



A Review on Cooperative transmission mechanism for MIMO Equipped mobile Ad-Hoc Network

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ABSTRACT

Mobile ad-hoc network is a temporary network connection created for a specific purpose such as transferring data from one node to other. With the rapid growth of wireless communication infrastructure over the recent few years, new challenges have been proposed on the system and on analysis of wireless ad-hoc networking. Implementing MIMO equipped a cooperative transmission mechanism in such type of network is enhancing the packet transmission capabilities of network based on energy performance of the network and minimizes the BER.

KEYWORDS Multi Input Multi Output (MIMO), adhoc network, cooperative transmission .

I. INTRODUCTION

Ad hoc networks are a new paradigm of wireless communication for mobile hosts. In which there is no fixed infrastructure such as base stations or mobile switching centers are required. Mobile nodes that are within each other's radio range communicate directly via wireless links, while those that are far apart rely on other nodes to relay messages as routers. It is a temporary network connection created for a specific purpose such as transferring data from one node to other .

MIMO is an antenna configuration which stands for multiple inputs multiple outputs. The major elements for successful implementation of MIMO communication systems is the signal transmission technique using multiple antennas at the two sides of a communication links and it has a great potential to significantly improve the transmission efficiency of the wireless communication system without the need for extra operational frequency bandwidth We can use cooperative transmission which is a much more efficient method than traditional flooding broadcast. The transmission algorithm can be designed in such a manner to exploit the diversity.

new wireless networking paradigm for mobile hosts. Unlike traditional mobile wireless networks, ad hoc networks do not rely on any fixed infrastructure. Instead, hosts rely on each other to keep the network connected. Mobile nodes that are within each other's radio range communicate directly via wireless links, while those that are far apart rely on other

nodes to relay messages as routers. Node mobility in an ad hoc network causes frequent changes of the network topology.

We can classify ad hoc networks, depending on their coverage area, into four main classes: Body, Personal, Local, and Wide Area Networks. Wide area ad hoc networks are mobile multi-hop wireless networks. They present many challenges that are still to be solved and they are not likely to become available for some time. On smaller scales, mobile ad hoc networks will soon appear specifically, ad hoc, single-hop BAN, PAN, and d LAN wireless networks are beginning to appear on the market. These technologies constitute the building blocks to construct small multi-hop ad hoc networks that extend the range of the ad hoc networks' technologies over a few radio hops.

II. WIRELESS ADHOC NETWORK

It is a temporary network connection created for a specific purpose such as transferring data from one node to other it is decentralized type of wireless network Various ad-hoc networks –PAN,LAN, Bluetooth, mobile ad-hoc .They are a

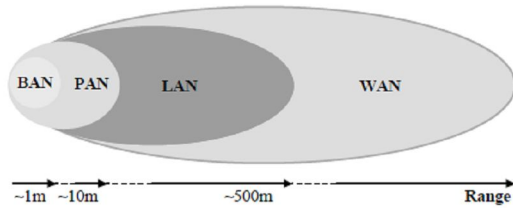
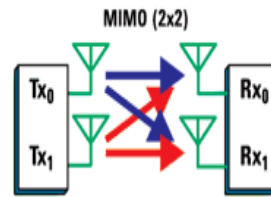


Fig 1. Ad hoc networks taxonomy



V. MIMO IN AD-HOC NETWORK

III. MOBILE AD-HOC NETWORK

It is a collection of mobile nodes that can communicate with each other without utilizing any fixed base station infrastructure and centralized manager it is a system of wireless mobile nodes that dynamically self-organize in arbitrary and temporary network topologies. People and vehicles can thus be internetworked in areas without a preexisting communication infrastructure or when the use of such infrastructure requires wireless extension.



Fig.2
Mobile ad hoc network



Fig.3
wireless fixed network

It is a collection of wireless mobile nodes that self-configure to form a network. It works in multipath manner i.e. Any two nodes can communicate with each other it has High capacity link which are useful for multimedia services and there is No fixed infrastructure is required. Also it offers Higher data rates, improved reliability and coverage Broadband over air Multimedia applications (video streaming, e-commerce...) it can also be used in Wireless internet access (WLAN, Wi-Fi, Wi-Max), Wireless last-mile systems (home, office),

Vehicular-networks (vehicle-to-vehicle, vehicle-to-infrastructure), Short-range-applications (indoor, Wi-Fi), Optical wireless-communications, Underwater-communications, (e.g. sonar), Radar applications. It gives Capacity scales linearly with number of antennas Channel knowledge/estimation at Rx needed. It offers potential for larger data rate, larger spectral efficiency, larger number of users. It gives better interference suppression, better quality of service (QoS), lower bit-error rate (BER) and also MIMO requires lower Tx power.

IV. Various Wireless antenna configurations

Depending on no. of transmitter antenna & receiver antenna they are classified as

1. SISO- Single Input Single Output system
2. SIMO- Single Input Multiple Output system
3. MISO- Multiple Input Single Output system
4. MIMO- Multiple Input Multiple Output system

- MIMO- Multiple Input Multiple Output system
it has multiple antennas at the transmitter and multiple antenna at the receiver.

VI. COOPERATIVE-TRANSMISSION MECHANISM

Cooperative transmission (CT) mechanism is based on resource sharing as a result two or more single antenna transmitters achieve the benefits of an array transmitter

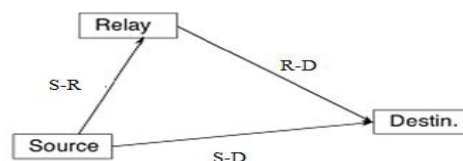
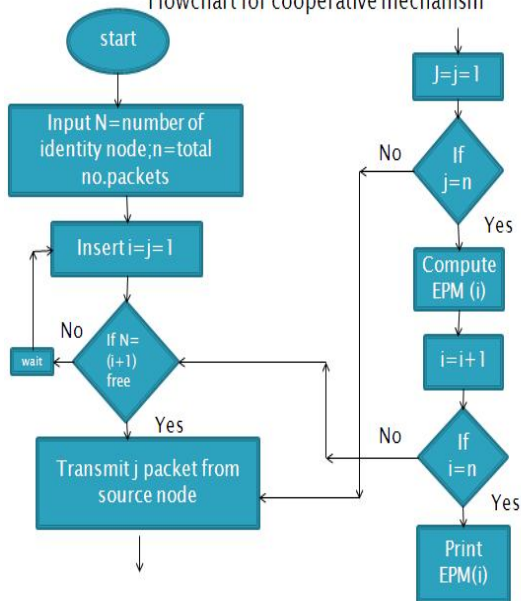


Fig.4. Example of Cooperative Transmission

An example of single-relay cooperative scenarios is shown in Figure 4. here Source terminal (S) transmits a signal to the destination terminal (D) through two paths for overhear the signal. One is direct path (S-D) and other one is via the relay terminal R. When Relay terminal (R) is in a cooperative mode, it forwards the source message to the destination D. As a result D receives two signals: the original one transmitted from S through the direct path (S-D) and the relayed one forwarded by R through the relayed path (S-R-D). These two received signals are combined at the destination terminal to achieve a better spatial diversity compared to the receive signal achieved with a single direct path method. Here two or more node cooperates to transmit the same.

Flowchart for cooperative mechanism



VII. CONCLUSIONS

By using cooperative mechanism for MIMO equipped mobile adhoc network Bit Error Rate can be minimized, The processing time, power loss can also be minimized, The packet transmission rate of the network can be increased.

VIII. REFERENCE:

- 1.<http://searchmobilecomputing.techtarget.com/definition/ad-hoc-network>
- 2.<http://www.radio-electronics.com/info/antennas/mimo/formats-siso-simo-miso-mimo.php>
- 3.www.allitebooks.com

- 4.S.Chowdhuri,A.K.Mondal,P.K.Banerjee “MIMO Ad-Hoc Networks-Mutual Information and Channel capacity”, COSIT 2011,Part1, CCIS 131,pp 225-235, Springer-Verlag Berlin Heidelberg,2011.

- 5.<http://www.journals.elsevier.com/ad-hoc-networks/>

- 6.. Swati Chowdhuri, Dr. Arun Kumar Mondal, Dr. P.K.Banerjee,“Implementation of MIMO-OFDM system in Mobile AD-Hoc Networks”, International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 Vol. 1, Issue 3, pp.753-757,2011.

- 7.S.Chowdhuri,A.K.Mondal,P.K.Banerjee “Analysis of Fading in MIMO based Mobile Ad-Hoc Network”. International Journal of Distributed and Parallel Systems (IJDPS), Vol.2, No.4, July 2011

- 8..<http://www.journals.elsevier.com/ad-hoc-networks/>

- 9.user.it.uu.se/~erikn/files/DK2-adhoc.pdf

- 10.www.it.iitb.ac.in/~sri/talks/manet.pdf

- 11.<http://www.wikipedia.com>