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Corman: The Advanced Cooperative Opportunistic Routing Scheme in Mobile Ad-Hoc Networks

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ABSTRACT— The mobile ad hoc network (MANET) is a wire fewer network that uses multi-hop peer to peer routing. A user can be able to move at anytime in an ad hoc scenario. As a result, such a needs to have routing protocols that can be adopted dynamically changing topology. To achieve this, a number of routing protocols have been proposed and implemented such as Ad hoc On-Demand Distance Vector routing (AODV), Path finding algorithm (PFA) and link vector algorithm(LV). The comparison had been done on the basis of Routing messages overhead; send list adaption and robustness against link quality variation, It tackles the issue of opportunistic data transfer in ad-hoc networks. The best solution is called cooperative opportunistic routing in mobile ad-hoc networks (CORMAN). That is pure network layer schemes that can be built a top off-the-shelf wire fewer networking equipment. The CORMAN and AODV will observe the significant performance of the network.

KEYWORDS— Pro-active source routing, cooperative communication, opportunistic routing mobile ad-hoc networks.

I. INTRODUCTION

The mobile ad hoc network (MANET) is a self configuring network in mobile device MANET is free to any direction and any move to independently. Varies types of networks in vehicular ad-hoc network(VANETs), internet based mobile ad-hoc networks (I MANETs), an Intelligent vehicular ad hoc networks(In VANETs) There are the several ways of the simulations tools is used in OPNET,Netsim,NS-2 network simulator. Mobile adhoc networks are used in mobile phones, laptops check for mails and ticket booking and railway enquiry it has to been used in GPS(global position System) can be exchanged the field of the information using LANs home users and synchronize the file transfer between the portable device to desktop or laptops. More powerful run more applications and network service in the mobile computing network the past two years the mobile connections and mobile internet terminals will be growth on 50% to 75% we expect the total number of mobile internet and executed of the fixed line internet users. MANET is to improve battlefield communication. Mobile ad hoc networks less infrastructure networks do not any require infrastructure in such a base station in general routers between nodes in an ad-hoc networks II. Discussion about related works, III. Modified works IV. Simulation results & Discussion V. Conclusion VI. References.

II. RELATED WORKS

1.Zehua Wang and Yuanzhu Chen[1] Discusses about the Problem of opportunistic data transfer in mobile ad hoc networks. Traditional routing would route all the data through the same intermediate; the high loss rate would require each packet to be sent an average of ten times before being received by the intermediate, once more to reach the destination, for a total throughput of 0.09 times the nominal radio speed. CORMAN would achieve a throughput of roughly 0.5, since each of the source's transmissions is likely to be received by at least one intermediate.

2. Biswas. S and R. Morris [2], introduces EX-OR, an integrated routing MAC protocol that increases to the throughput of the large uni-cast transfer in multi-hop wireless networks. EX-OR chooses each hop of a packets route after the transmission for that hop, so that the choice of the react with an intermediate nodes actually received the transmission. The deferred choice gives each transmission multiple opportunities to make progress. EX-OR design faces the following challenges. The nodes receive each packet must be agree on their identities and choose one forwarder. The agreement of the protocol must have lower overhead, and must also be rousted enough that it rarely forwards a packet zero times or more than once. Finally, the EX-OR must choose the forwarder with the lowest remaining cost to the ultimate destination. The measurements of an implementation on a 38-nodis used for 802.11b test-bed show that EX-OR increases throughput for the most node pairs when compared with traditional routing.

3. Chachulski S et al [3], discusses about the Opportunistic routing which is a recent technique that the achieves high throughput in the face of lossy wireless links. The current opportunistic of the routing protocol, EX-OR ties with the MAC with routing, imposing a strict schedule on the routers' can access to the medium. This paper is presents MORE, a MAC independent opportunistic routing protocol. MORE randomly mixes packets before forwarding them. The randomness ensures the routers that hear the same transmission do not forward the same packets. Thus, MORE needs to the no special scheduler to coordinate routers and can be run directly on top of 802.11. MORE protocol is implemented to the Click modular router running on off-the-shelf PCs equipped with 802.11 (Wi-Fi) wireless interfaces. In experimental results from a 20-node wireless test bed show that MORE's median uni-cast throughput is 20% higher than EX-OR, and the gains rise to 50% over EX-OR when there is a chance of spatial reuse.

4. Chlamtac. I et al [4], describes about, a mobile ad hoc network (MANET), sometimes called a mobile mesh networks, it is a self-configuring network of mobile devices connected by the wireless link. The Ad hoc networks are a new wireless networking paradigm for mobile hosts. Unlike the traditional mobile wireless networks, in the ad hoc networks do not rely on any fixed infrastructure. That is instead, hosts rely on each other to keep the network connected. Recently, the introduction of the new technologies such as the Bluetooth, IEEE 802.11 and Hyper LAN are helping to enable eventual commercial MANET deployment's outside the military domain. These are recent evolutions to have been generating a renewed and growing interest in the research and development of MANET. This paper attempts to provide a comprehensive overview to this dynamic field.

5. C. Fragouli et al [5], in their paper said about network coding. Network coding is a new research area that may have interesting applications in practical networking systems. With network coding, intermediate nodes may send out packets that are linear combinations of previously received information. There are two main benefits of this approach: potential throughput improvements and a high degree of robustness. This paper is an instant primer on network coding it explains what network coding does and how it does? It includes the discussion about the implications of theoretical results on network coding for realistic settings and shows how network coding can be used in practice

III. MODIFIED WORKS

Pro-active source routing

Pro-active source routing is a table driven routing protocol. The route to all the nodes is maintained in routing table. Packets are transferred the routing table. Proactive source is a low latency the routers are maintained the all times

Destination-sequenced distance vector (DSDV) protocol

The table driven DSDV protocol is a modified of the distributed bellman ford algorithm that was used successfully in many dynamic packets DSDV is each nodes are required to the transmit of the sequence number is increased by two transmitted along the any other routing update message to all the neighboring nodes. The some challenges of PSR is formulated graphs discuss some of the crucial aspects in implementation the protocol. As a PSRP we reduced the overhead of PSR. We need to provide the each node and the routing information using a communication overhead to proactive protocol. Reduced the communication overhead PSR allow to immediate nodes to modify the paths carried by data packets to their update network information.

Cooperative communication

In cooperative wireless communication are concerned with a wireless network in a cellular ad hoc the ad hoc wireless agents we call users the increase their effective quality of service. In cooperative communication system is a wireless user is assumed to transmit data as well as a cooperative cooperation to interesting a code rate and transmit power in the case of power. One hand that more power reduced power is needed to each user and cooperative mode is transmitted for the both users we can reduced the power and diversity. Cooperative communication each user transmits both own bits as well as information spectral efficiency of each user information to improve due to the cooperation diversity of the channel code rate to be increased.

Overview of CORMAN

CORMAN is a network layer the opportunistic transfer in the mobile ad hoc networks In the node coordination is largely that EXOR and is extension to EXOR in order to accommodate node mobility the highlight out objectives and challenges in order to achieve. We provide a general description of CORMAN. We will be under laying the data packets in the same patch carry the forwarder list the source code to support the CORMAN the proactive source routing (PSR) and the large scale live update And small scale re transmission in the corman is a completely network layer solution.

B. Modified CORMAN

Batch size Number of packets the same value for all packets in a given batch Forward list size Number of forwarders in the forward list in the same value for all packets in the given batch. Packet number The packets in the batch Forward number The forwarder on the forwarder list it indicates the node in the list has to been transmitted Batch map An array of size equal the batch size the element of the map the packet number and value of the forwarder number of the highest priority forwarder that has to been packet has to been reached. Fragment The subset of the packets in the current batch the sent together for the given forwarder.

CORMAN Drawback:

1. A short forwarder list forces packets to be forwarded over long and possibly weak links which may drop the packets.
2. Nodes overhear in order to retransmit the dropped packets which are less secure.

We propose a link quality aware routing protocol for MANETs resulting in robust delivery and high performance by finding out a reliable path with strong links. During route discovery, the strong links are effectively exploited by forwarding the packet with the highest link quality among multiple links. Compared to the CORMAN, the proposed scheme may not have the minimum hop-count route but the one with more number of hops. However, the discovered route is a reliable path with high data rate because it consists of strong links without drops, resulting in high performance with increased packet delivery ratio and throughput. So there is no need of overhearing and retransmission.

Link quality

Link quality analysis (LQA) is the overall process by which measurements of signal quality are made, assessed, and analyzed. In LQA, signal quality is determined by measuring, assessing, and analyzing link parameters, such as bit error ratio (BER), and the levels of the ratio of signal-plus-noise-plus-distortion to noise-plus-distortion (SINAD). Measurements are stored at and exchanged between stations, for use in making decisions about link establishment. It can also transmit counts of packets sent, received, and rejected with errors. Wireless links often experience significant quality fluctuations and performance degradation or weak connectivity. Accurate link-quality measurement is essential to solve the problem associated with varying link-quality.

It identifies all the nodes in a wireless network and assigns weights to the links among the nodes. In addition, the channel, the bandwidth, and the loss are determined for every possible link. This information is sent to all the nodes. Based on this information, it defines the best path for the transmission of data from a given source to a given destination.

Advantages:

Selection of the best relay node: Accurate link-quality information can reduce the recovery cost of lost frames caused by link-quality fluctuations.

Network failure diagnosis:

Link-quality statistics can be used to diagnose and isolate faulty nodes/links (or faulty areas) facilitating network management. Networks covering shopping malls, a campus or a city, usually consist of a number of nodes, and each node must deal with site-specific link conditions. Thus, networks require a clear picture of local link conditions for network troubleshooting.

Identifying high-quality channels:

Link-quality information helps WMNs identify high-quality channels. WMNs usually use multiple channels to reduce interference between neighboring nodes. However, due to the use of shared wireless media, link-quality differs from one channel to another, and hence, determining the best-quality channel is of great importance to channel-assignment algorithms

Proposed frame work

Opportunistic routing mobile ad-hoc networks. The source broadcast a batch of the packets and intermediate expire the radios further from the re transmit the packets that the no closer radio and it has to be a retransmitted. Intermediate radios are set to an estimate the transmission that the closer radios we need the order to transmit packets. EXOR uses the conventional routing protocol to collect information that the probability of a successful transmission between the each pair of the digital radios in the network. That transmitting packets could use too much of the available radio time. And his ExOR.

IV. SIMULATION RESULTS AND DISCUSSION

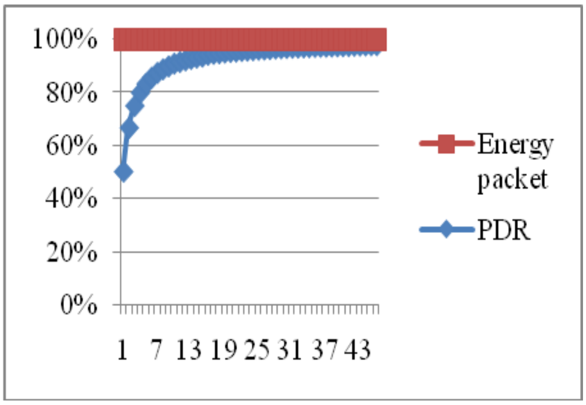

Fig 1: PDR Energy packet

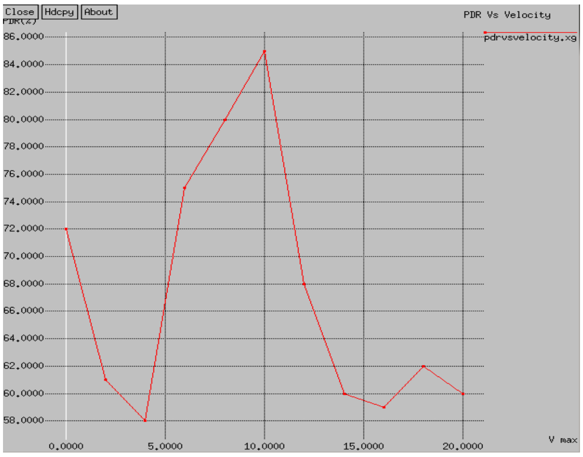

Fig 2: PDR vs Velocity

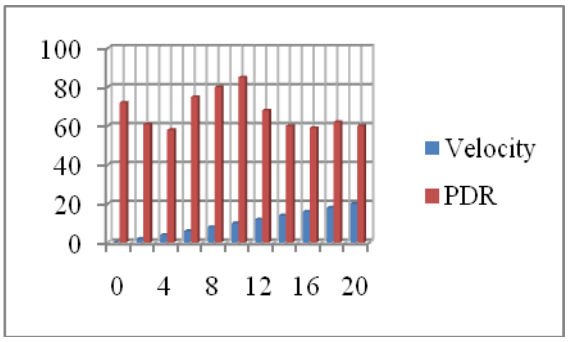

Fig3:PDR vs Velocity

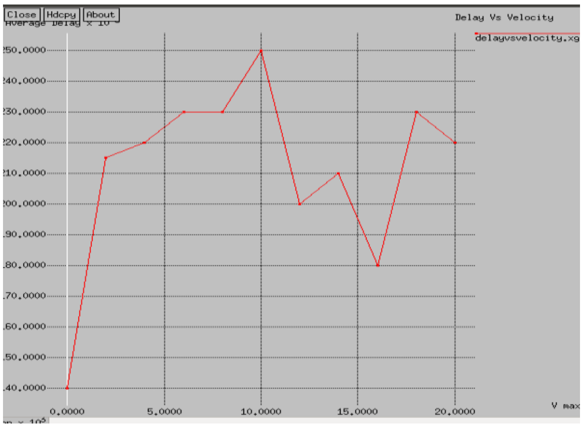

Fig4: Average Delay vs Velocity

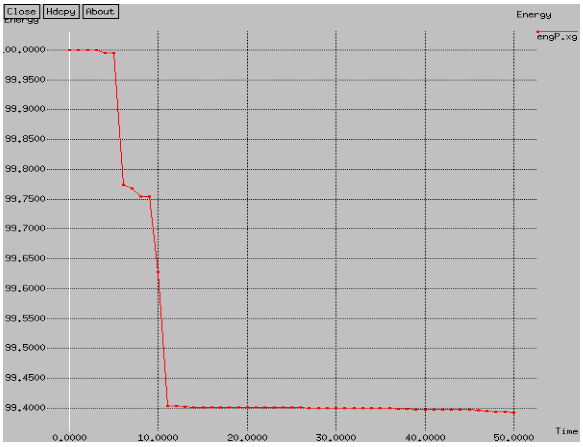

Fig5: Energy vs Time

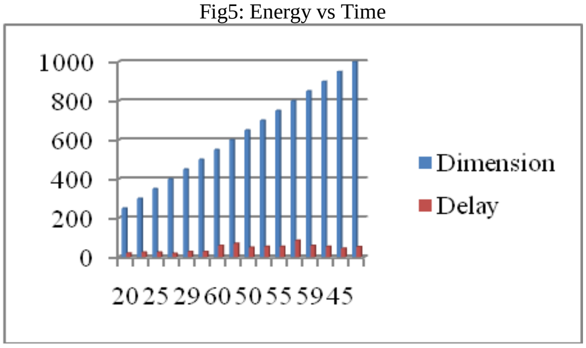

Fig 6: Delay vs Dimension

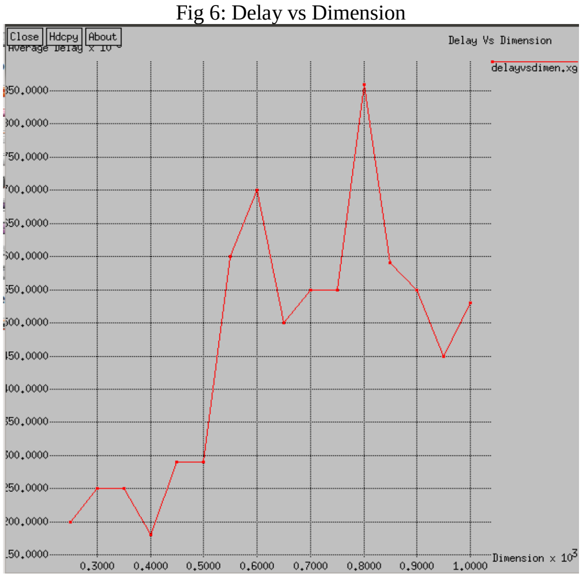

Fig7: Average Delay×10^3 Vs Dimension×10^3

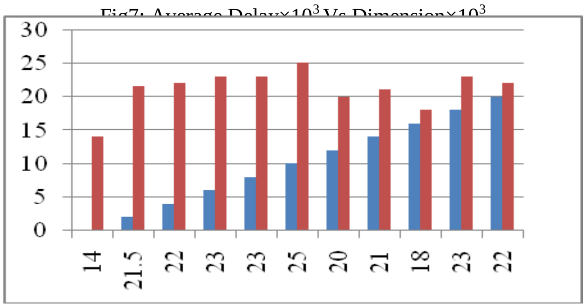

Fig 8: Delay vs Velocity

Packet delivery ratio:

The **ratio** of **packet**s that are successfully delivered to a destination compared to the number of **packet**s that have been sent out by the sender.

∑ Number of packet receive / ∑ Number of packet send

The greater value of packet delivery ratio means the better performance of the protocol.

End-to-end Delay:

The average time taken by a data packet to arrive in the destination. It also includes the delay caused by route discovery process and the queue in data packet transmission. Only the data packets that successfully delivered to destinations that counted.

∑ (arrive time – send time) / ∑ Number of Connections

The lower value of end to end delay means the better performance of the protocol.

Suppose we run a simulation, an obtain a trace file "out.tr". We would like to compute the average values of delay. Let's define delay as the duration since a packet enters a queue of a beginning node until it it arrives at the ending node. The definition of beginning and ending nodes depends on the type of delay under consideration as follows:

TABLE 1
Type of delay

Type of Delay	**Beginning node**	**Ending node**
Link delay	Packet Transmitter	Packet Receive
End to end Delay	Packet creator	Packet Destructor

The values in the parentheses are the columns in the trace file which correspond to the beginning and ending nodes.

Delay Computation:

Average delay is computed by

$$E[delay] = \frac{\sum \text{all delay samples}}{\text{Number of samples}}$$

where a delay sample is delay associated with a packet. The key to collect delay sample is to record packet arrival time in an associative array variable, namely *t_arr* whose index is the packet unique ID. When a new packet enters a queue of a beginning node, the associated time is recorded in a variable *$t_arr[pid]*, where pid is the packet unique ID. When a packet with the same unique ID arrives at an ending node, the delay is computed as "*(current time) - $t_arr[pid]*". The delay same is accumulated in the variable *$total_delay*, and the number of samles is incremented by one. At the end of the program, the average delay is computed and stored in a variable *avg_delay*.

Packet Lost :

The total number of packets dropped during the simulation.

Packet lost = Number of packet send – Number of packet Received.

The lower value of the packet lost means the better performance of the protocol.

awk -f PacketDeliveryRatio.awk (name trace file.tr)

awk -f Endtoenddelay.awk (name trace file.tr)

Average Delay:

Average Delay vs rate is consumed to the conventional out then *10 it's the delay is low and also the high output cavity and it's to been dimension is *10 that's should been a delay to the cavity of the dimension.

V. HIERARCHIAL ROUTING PROTOCOL

To improve the performances do not allow the protocol scale well large networks and alternative routing scheme clustering protocol. Clustering protocol and performance the hierarchical routing between these clusters a hierarchical routing scheme can be increased and the mobility

Fisheye state routing protocol

Fisheye state routing protocol is an implicit is an hierarchical routing protocol it is used this techniques was used to reduce the size of the information to required the graphical data the FSR is a captures with high details the pixels near the focal point. The detail decrease as the distance from the focal point increases the fisheye approach translates to maintaining the distance and path quality information about the intermediate neighbour hood of the node with the progressively less detail as the distance increases. FSR is a Link state routing that maintain the topology map at each node the key difference is the way in which the routing information disseminated in the link state packets are generated and flooded in to the network. FSR is a periodic table is exchanged resembles the vector exchange in Distributed Bellman-Ford(DBF) or DSDC the distance are updated to according to the sequence number or time stamp are assigned the propagated in the moreover like in the link state a full topology map at the kept each node at the shortest path are computed using the map.

VI. CONCLUSIONS

We have proposed CORMAN as an opportunistic routing scheme for mobile ad hoc networks CORMAN is composed for the three components PSR-proactive source routing protocol large scale live update and small scale re transmission of the missing packets. Such a node on the peer to peer packets basics through the simulation in corman and the performance and measured in PDR.CORMAN is a comparison of the Proactive and reactive source routing protocol and the hybrid source routing protocol and the hierarical routing protocol this protocol is used for the Proactive source routing protocol is AODV and reactive source routing protocol is DSDV and the hybrid protocol is ZRP and the hierarchical source routing protocol is a fisheye state routing protocol for this proposed and enhanced the Clustering the header in the corman.

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