector) is one of the famous routing protocol used in the MANET (Mobile ad hoc Network). This protocol is improvement version of DSDV (Reactive on Demand Routing Protocol). DSDV is to create a route to the concern destination only if they needed. ROUTE REQUEST (RREQ) and ROUTE REPLY (RREP) packets are involved in the route selection process. Using RREQ packets the source node selects the route using route finding task. The created route forward to the neighbour node and repeat the same process until it reaches the destination node. When receiving a RREQ packet, a middle node with route to destination node, it creates a RREP consists of the number of hops needed to reach the destination node. All of the middle nodes that involves in relaying this reply to the source node generates a forward route to destination node. AODV protocol reduces the number of packets involved in route finding process by generating routes based on-demand.

Before the establishment of connection between the source node and receiver node, the routing protocol should be specify to find the route between them. Data Transmission is created between nodes by using UDP agent and the CBR traffic. Create ad-hoc network and RSU (Road Side Unit) and make communication between all vehicles on the road. Configuring every node such resource allocation based on their frequency and bandwidth.
Each and every node updates their location and RSU create a communication between online nodes with offline node.

5. Results and Discussion

For simulating our proposed system we are going to use 50 nodes for communication. These nodes will be deployed in the NS2 simulator and allowed for communication. We are going to monitor two parameters namely time delay and throughput which will increase the transmission rate of data’s in 5G network.

The total number of nodes declared in our system is 44 nodes. In this we have created one sender and one receiver. The communication between the sender and receiver will be done by nodes that are present between them by following the concept of AODV algorithm. The transmission frequency in which the data’s are transmitted is 2.4 GHz. In a packet we will have 1124 bits which will be transmitted from one node to another node.

The main benefits of the 5G communication is that many users are connected with the specific network. The latency of the 5G communication is also very less compared with existing 3G and 4G technology. It provides the services uninterrupted continuous services to the users. This system can be simulated by using NS2 simulation tool. It is the open source simulator and it is mainly used for network researches. The main features of the NS2 simulators are

- Distinct simulator of events for the purpose of research
- It supports various groups of protocols such as DSR, FTP, TCP, UDP and HTPP
- It is also used to simulate the guided and unguided network
- It is the UNIX operating system based simulator
- It uses TCL scripting language
- Support object oriented features also
- It is one the scheduler with distinct event

The following screen shots demonstrate the screen shot of the proposed system. The following graphs show the relationship between number of communication and throughput value. If the number of communications are increased automatically through put value is going be reduced. The various factors affects the value of throughput like limitation of the transmission medium, congestion in network, packet loss value and operation of the protocol.
Figure 2. Creation of Nodes

Figure 3. Communications between the Nodes
The graph is plotted between throughput and time as shown in Figure 5. For each and every frequent interval of time the graph is plotted. The graph clearly shows that the time throughput is not consistent in the existing system and throughput is consistent in our proposed system.
Figure 6. Packet loss Vs Time

The graph is plotted between number of dropped packets and time. For each and every frequent of time the graph is plotted. The graph clearly shows that the packet loss is more in the existing system and packet loss is less in our proposed system.

Table 1: Throughput values for of Figure 5

| Time in ms | Existing bps | Proposed bps |
|------------|--------------|--------------|
| 5          | 0            | 89760        |
| 10         | 170240       | 89760        |
| 15         | 8512         | 179520       |
| 20         | 72352        | 163200       |
| 25         | 38304        | 155040       |
| 30         | 29792        | 171360       |
| 35         | 34048        | 146880       |
| 40.5       | 8512         | 106080       |
| 50         | 89376        | 171360       |
### Table 2: Packet loss values for of Figure 6

| Time in ms | Existing bps | Proposed bps |
|------------|--------------|--------------|
| 7          | 348          | 88           |
| 8.5        | 190          | 16           |
| 9.5        | 64           | 0            |
| 15.5       | 116          | 0            |
| 18         | 142          | 0            |
| 20         | 42           | 0            |
| 40         | 598          | 0            |

### 6. Conclusion and Future Scope

The proposed system contains various advantages. It supports high resolution and high bandwidth compared with other techniques. This proposed 5G technology collect the entire networks and placed in a simple platform and it is more efficient and effective. It also supports above 60,000 communications and it managed easily. Using 5G network the users can access uninterrupted and uniform services throughout the world. Thus in this work developed a new 5G network communication with the help of implementing tail theft in the existing AODV algorithm. 5G network with efficient BW utilization is the scope of future work.

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