# A Novel Broadcasting Algorithm for Minimizing Energy Consumption in MANET

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Abstract: The aim of this project is to control energy (transmission range) on a per node basis depending on local network density. In which use modified algorithm for to control power. MANETs has no fixed infrastructure or central administration network of mobiles node. Mobile nodes in network work not only as hosts but also as routers in the network, and communication is take place using data packet. Since most wireless nodes in MANET networks are not connected to a power supply and battery replacement may be difficult, optimizing the energy consumption in these networks has a high priority and power management is one of the most challenging problems in MANET. Now-a-days we seen that more and more devices are getting portable to increase efficiency in the network. In addition to device in MANET the portability does not require a pre-established any mobiles network infrastructure of MANET. Its result is to be deployed mobiles nodes in situations like emergency situation and disaster management in the emergency situation. All Nodes in MANET are run by battery power and each device has limited battery power therefore energy consumption is important issue in MANET and its more challenging problem in MANET.

Keywords: Energy, Network Density, MANET

#### 1. Introduction

Mobile ad-hoc network (MANET) consist wireless enabled mobile nodes network that not only communicate with each other but also intermediate nodes that are out of range from one another. When we send message from to destination node it might be travel through multiple hops before reaching the destination node. MANET is a wireless device to device network of mobiles nodes that are devoid of any centralized decision making entity.



Such networks have typically been studied for application related to military operations in hostile region or disaster recovery when traditional communication infrastructure has failed. More recent applications include mobile telephony for remote rural regions which cannot afford traditional communication infrastructure.[1], [2], [3]Large part of developing world devoid of traditional communication infrastructure which is mainly due to economic reasons. MANET comprises entirely of basic, affordable mobiles phones are a promising alternative to create local telephony without requiring phones towers or others expensive supporting infrastructure network [1]. However the traditional community model entails centralized content filtering and dissemination. A true peer-to-peer (device-todevice) model empowers any user to create and broadcast. A true peer-to-peer (device-to-device) model empowers any user to create and broadcast content to the entire network. It is provide function that enabling such a community service on phone-based. MANET entails that each device enabling such a community service on a phone-based MANET entails that each device in the network is to be able reliability broadcast data packets to all other nodes in the network. In recent work has proposed using mobile Ad-hoc network for exactly such a community system and reviewed the suitability of existing system. MANET broadcast algorithms for this application.[5] In MANETs require no fixed infrastructure or central administrator. Therefore in MANET contents various problems .In which mobile nodes are work not only acts as host but also acts as routers, an each nodes communicate with each other via data packets. Since most of the wireless nodes in ad-hoc networks are not connected to power supply and battery replacement in MANET may be difficult, optimizing the energy consumption in these networks has a high priority's and power management is one of the most challenging problems in MANET. In MANET energy play an important role because device in it work through energy and in each device preserving energy is an important goal that must be considered. In EABA (environ aware routing algorithm) solve the problem of high jitter, .high latency, reduce the packet loss ratio but energy consumption in EABA is more to overcome this problem we proposed modified algorithm this is novel broadcasting algorithm. By using this algorithm we can minimize power on per node basis and maximize the network lifetime. In power aware routing protocol that distributes power consumption evenly over nodes and minimizes the overall transmission power in network is proposed.

#### 2. Problem Definition

#### 2.1 High Energy Consumption in MANET

• Mobile ad-hoc network has no fixed infrastructure it is dynamic structure. Mobile ad-hoc network (MANET)

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consist wireless enabled mobile nodes network that not only communicate with each other but also intermediate nodes that are out of range from one another.

- When we send message from to destination node it might be travel through multiple hops before reaching the destination node and in MANET device are work through energy and each node contain self battery backup power that leads to issue how we select the node from network because all are contain limited power.
- Since most of the wireless nodes in ad-hoc networks are not connected to power supply and battery replacement in MANET may be difficult, optimizing the energy consumption in these networks has a high priority's and power management is one of the most challenging problems in MANET.
- In MANET energy play an important role because device in it work through energy and in each device preserving energy is an important goal that must be considered.

### 3. Objective

#### 3.1 Minimize Energy Consumption

The algorithm implemented will control energy consumption on per node basis. In mobile Ad-hoc network power consumption is serious challenging problem because it affect the network lifetime. Mobile ad-hoc network devices is work through energy therefore in MANET energy play a important role without power device is not work in proper way its life time is depend on battery power therefore its need to be save a energy in MANET. Mobile ad hoc network is an infrastructure-less network where each node communicates with other nodes directly or indirectly through intermediate nodes. MANET device are work through energy and each node contain self battery backup power that leads to issue how we select the node from network because all are contain limited energy.[1].[2].

#### 3.2 Maximize Network lifetime

In MANET Devices are work through energy and each device has limited power. MANET has no fixed infrastructure therefore battery replacement and charge devices is not possible all time its affect the network life of network .Hence maximize network life is also important

# 4. Overview of Proposed System

Mobile ad-hoc network (MANET) consist wireless enabled mobile nodes network that not only communicate with each other but also intermediate nodes that are out of range from one another. When we send message from to destination node it might be travel through multiple hops before reaching the destination node. MANET is a wireless device to device network of mobiles nodes that are devoid of any centralized decision making entity In MANET deices are work through energy therefore reduce energy consumption is more important. In existing algorithm they implemented EABA algorithm by using this algorithm we can overcome the problem of high latency, jitter, increase the packet delivery ratio but energy consumption is more in this. To overcome the energy consumption we implement the modified EABA In which we used modified DSR algorithm o reduce the power consumption. In this we used modified DSR algorithm with EABA algorithm in modified DSR algorithm to reduce energy consumption we use proposed mechanism called modified algorithm of minimizing energy consumption in MANET. In which, transmit Power control algorithm is used in EABA. In Environs Aware Broadcasting Algorithm (EABA), each node independently decides to use either SBA or MABA as the broadcasting algorithm, depending on network conditions and the position of the current packet in the stream. The position of the packet in the stream is important as a node's memory of past behavior can only be used for that particular stream. With every new source a new set of routes will have to be discovered (using a neighbor knowledge scheme like SBA), stored and used (by MABA). To the best of our knowledge ours is the first broadcast algorithm to have been specifically designed for a MANET enabled data broadcast application. When the network mobility is variable (static at times and dynamic at other times) SBA is unsuitable as the broadcasting algorithm for static network. An altogether different and far simpler algorithm with lesser overheads can be as or more effective than SBA. In this new algorithm (which we call Memoryaided Broadcast Algorithm -MABA) a node remembers its past behavior and uses that to decide whether or not to rebroadcast a message. Potential advantages of MABA include

- a) Lesser network congestion due to lesser number of hello messages,
- b) Lower latency and jitter because of not using the RAD component and
- c) Increased efficiency because of exploiting a node's memory of its past behavior





(b)High Transmission

# 5. System Design

#### 5.1 We design and conduct five distinct sets of simulation

In first set evaluates broadcast algorithm enviorn aware broadcast algorithm (EABA) and compares its performance to its existing algorithm.EABA has two types of algorithm when mobility is high its switches to Scalable broadcast algorithm (SBA) and when mobility is low its switches to Memory aided algorithm (MABA) Depending on network mobility decides which algorithm is to be switches As part of EABA four complementary strategies are deployed at each node.

(1) Mobility detection

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(2) Adapting the frequency of hello

- (3) Maintain history of broadcasting nodes and information
- (4) Decide which algorithm is to be switch: SBA or MABA

(5) Used modified DSR algorithm in EABA to minimize energy consumption in MANET

#### 5.1.1 Mobility detection

First we evaluate the mobility of the network to calculate the density. Mobility is defined as how many number of mobiles nodes present in the network. if number of mobiles node is high then we said to be high mobility of network. and numbers of mobiles node is low then it is said to be low .mobility means the when the number of variation in network then its high mobility network The working of algorithm is depend on density of network on the basis of density we decides which modes of algorithm we can used to broadcasting data. In that each node maintains a measure in the network called the mobility factor which is its local view of the mobility in the network. To calculate mobility factor of a node by keeping track of changes to its neighbor table the intuition being that occurred rapid changes in the neighbor table of a node indicates a rapidly changing network topology and hence it said to be a high degree of mobility. Inversely, a stable neighbor table indicates that the network is static or at the very least that locally there is relative stability in the network.

# **5.1.2** Adapting the frequency of hello messages (hello message interval

In SBA algorithm needs periodic hello messages so that can decipher their local topology of the network. However these messages in the mobile network create a significant overhead in terms of mobile network utilization when the network is statistic the utility of these hello message is limited as neighbor table will not changes frequently in the table then said to be static. It is Maintaining and using the node's recent history to evaluate broadcasting behavior of network.[1].[2].[3]

#### 5.1.3 Deciding which mode to switch to: SBA or MABA

Finally we decide which mode of algorithm is to for broadcasting data .In EABA content two modes SBA and MABA. When mobility is high we used SBA algorithm for broadcasting and when mobility is low its uses MABA since in the static scenario the same path in the network can be reused for all in the network another factor should determine if a node uses SBA or MABA in EABA.[1]

# **5.1.4Used modified DSR algorithm with EABA to minimize energy consumption**

In this phase implemented power aware broadcasting algorithm to minimize power consumption in MANET. In this scenario shows the network of mobile nodes has been designed. We propose that power aware broadcasting algorithm in MANET. In this algorithm the broadcasting to nearby nodes is take place as per the node mobility factor which is different for each node the process of broadcasting is started with broadcasting information and neighbor node knowledge is stored at memory of node.

## 6. Simulation Result

This research aims at evaluating and proposing a new design of efficient power aware broadcasting algorithm for minimizing energy consumption in MANET. In simulation shows that the overall implementation of modified algorithm. This section discusses how we run our simulation and postprocess the output data. We used popular network simulator called NS2 to model mobile ad-hoc network and have implemented the broadcast algorithms The problems found during running the simulation and our solutions to deal with them are also described have revealed a crisis of mistaken analyses of network simulation results. This research aims at evaluating and proposing a new design of efficient power aware broadcasting algorithm. This section discusses how we run our simulation and post-process the output data. We used popular network simulator called NS2 to model mobile adhoc network and have implemented the broadcast algorithms The problems found during running the simulation and our solutions to deal with them are also described have revealed a crisis of mistaken analyses of network simulation results. Traffic sources are chosen as CBR with a packet size of 512 bytes. All traffic sessions are established at random times near the beginning of the simulation run and they remain active until the end of the simulation time. Each of 100 nodes has a 200 J of energy at the start of every simulation while varying the number of traffic sources from 10 to 100. Total energy consumption is the difference of the total energy supplied to the network and the residual energy in joules. The initial energy supplied to the network in each scenario is 5000 J.

We design and conduct fifth set of simulations. The first set evaluates our proposed mobility detection scheme. The second set evaluates our EABA algorithm. The third set evaluates our proposed algorithm and compare its performances with existing EABA algorithm on number of relevant dimensions. the four set of tests looks at the effects of changing various parameter on the broadcast algorithms being evaluated while the fifth set of simulation looks at variations in the model and their performance of efficient EABA.

#### 6.1 Simulation set 1

In this step, simulation model, we propose that each node maintains a measure called the mobility factor called mobility First we evaluate the mobility of the network to calculate the density. Mobility is defined as how many number of mobiles nodes present in the network. if number of mobiles node is high then we said to be high mobility of network. and numbers of mobiles node is low then it is said to be low mobility means the when the number of variation in network then its high mobility network The working of algorithm is depend on density of network on the basis of density we decides which modes of algorithm we can used to broadcasting data. In that each node maintains a measure in the network called the mobility factor which is its local view of the mobility in the network. To calculate mobility factor of a node by keeping track of changes to its neighbor table the intuition being that occurred rapid changes in the neighbor

table of a node indicates a rapidly changing network topology and hence it said to be a high degree of mobility. Inversely, a stable neighbor table indicates that the network is static or at the very least that locally there is relative stability in the network.

#### 6.2 Simulation set 2

In this step, simulation model, we design EABA algorithm In which content two modes of algorithm first one SBA (Scalable broadcast algorithm) EABA is efficient for minimize the packet delivery ratio, to reduce packet drop ratio, and reduce high latency and jitter and Second one MABA (Memory aided broadcast algorithm). When mobility is high its uses SBA algorithm for broadcasting data packet to destination and when mobility is high its uses MABA algorithm for broadcasting data packet to destination node.



Figure2: Scenario of EABA algorithm in MANET



In this graph show that how much energy consumed in EABA algorithm. In EABA take more energy to transmit packet to source to destination. Energy consumption is more in which when we send data packet to source node to destination node It is require more energy for transmission data packet.

#### 6.4 Simulation set 4

In this implemented novel broadcasting algorithm for minimizing energy consumption in MANET. In which use modified DSR algorithm with EABA to reduce energy consumption. In modified DSR first start route discovery in which first send route request message to all nodes to fined destination node. After that check whether the node we send data packet is it destination node not f it is not destination node then forward packet to the next node with the packet path address which is add in the header of the data packet. In this way process is continue working till find out the destination node. In this way we find out minimum cost path and suitable path for transmit data packet to destination.



Figure4: Scenario of Energy aware algorithm

In this show the source node send route request message to destination node. To find out the best path for transmitting data in this way we reduce the energy on per node basis.

#### 6.5 Simulation set 5

In this show the comparisons graph between EABA and proposed algorithm. In which show that how much energy is consumed on per node basis. In existing algorithm energy consumption is more than our proposed algorithm .Red colour line show that the existing algorithm and green line indicate proposed algorithm.



proposed algorithm

### 7. Conclusion

In this paper, we have studied and analyzed EABA algorithm and proposed algorithm. Efficient energy aware algorithm to save energy which leads to higher network lifetime. The simulation results of proposed algorithm shows that the performance of efficient energy aware algorithm is much better than existing algorithm according to energy consumption at each node, average consumption and packet delivery ratio, average energy consumption. From the simulation results we can conclude that Novel broadcasting algorithm for minimizing energy consumption is better than existing EABA algorithm by giving more network lifetime or by consuming less energy as compare to EABA algorithm.

In this paper, we have evaluated the energy efficiency of the existing algorithm well known MANETs broadcasting algorithms. Broadcasting algorithm are not only used to find the efficient and correct route but also it should keep network alive as long as possible means it should use nodes energy in such way that the lifetime of network increases. To accomplish this goal we are minimizing the communication cost a node load distribution and transmission energy control are two approaches. We are using to minimize active communication cost.

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