JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

BEE-AD-HOC REACTIVE ROUTING ALGORITHM TO IMPROVE ENERGY EFFICIENCY FOR VEHICULAR MOBILE NETWORK OF IEEE802.11 BASED AD-HOC NETWORK

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ABSTRACT:

One of the most Vibrant and active fields today is that of ad-hoc networks, also called as packet radio or multihop networks. An ad-hoc network is a collection of communicating devices called as nodes that wish to communicate but does not have a fixed infrastructure available or does not have predetermined organization of available links. VANETS (vehicular ad-hoc networks)is a subtype of ad- hoc networks that provides a wireless communication between moving vechicles using a dedicated short range communication(DSRC).The routing of data in a VANET is a challenging task due to the high dynamic unstable connection environments and transfer direction limit (real road planning) involved. This paper proposes an energy efficient routing algorithm for VANET ad-hoc networks inspired by the foraging principles of honey bees. The algorithm mainly utilizes two types of agents scouts and foragers for doing routing. It is a reactive routing algorithm and it consumes less energy as compared to existing state –of –art algorithms as it utilizes less control packets to do routing. The algorithm achieves the objectives by sending less control packets and distributing data packets on multiple paths.

INTRODUCTION:

In recent years, mobile computing has enjoyed a tremendous rise in popularity. The continued miniaturization of mobile computing devices and the extraordinary rise of processing power available in mobile laptop computers combine to put more and better computer-based applications into the hands of a growing segment of the population. At the same time, the markets for wireless telephones and communication devices are experiencing rapid growth One of the most vibrant and active fields today is that of ad-hoc networks also called as packet radio or multi-hop network.An ad-hoc network is a collection of communications devices called as nodes that wish to communicate, but does not have a fixed infrastructure available or does not have pre-determined organization of available links.A significant feature of ad-hoc networks is that rapid changes in connectivity and link characteristics are introduced. due to node mobility and power control practices.

AD_HOC NETWORKS:

Ad hoc networks can be built around any wireless technology including infrared and radio frequency(RF).Ad-hoc networking is a multilayer problem

1. The physical layer – adapt to rapid changes in link characteristics.
2. MAC layer – needs to minimize collisions allow fair access,semi-reliably transport data.
3. Network layer – handle delay and packet loss statistics that are different than wired network.

Applications need to be designed to handle frequent disconnection and reconnection with peerapplications as well as widely varying delay and packet loss characteristics.

Ad-hoc network are suited for use in situation where infrastructure is either not available ,not trusted ,ornot relied on times of emergency few examples of usage of ad-hoc networks are

- Military ,soldiers in the field
- Sensor Scattered throughout acity for biological detection
- An infrastructure less network of notebook Computers in a Conference or Campus Setting
- The forestry or lumber industry
- Space exploration
- Undersea operations

5. Temperory offices such as campaign headquartersThe common subtypes of these networks are
   - Internet of things
   - mobile ad –hoc networks (MANETS)
   - .flying ad-hoc Networks (FANETS)
   - Vehicular ad-hoc networks (VANETS)

VEHICULAR AD-HOC NETWORKS(VANETS):

The biggest problem regarding the increased number of fatalities that occur due to accidents on the roads, the expenses and dangers have been recognized as a serious problem being Confronted by themodern Society.

Vanet provides a wireless communication between moving vehicles using a dedicated short range Communication (DSRC).

Vanets provides two types of communication

1. Vehicle can Communicate with other Vehicles directly forming vehicle to vehiclecommunication (V2V)
2. Communicate with the fixed equipment next to the road, called as road side unit(RSU) forming Vehicle to infrastructure Communication(V2I)

These types of Communication allows vehicles to share different kinds of information

1. Safety information for the purpose of accident prevention post –accident investigation or traffic –Jam
2. To provide a safety message to warndrivers about expected hazards in order to decrease the number of accidents and save people lives
3. Provides passengers with pleasant Journey

BEEADHOC ROUTING PROTOCOL

It is an energy efficient routing algorithm for mobile Ad-hoc networks inspired by Bee behavior

.the algorithm is inspired by the foraging principles of honey bees,It is a reactive source routing algorithm and it consumes less energy as compared to the existing state-of-art algorithm because it utilizes less control packets to do routing

The algorithm mainly utilizes two types of agents - scouts and foragers,for doing routing

The algorithm achieves the objectives by sending less control packets and distributing data packets on multiple paths. Such a behavior is made possible by taking inspirations from the foraging behaviour of honey bees, we use a bee agent model in our algorithm.our bee agent model is inspired fromthe foraging principles of a honey bee colony. The agent model consists of 4 types of agents

1.Packets 2.Scouts 3.Foragers4.Swarms

Packers: These agents mimic the task of a food –store bee,they always resides inside the node ,receive and store the data packets from the transport layer. Their major job is to find a forager for their data packet,and they die once they hand over it to the foragers.

SCOUTS: These agents discover new routes from their launching node to their destination node.A scout is transmitted using the broadcasting principle to all the neighbours of a node with an expanding time to liver timer(TTL). This timer controls the number of times a scout could be rebroadcasted. Each scout isuniquely identified with a key based on its ID and SOURCE NODE

Once a scout reaches at the destination then it starts the backward journey on the same route that it followed to the destination

A destination node sends back all of the received scouts to ensure discovery of multiple paths

,Once a scout returns to its source node ,it then recruits the foragers for its route by using the metaphor of dance(as scouts do in nature).

A dance is a abstracted as the number of clones that could be mode of a scout

FORAGERS

Foragers are the main workers in our Bee Adhoc algorithm

They receive the data packets from packers and then transport them to their destinationEach forager has a special type

1. delay
2. lifetime

The delay foragers collect the delay information from the network while the lifetime foragers collect the remaining battery capacity of the nodes that they visit

The first ones try to route packets along a path that has a minimum delay while the second ones try to route packets in such a manner that the life time of the network is increased

A foragers gets the complete route in the form of a sequence of nodes leading to a destinationfrom a scout or another forager

A forager follows point - to –point mode of transmission till the destination and collects the information about the network state depends upon its type

Once a forager reaches at the destination then it remains there until it could be piggybacked on the network traffic from the destination node to the source node

This optimization reduces the overhead of control packets and hence saves energy as well

SWARMS

An unreliable transport protocol like UDP sends no explicit acknowledgements for the received data packets

Such a protocol may not be able to provide an implicit return path to a waiting foragers and hence it could never return to its source node

As a result its source node might run out of the foragers and unable to continue the communication

Once the difference between the incoming foragers from a certain node I and the outgoing foragers to the same node I reaches above a threshold value at a node j then the node j launches a Swarmsof foragers to the node i

We put one forager in the header of the swarm while the other are put in the payload part of the swarm Once the Swarm arrives at the node i then the foragers are extracted from the payload part and they are stored likely they would have arrived at the node in a normal fashion

CONCLUSION:

Bee -ad-hoc is an energy efficient routing algorithm inspired by the foraging principles of honey bees.it is a reactive source routing algorithm and it consumes less energy as compared to the existing state –of –art routing algorithm because it utilizes less control packets to do routing. These results and be simulated as a further expansion of this paper to show the results

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