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CACHING AND FORWARDING IN ICN BASED VANET

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ABSTRACT

The future Information-Centric Network architecture suitable for various vehicular ad-hoc network upcoming applications which is interconnected with wireless network structure. The concept of the ICN structure would be most sufficient and capable to handle dynamic environments with strong security aspects and high storage facility. The wireless network packet transmission in vehicular ad-hoc network using named data networking ICN mechanism will lead to leakage of data and data forwarding issues in the various interruptions. The number of applications in the Information centric networking will engage with data forwarding strategy and one of the most successful application is Vehicular Intelligent Transport System where the information is frequently share data between the connected devices .Proper data dissemination in VANET using NDN information –centric network should contain the forwarding number of node's and packets of the information is useful to maintain data strength. The IP based vehicular ad-hoc network is designed with the router based communication and performs with the request from consumers and the producer will depends on the consumers request and data transmission will be related with the router. So there will be the challenges in speed and successful data transmission, content delivery finally the user review will be average and it mainly depends on the application oriented program. Inspired by the following research ideas in NDN-based VANET, in this paper , we have proposed NDN-based VANET with probabilistic caching algorithm & MobCCN Queue interest forwarding algorithm. All the more definitely, we explore Named Data Networking in VANET and talk about the attainability of Named Data network design in VANET condition. In this idea, we broaden in detail, NDN-based naming, directing and sending, reserving, portability, and security component for VANET. We addressed the current measures, arrangements, and recreation apparatuses utilized in Named Data Networking -based VANET.

KEYWORDS: INFORMATION CENTRIC NETWORKING (ICN) , VEHICULAR INTELLIGENT TRANSPORT SYSTEM (VITS), DATA FORWARDING STRATEGY ,VANET.

1. INTRODUCTION

Named Data Networking (NDN) is focused on the new pattern of communication system which brings the Internet Forward Strategy planning method and it won't depend on the request and response[9]. NDN utilizes names to distinguish each bit of substance rather than IP addresses for equipment gadgets joined to IP arrange[5]. NDN advances data chunks by names, which suggests a significant re-building of sending and its query system. We feature the difficulties as takes after : A. Bounded handling time and high throughput. NDN names, not at all like settled length IP addresses, may have variable lengths without a remotely forced upper bound[19]. This influences line-to speed name query to a great degree testing as self-assertively long name will cost a query time direct to its length, as opposed to a settled time utilizing conventional tree-based or hash-based technique. B. Longest name prefix coordinating. NDN names, not at all like the present tactless IP addresses, have various leveled structure also, coarser granularity, comprising of a progression of delimited parts. NDN's longest prefix coordinating varies from that of IP in the way that NDN must match a prefix toward the finish of a segment, instead of at any digit in IP. Subsequently, customary prefix coordinating calculations will be far less proficient in NDN name query. C. High refresh rate. NDN name query is went with more successive updates than the Forwarding Information Base (FIB) in the present switch, for the reason that, other than directing reviving, NDN name table refresh is additionally directed powerfully regardless of when another content is embedded or an old substance is supplanted[24]. As this data is intended to be put away together with sending data in NDN switch, the name query must help quick addition and erasure with sensibly low overhead[27].

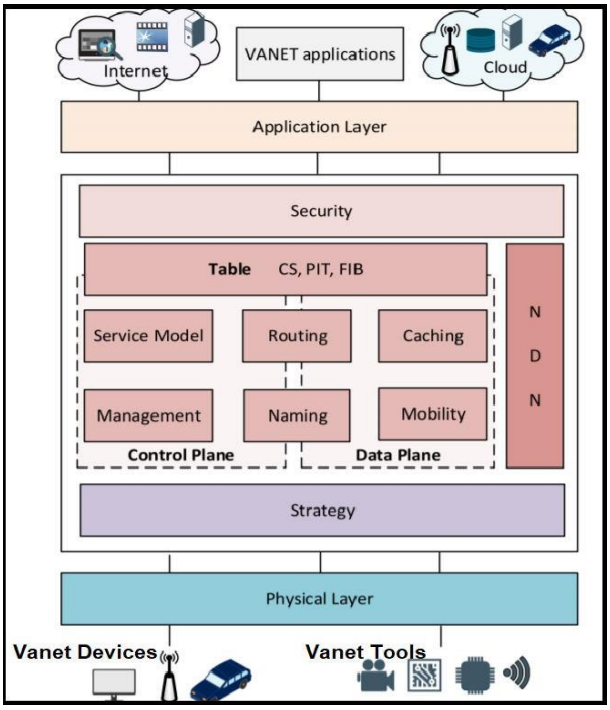

Figure :1 NDN Priority Architecture

Named Data Networking is a future internet architecture which has designed with pull model and inserted the content into the router based on consumer's request. Figure 1clearly shows the layered architecture with NDN priority. The application layer connected with real time application and security part of link layer Even then the consumer request has fulfilled through interests and content objects. The content object basically constructed binary data together combined its name, bits of confirmation and data signature. In hierarchical structure NDN content has more than one component .High Volume content are spited with frame fragments and its easily identifiable name. After security part in architecture the named data network designed with control plane and data plane. Optional control information provides the filter facility to send desired content in same name which are stored in the router. The NDN router forwards consumer requested interest name towards network content producer since the content stored in producer with name using prefix where as in host centric IP prefix utilized for request the content. Every Step of data process will held FIB (Forwarding Information Base).It is called lookup table and its supports multipath delivery towards frequent forwarding incoming entries in the same prefix name. The NDN router maintains the PIT (pending interest Table) and it stacks outstanding consumer interest .The final step of data process is retrieve the content from content producer and traverse the same path to reach the consumer. The above architecture clearly described about content cache in Router content store. The refined structure cache a copy of content in each router content store. Every consumer request does not need to respond from content producer further then request will get the response from nearest content availability. Further then the physical layer connected with VANET Devices and tools.

Despite the fact that getting to utilizing application name tackles numerous issues related with current IP based systems administration, yet NDN is confronting two noteworthy difficulties[19]. Right off the bat, putting away factor length names expend higher memory in contrast with an IP address. E.g., NDN name may have by and large 5– 6 parts. On the off chance that, every segment has 5 characters, the aggregate memory devoured is 25 bytes for putting away a NDN name. In this manner, NDN switches can rapidly get exhausted of accessible memory space contrasted with IP switches. Furthermore, each time a substance ask for or a comparing answer lands at the NDN switch, the whole PIT is query utilizing a correct coordinating (character to-character coordinating) method to check whether a section for the substance name as of now exists or not. A straightforward query plot brings about time relative to the quantity of PIT sections and also the length of individual names.

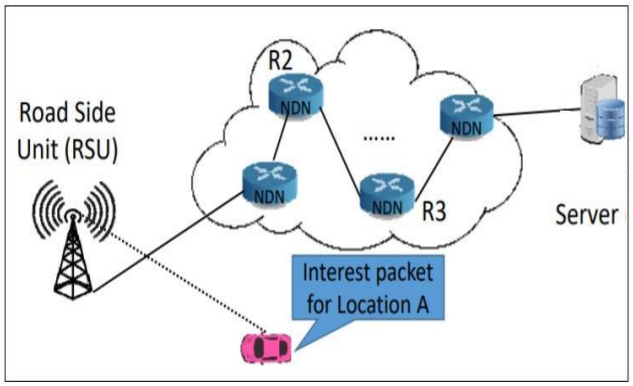

Figure : 2 NDN VANET Communication

The above mentioned Figure 2, image clearly describes the vehicle planning application which helps to get the traffic / delay on the location A. Further then it generates the packets to server, the transmission pass through the NDN structure .On the way may be cache occurs through routers like R2 or R3 .Even though not cache the process of data communication to server finally completed. As clear from the previously mentioned deficiencies, we require a proficient and dynamic information structure for putting away names in the PIT of NDN switches. The information structure should bolster less memory utilization, low computational multifaceted nature, and quick name query. Some traditional information structures like, Hash Table, Segment Character Trie (CCT), and Name Prefix Trie (NPT) are utilized as a part of correct coordinating calculations. Utilizing Hash Table, either the entire substance name or its segments are mapped into affiliated cluster utilizing a hash work. This structure brings about less memory Though getting to content utilizing application name unravels numerous issues related with current IP based systems administration, yet NDN is confronting two noteworthy difficulties[12]. Right off the bat, putting away factor length names devour higher memory in contrast with an IP address. E.g., NDN name may have overall 5– 6 parts. On the off chance that, every part has 5 characters, the aggregate memory devoured is 25 bytes for putting away a NDN name. In this manner, NDN switches can rapidly get exhausted of accessible memory space contrasted with IP switches[19]. Furthermore, each time a substance ask for or a relating answer touches base at the NDN switch, the whole PIT is query utilizing a correct coordinating (character to-character coordinating) system to check whether a section for the substance name as of now exists or not. A basic query plot causes time corresponding to the quantity of PIT sections and in addition the length of individual names.

Table 1.Acronym

Acronym	**Notations**
ICN	Information Centric Networking
IoT	Internet of Things
NDN	Named Data Networking
VANET	Vehicle Adhoc Network
V2I	Vehicle to Infrastructure
PIT	Pending Interest Table
CS	Content Store
FIB	Forwarding Information Base
CNN	Convolutional Neural Network
MPC	Most Popular Concnet
SPRA	Storage Planning and Replica Assignment
SNA	Social Network Analysis
VSN	Vehicular Social Network
DTN	Delay Tolerant Network
PNCC	Proper Node Cooperative Caching scheme
LDCC	Location Dependent Cooperative Caching
RSU	Road Side Unit

Related Work:

The evolution of V2V with caching strategies is a valuable way to tackle the challenge of directing to connecting the vehicles to the RSUs uninterruptedly regardless of having low quality wireless links and swiftly changing topology. In this technology, each vehicle is considered significant by treating either a cache node to pace up file transmission

seamlessly or a subscriber to call for a data file. Also, the data delivery is notably enhanced by cache function as it uses V2V communications rather than relying on the V2I communications.
Even though, this approach is reliable how it does not work for accurate caching decision. Later on, CNN, MPC were also proposed, however only prominent contents are cached in the nodes. Afterwards, ProbCache was used where was caught only with a fixed probability at every content router and also if probability is lower the defined, else it is not worked. Also SPRA approached was used that is successful to decline content request time and maintain network traffic, however communication mechanism was interrupted.
In this technological era, caching for mobile networks has also been addressed where caching with heterogeneity is done in a fully distributed technique where only those targets get stored that having the highest votes. To catch nodes, even social attributes like contact patterns and their relationships are considered. Whereas key positions are considered as caching nodes for those located at key positions to balance between caching overhead and data accessibility[27].
In Distributed Probabilistic Caching strategy, caching decisions are taken by every node independently and also some factions are taken into consideration. In Proper Node Cooperative Caching scheme, there is a need of a greedy algorithm to select entire cache nodes by considering the contacts between the query situation and pair wise nodes for diverse data items. In case of Location Dependent Cooperative Caching, a state prediction model is used to analyze the movement behaviour of customers. Afterwards, customers with higher probability was chosen as caching nodes.
Even though, there was a significant improvement noticed by mobile nodes to cache contents, however none of technology is rewarded as the entire solution of trajectory records and forecast toward future trips. Moreover, the best and successful caching scheme must need to overcome the solutions of two barriers simultaneously: the selection of caching contents and the selection of caching nodes. Our technique is to PPM to execute previous travel patterns with an intention to forecast future tours before it chooses the perfect caching nodes for the perfect cache contents.
The existing work has been related a sensor data collection of smart city application from urban streets with the assistance of vehicles [27]. This concept is designed to focus on a worthwhile information-centric ranking system in favor of vehicles inspired by social networks [16]. Thus, the application integrated with vehicular adhoc network and the related work is divided into two parts:

i) How does ICN paradigm emerge with distinct urban sensing schemes in vehicular network
ii) How does social network analysis influence the identification and selection of significant vehicles in the underlying vehicular network.

i) The fact, ICN interacts with Urban Sensing and vicinity monitoring with the assistance of vehicles that have influenced massive researchers in the last few years. Moreover, different schemes are proposed on sensor-equipped vehicles sense. Moreover, the recruitment of those vehicles for urban sensing has taken into considered recently. For instance: Aspirants with high goodwill are recruited to indulge in urban sensing. The intention behind is to cover an area as per limited budget. Also, the ICN paradigm is considered as a promising solution to gratify the peculiarities of the vehicular environment, featured by intermittent connectivity, interrupted broadcast channels, and flexible topologies.

ii) Social Network interacts Vehicular Network SNA (Social Network Analysis) is used to seek out significant nodes in a social network that mostly depend on prominent network centrality schemes like Closeness, Betweenness, Degree, and Eigenvector centrality. In a survey on VSNs (Vehicular Social Networks), distinct security, sociability, and applicability aspects of Vehicular Social Networks paradigm are talked about. The author also ensures an exhaustive survey on distinct social aware routing protocols for DTN's (Delay Tolerant Networks) and also recommended to follow the social metrics as per the application requirements that influence the requirement to suggest a new metric for imperative vehicle identification.

As per the above discussion, it is concluded that we make use of Information-Centric Vehicular Networking for vicinity monitoring and urban sensing [16]. To choose the imperative vehicles, there should use of a vehicle centrality scheme to rank vehicles accordingly facilitators, information producers, and consumers. But is not worthwhile to use centrality-based popularity schemes to seek out imperative information destination centrality-based popularity schemes for different reasons. Secondly, centrality measures like Closeness, Betweenness, Degree, and Eigenvector centrality used to compute needed network-wide parameters however in case of a vehicular network; it is not possible by a vehicle to get such information to take vehicular run-time decisions. Thus, a new vehicle ranking system is used to vehicular networks to know their relative significance in the network by fading the above-written constraints.
CCN- The fact, maximum of previous caching schemes in CCNs is used to divide into advertisement-based ones, and non-advertisement-based ones. All of this, is entirely relied on either the cache state is advertised to another content

router or not. Both of these cases are related with heterogeneous caching schemes where routers cache distinct contents as of the distinct observation history and cache sizes. With the assistance of advertisement -based approaches, it is possible to decline access delay with advertising of the cache state. Also, inter-domain cooperative caching equipment was presented. In this, the main content router that is equal to the border area router is used to assemble cache states of routers. After this, these can advertise.

CATT is an intra-domain cooperation scheme that is essential to advertise the availability information of the information or content to its neighbors. In this case, there is an existence of a centralized manager that is used to take charge of supervising the cache of state related to the network. In a case of non-advertisement based approaches, content routers never depend on other advertisement mechanism to send their cache states [12].

Moreover, ProbCache is a probabilistic caching mechanism that was first taken into consideration to know about the actual availability of caching routers before popular contents were considered. In this case, contents are used to split into tiny chunks to store it into different nodes with an intention to enhance its efficiency. Besides, WAVE is also used to check the content popularity to analyze downstream routers' chunk selection. For this, every router is given a label.

Caching is also done in mobile networks- In some last years, mobile networks are also considered for mobile networks. In this, the items grabbing the highest votes are considered to store in content routers. In a case of social attributes like contact patterns and relationship are taken into consideration to select caching nodes. Those nodes that are available at key positions are selecting and named as caching nodes. These are used to maintain balance between caching overhead and data accessibility.

In Distributed Probabilistic Caching strategy, there is usage of caching decisions for every node. Besides, three factions are also taken into consideration that are movement of the sender and receiver, users' expectations mined from the collaborative results, and significance of vehicles accordingly degree and betweenness between the ego network (where current node is available) and one-hop neighbor (where the current node is at the center of the network).

The PNCC or Proper Node Cooperative Caching scheme is basically a greedy algorithm. It is used to select accurate cache nodes by considering the connection between the query situation and pair wise nodes for distinct data items. In a case of LDCC or Location Dependent Cooperative Caching, there is a usage of a state prediction model to predict the movement behavior of customers. After this, the probability of the mobile customers coming into a particular scope for a specific time is accessed. Afterwards, customers having the higher probability will be selecting as caching nodes within a short span. Moreover, other works are also used to exploiting the publication with an intention to enhance the network performance [3].

The fact, MI-VANET or Mobile Infrastructure Based VANET was used to establish buses to make up a mobile backbone for flawless data delivery while the ordinary cars used to run as the second tier like a tiered-system [27]. Mobile Infrastructure Based VANET was the best to enhance both the delivery ratio of packets and the network connectivity [1]. Moreover, the bus-assisted transmission protocol was considered once got benefited from the regularity and predictability of buses. With an intention to upgrade the reliability and accuracy of transmitting packets in the MI-VANET, the packets are used to transmit shifting between common buses and vehicles.

Moreover, a worthwhile service circulation along with a discovery scheme was presented with the assistance of public transportation systems [3]. Besides, a virtual backbone is created by those buses, having the routine bus ride or fixed routes in public transportation systems, thereby needed information and data can be seamlessly discovered and accumulated through the backbone. The fact, Wang et al. used buses fixed routes and traces to eliminate the limited coverage issues that were arisen in RSUs. It will be the best if we concentrate on the query of the cooperation among private taxis and vehicles, regular users, instead of buses to cache prominent contents or data for seamless delivery.

Since, there have been usage of mobile nodes to cache data or contents; no one has offered the trajectory records and accurate predictions for future trips. Moreover, with the assistance of a successful caching scheme, two major queries can be overcome cohesively. First is the selection of caching contents and another is the selection of caching nodes. We conclude here we are comfortable in using PPM to process previous travel patterns with in intention to forecast future trips prior it goes with effective caching nodes for the selected cache data or contents.

2. LITERATURE REVIEW

Named Data Networking extended architecture would be Content Centric Networking traditional into this IP based internet structure compare with the existing method of IP based networking Named Data Network structured with unique concept information centric networking instead of users and hosts[9].The Information centric networking would be working under internet scenarios of users side but normally the host and IP based architecture placed .Here usage

scenario will accommodate the data and which is nothing but information centric networking. Consider the case of popular internet page has been saved different locations with accessing punch of users will reduce the traffic and load will be significantly reduced and the users will be access the data regularly. Based on users request the routers has reduced the traffic overall the network.NDN Content Centric network based on information and data to UDP/TCP to implement ideal features of caching and naming to reduce the congestion through this method NDN will get optimizes the resources[16].

Reza Tourani, Travis Mick Proposed that security protocols integrated with client and significant mitigation might be investigated[23]. Every investigation suspicious interfaces identified and prefixes the attacks. By following the content cache the privacy analyzed schemes are affect the clients significantly [12]. The propositional way network load will be increased and increased download latency in traffic .The network will maintain privacy mechanism which is routed to wide network approach and not fulfilled in cache scheme.

Zheng ,proposed an content encryption method , the process of the encryption is notifies with public key and random key, every client communications will pass through the random key k1 and request has reached to random key k2 which is located another communication of the process[12]. Now each communication will ends with edge router which encrypts the random key content name and publisher identity .The Publisher key has decrypted the content and identity and finally encrypted the name and identity of the communication. These process will 10seconds time for small content. The large content of the request will flow through the edge routers for multimedia applications.

Marica Amadeo, Claudia Campolo Proposed Priority based data delivery in the interest vehicles via ndn Named Data Networking.The content of Named Data Networking communication perform in caching and accurate movements on the time based on the requested from the other vehicles or RSUs.The selection and forwarding will be decides in interests low priority and High Priority contents with the prefix name of Low and High. The Consumers will send the request from same time it will deliver the packets in simultaneously forwarded the both requests. This will analyze the latency and reliability of the data and secures the sensitive data.
Li Proposed architecture based encryption concept for ICN control [2], the subject and content will be shared to all clients who are authorized in the system and all the authorized clients will maintain a symmetric key. The symmetric key will encrypts the content name and subject.
The publisher creates the AC policy which can relates to third party accessible .Whenever the publisher send the content and subject to the client third party will encrypts the data and send to client and symmetric key encrypts the details and share it to client .Ac policy does the encryption on the process and indicates the details to the clients. The process of the ICN architecture will maintain the system.
Tan Proposed the protected content into two portions. One is large cacheable portion and second is small cacheable portion .Every client retrieves the smaller portion from publisher which is used to reconstruct the content and check the verified clients. The malicious user pass the smaller content to illegal user whom wants to check the authorized clients means the system will not allow to pass the details. Also the process need online connectivity until complete the entire process.

3. PROBLEM STATEMENT

A. Naming Issues

Named Data Networking is combined in hierarchical method , parameters naming values in the networks .The parameter values clarifies the difference between the attention of the content based names[12]. There will be two sort of naming in content naming one is hierarchical naming and other one is hybrid naming in the term of Hierarchical naming will be combined with the features of scalability and the other side will be hybrid names which will elaborate the benefits of the entire network in terms of security , speed up , aggressiveness , storage , privacy[23] .The major problem of the scheme is naming the process and variables are unbounded names which will consume more memory ,power which will affect the scalability of the FIB process mainly in terms of the mobility in the Vehicular networking. The structured naming design is needed to place the length.

B. In-Network Caching

The utilization of in-arrange storing encourages the system to accomplish better exhibitions contrasting with conventional IP systems. A few storing systems are exhibited in VANET focusing on the substance prevalence and other probabilistic answers for keep just the famous substance closer to shoppers. Analysts are concentrating on probabilistic and content fame based naming in any case, because of the different variety of traffic in VANET[1], identified with the

traffic values stored in the problems. In further the extension of organized different hubs and allocated for the switches and vehicles have specified for the hub extension. On the sequence of priority of vehicles considering the properties with sensors that makes the perfect framework and then internet scale will be flow open issues for specialists [9].

4. EXPERIMENTAL ANALYSIS & INSIGHT TRAFFIC FORWARDING SUPPORT

Our main objective is to propose a forwarding strategy that will check the priority of the Interest packets from consumers and will forward the Interest packets towards provider node in order to accommodate the important traffic on time with lower delay and higher throughput[24].

The proposed model makes following contributions:

1) Enhancement to the hierarchical naming scheme and amendment in the conventional Interest packet format by using the additional field.

2) Proposes a forwarding strategy to forward the data packet of high priority to most reliable interface rather than least priority data packet to be using the highest quality interface.

3) Achieves high throughput and least delay

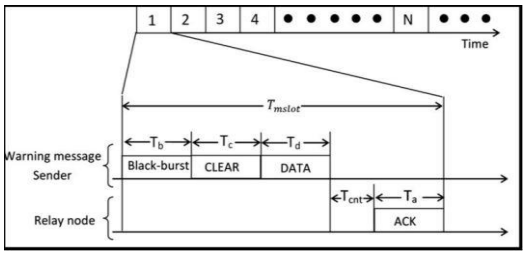

Figure :3 Multihop Protocol

Figure 3 describe multihop protocol. Important of the multihop protocol is the value of T is provided to minimize the amount of energy consumption in priority .the transmission of packets towards the nodes which are located in different locations which maintains the energy consumption .the multihop system provides the facility to accommodate more traffic than others .The process of the multihop is fixed with node identifier which does distinguish the Mac addresses ,the logic of the Mac has been fixing the interest and data messages .The target of the Mac address will be forwarded Interest and Data Messages to the target and at the same time the origin MAC address clearly describes about the interest or Data origin from. The entire process will belongs to time slot which contains the black , clear and data every request of interest will process the data and based on the queue the sender will get the warning message also the delivery part will take the acknowledgement part.

Provider nodes are the end nodes that will satisfy the Interest packet with suitable data and it will be forwarded to the nearest intermediate node towards the consumer with a custom-made decision given the priority of the Interest packet interface. Based on all the traffic received, the traffic is classified in following categories depending upon their latency requirements.

1) Critical data (Traffic class 1)
2) Semi-Critical data (Traffic class 2)
3) Non-Critical data (Traffic class 3)

```
Algorithm: (Probabilistic caching Schemes)
1. Begin
2. Analyze the traffic
3. The Data is Passed to the RSU
4. for i=1; i<number of vehicles;
        Forward the packet to the RSU
        Sense the traffic of the Packet at RSU
        if ( delay > threshold )
            Critical Data
        else if (delay == threshold)
            Semi critical Data
        else
            Non critical data
end for
5. If ( data type == Critical )
        Data is emergency then forward first
        Priority level is high
6. else if ( data type == Semi Critical )
        forwarded on each intermediate node with reliable
    yet less fast-active link
7. else if (data type == Non Critical )
        forwarded on the least fast active connection
8. END
```

Algorithm : 1 Probabilistic caching Algorithm

Critical data will be served first on fastest and most reliable interface of all the active interfaces at it is classified as "Emergency Data". Semi-Critical data will be forwarded on each intermediate node with reliable yet less fast-active link, and Non-Critical data will be forwarded on the least fast active connection as it will have no specific latency requirements [27]. All RSUs need to count the number of incoming interests for each content name to measure the popularity of content [13]. The threshold is the maximum value according to which the content is considered popular, and this value is fixed by the probabilistic caching mechanism. Based on delay of response the system gets the higher number of content need to deliver. When the popularity count for a particular content name becomes equal to the threshold value, the content is labeled as popular. In order RSUs holds the popular content, it recommends caching it at its RSUs nodes by sending a Data messages. While popular content is cached at system resources, its popularity is maintained to refuse flooding caused by the replication of analogous content

Output : Np
List the all the messages in the node q
While M!=0
{
i=M.First()
CNU.CreateEntry(i,q)
FIB.entry=FIB.Find(i)
if(FIB.entry==0)
{
FIB.CreateEntry(i,q)
}
if(i in CS of node q)
{
$U_{pj}^{(d)} = \frac{1}{ICTpj}$
}
else
{
$U_{pqj}^{(Ind)} = \frac{1}{\frac{1}{Uqj} + ICTpj}$
}
FIB.UpdateEntry(i,q)
$U_{pj} = Max_{j<N_p} \left\{U_{pj}^{(d)}, U_{Pjj}^{(Ind)}\right\}$
M=M-{j}
}
When contact with q expires
Remove CNU Entry
}

Algoritm : 2 MobCCN Queue interest forwarding algorithm

The above process describes the data transmission .In i=Interest , CNU- content new entry , q= list of all interest messages , P – popular content ,j – joined request , while the incoming interest packets routed in FIB table based on the content prefix name. Every entry of FIB table has fulfilled with CS (content Store) or it will get re entry in the FIB table to fulfill the interest request in the queue. Fulfillment process is clearly describes the content will be delivered based on the interest from the consumer. MobCCN is intended to execute the steering and sending systems of the fundamental ICN acknowledge, for example, CCN. The first part of MobCCN is to execute a proficient sharp systems administration steering plan to populate the Forwarding Interest Base (FIB) tables of the hubs, with the end goal to control the spread of Interest bundles towards hubs that store the required information[2]. In particular, MobCCN characterizes the utility of every hub as a forwarder of Interest parcels for a specific sort of substance, with the end goal that Interest bundles can be proliferated along a positive utility angle, until the point when achieving some hub putting away the information.

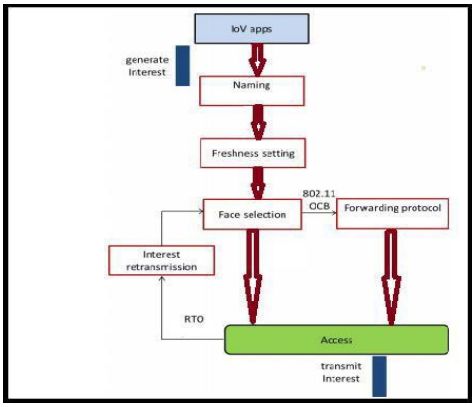

Figure : 4 Interest Processing Scheme

The above figure indicates the Named Data Networking interest processing scheme starts with user interest and it reaches the face selection of transmission. Finally the forwarding protocol would have transmit interest.

Table II : Simulation Parameters

Parameters	Values
Network Size	600 * 600
Maximum Speed of Nodes	16 m/s
Transmission Smooth Factor	0.5
Content Store	500 Packets
Data Rate	6 Mbps
Node Size	2.00
Speed	1.000
Zoom	2.000
Nodes	13
Simulation time (s)	600 sec
String Value	1024
X Axis Proposal	50
Y Axis Proposal	20

As per the experimental research on this we have received the output with graphs and we are mentioning the comparison with existing algorithm and how we have improved our own algorithm with results. We have compared with existing in five different parameters .First Graph mentioned Figure: 5 Standard Deviation of storage usage vs Nodes. The existing algorithm have compared with storage of usage n terms of nodes. Second graph Figure :6 mentioned that Impact of vehicle ratio vs success ratio. As per the figure it shows that how many vehicles have been participated in this event and how was the success ratio on this.

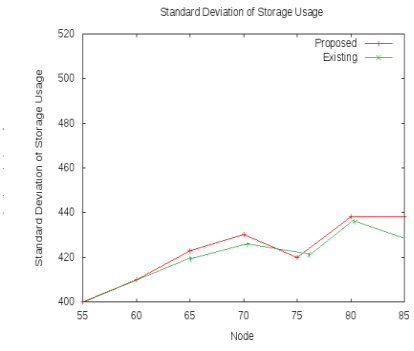

Figure : 5 Standard Deviation of Storage Usage

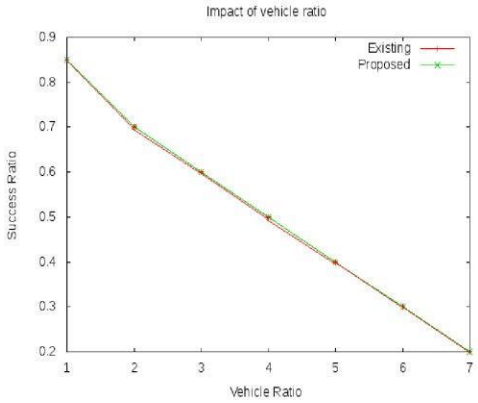

Figure : 6 Impact of Vehicle Ratio

As per Figure :7 mentioned below the interest satisfaction rate against Network size with average speed has compared with existing and mentioned how much improved in proposed system. Based on the network size the speed with differ and the speed decides the interest satisfaction rate. Again Figure :8 mentioned same as Fig :8 interest satisfaction rate vs network size average speed .We have mentioned two different scenario taken for this comparative and mentioned with graph which has improved compare than existing system. The process of two graphs clearly says that the network data speed has improved over all network. The system deviation will be measured in various stages and mentioned in the graph.

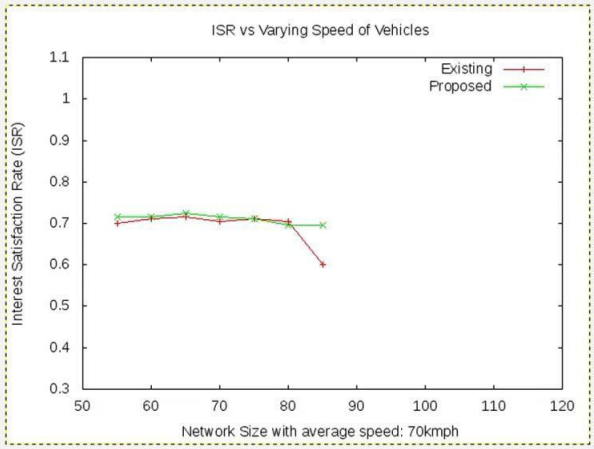

Figure: 7 ISR Vs Varying Speed of vehicles

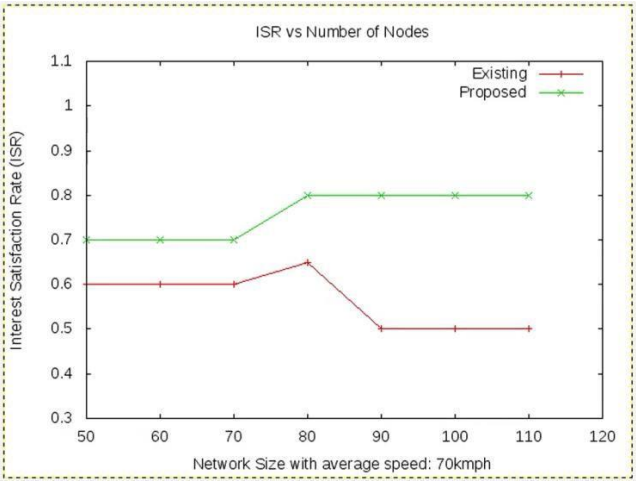

Figure:8 ISR vs Number of Nodes

As mentioned below Figure :9 indicates that interest satisfaction delay will depends on the interest priority .The data will be served in the information centric network method. In previous cases the data will be stored in Router and data will be

delivered through IP based network. Here the system will perform with information centric networking in users scenario. Finally the discussed parameters are PIT entry and CS entry ,system time and packet speed.

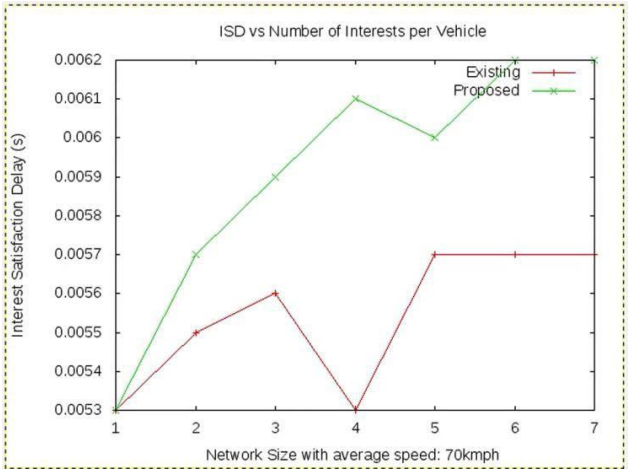

Figure:9 ISD vs Number of Interests per Vehicle

These are the parameters are using the network to estimate the performance of the system in various scenarios. The interest priority development position will be classified in three stages critical ,non critical and semi critical. As per the experiment the packet speed will be varied in all three segments based on the packet speed the system speed will redefine.

Table :III Interest Priority Deployment Position

Deployment Position	**Interest Priority ndnSIM Policy Development**		
Packet Interest Priority	**Critical**	**Semi Critical**	**Non Critical**
PIT Entry Overhead (Kb)	5.35	5.12	4.99
CS Entry Overhead (Kb)	0.79	0.65	0.55
System Time (S)	13.78	12.00	11.45
Packet Speed (S)	14.02	13.67	12.78

5. Conclusion

With the challenges in VENET communications for successful data transfer we choose Information Centric Network as an opportunity to provide solution for forwarding data essential from vehicle to vehicle. In this article we have discussed NDN priority architecture which describes VANET communication at different layers of NDN with vehicle connectivity. We have defined our problem in naming issues to forward content and probabilistic caching of data with priority for effective cache utilization in VANET. Our experimental results shows considerable improvement in storage utilization, impact of vehicle success ratio, interest satisfaction rate on varying speed of vehicles, and interest satisfaction delay per vehicle.

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