ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 3, March 2018

Intelligent Beam forming Schematic Nature Design with Multi-Time- Scale Strategies for Multi-Cell Network

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***Abstract* – Contemporary wireless devices are increasing the demand for higher wireless data usage. Unfortunately, progressive physical layer techniques such as e.g. Long Term Evolution (LTE) and Multi-User (MIMO) approach are not operated efficiently in a coordinated fashion across multiple densely deployed access points. Several access points in the specific region are not able to receive a balanced transmitting and receiving capacity factor while accessing the resources. In this paper, we introduce a new coordination architecture which can achieve the high- performance gains of the hypothetically synchronized MIMO approach without higher overhead and efficiency losses, thus making the vision of high capacity wireless access via multiple nodes located in multiple regions. Herein, we propose another algorithm which overcomes the inefficiency of the existing algorithm with SINR key metrics. The basic idea is to select the access points based on the required places on the network, which will increase the accuracy level of the architecture. The proposed system used the multi-time-scale architecture along with the divide and conquer algorithm implementation without the need of a synchronized timer with delay conditions in a communication region. Our performance results will achieve the faster processing with the elimination of path loss in the longest communication range by using the NS-2 Simulator. Our experiment will give higher efficiency rather than the existing experiments with multi-time-scale workflow for the multi-cell network.**

INTRODUCTION

In olden days, network instructions were entered using a bank of switches where the usages of users are also less. Nowadays the efficiency of the network depends on the number of users who are actively performed in the network domain. Increasing demand for wireless bandwidth by densely deploying a large number of the access point, which is centrally,managed [1]. In the meanwhile, energy efficiency of each and every user is affected because of the density network. To increase the efficiency, we are proposed a new approach that increases efficiency in a multi-cell network.

The substantial increase of the demand for network data, for wireless connectivity [2] of systems in the internet of things, and for fast low cast wireless network systems, demands to rethink future wireless broadband access. The industry's response to this challenge has been to come up with the successful propagation of wireless standards achieving regular performance improvements. These standards incorporate advanced physical layer technologies which manage to push more bits through the same time slots. For example, the new such technique, multiuser MIMO(MU-MIMO)[4] use multiple transmitting antennas to transmit signals to multiple receivers frequently and has been incorporated in the recent WLAN standard, 802.11ac, and in LTE-advanced.

The standards used in these technologies will increase the bandwidth, but it is not enough to meet the demand for wireless data. If the access points are increased then only we can overcome this problem. For example, while maintaining full coverage if the access point range is minimum then it will be difficult to provide high efficiency.

Unfortunately, things are not so easy. It has to overcome some challenges, e.g. it would be hard to find an available place for AP's in populated areas and also it would be costly to connect all of those stations with a wired network. Most notably, raising the frequency of AP's would extremely increase the inter-cell interference and eventually cancel any performance gains. Indeed, it is well known that interconnection network is much more useful at a short distance than at large distance. Thus combining more nodes and reusing the same frequency bands in space results in much more inter-cell interference. This is absolutely the situation all people are faced.

This problem can be solved by using some efficient algorithm in networking platform. In this paper, we introduce a new wireless coordinated architecture which can achieve high performance without the high overhead and deployment cost. It can be implemented in networking platform. Several architectures are used to

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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build a coordination network but, the multi-time-scale beamformingarchitecture will give efficient throughput than other structure.In this we propose a new framework for a distributed optimization of beamforming architecture will give efficient throughput than other structure.In this, we propose a new framework for a distributed optimization of beam formers at each base stations [23],[24]. Multi-timescale is only used in a multi-cell network. In the coordinated network, there are many nodes interconnected with each other. Every node can make a request with all other nodes, which is placed within a short distance. Basically, computer network means it enables the communication to all nodes which are connected to the internet. If all the nodes access the resources at the same time it is difficult to allocate the channel and medium to each node. To overcome this problem we introduce the new algorithm it will make the separation between the requests and respond nodes. The whole system is divided into several subsystems. It is called as a region. The particular amount of nodes present are in the region. Any node can make a request to its neighbour node, at the time it will lead to the congestion problem. In the particular region the request and respond nodes only in the active state, remaining nodes are in the de-active state. So the power conception will be reduced. In the existing system, they are using an SINR based greedy approach. In the platform of networking while passing the data on the network from one node to another node, we should mention or declare the path between the source and a destination node. A greedy approach will define a path from source node to the destination node without any instruction. There is an occurrence of data loss. To overcome this problem we introduce the new algorithm it will Test the appropriate neighbour to make a path between the source and a destination node. It will be the secured one. There is no data loss occurred in this transmission and also the efficiency will be increased.

II.RELATED WORK

In these recent years, a wide variety of papers are discussed the existing beamforming architecture such as analogue/digital beamforming, hybrid beamforming [5]-[7]. Our paper is considered multi-time-scale beamforming architecture which eliminates the need to deploy the number of RF chains in the MIMO network. Through this motive, MU-MIMO (i.e Multi User-Multiple Input Multiple Output) capabilities are increased where the reconfigurable combination of analogue front end is used. This analogue front end is the package of transmitter and receiver to achieve massive MIMO capacities. In these work, our goal is to reduce Inter-cell interference in the multi-cell network with the coordinated access points. These procedures are increasing the energy gain of the access points which are communicating in the multi-cell network.

There have been papers on the hybrid beam forming and two-time-scale beamforming.Author Xie, Xiufeng, Eugene Chai, Xinyu Zhang, KarthikeyanSundaresan, Amir Khojastepour, and SampathRangarajan[3] proposed, applied the development and implementation of two-time-scale beamforming where their contribution to achieving greater and practical capacity gains in the wireless multi-cell network with the high spectral benefit. However, the proposed system of the paper considers the global clock which is not suitable for WiFi. Even though, the system is well suited for indoor and outdoor environments wireless reflections are possible that violates the energy gain of the network.

Varieties of paper are followed coordinated beamforming. The main benefit of using this supports the loose coordination nature. The following papers are used this approach. The authorZakhour R, Ho ZK, Gesbert D[13]presented, well applicable reconfigurable front ends have been used which are restricted the ability of the wireless network[18]-[20]. The requirement of transmission of the access points is channel state information only, which satisfies the possible communications occurring the region. The author Dahrouj H, Yu W [9] submitted, coordination approach requires the channel state information for the purpose of communication with the flexible synchronization.

There is the possibility to achieve the increased performance in the multi-cell network using analogue beamforming. Some of the papers are implemented this beamforming. To reduce inter-cell interference the enhanced MAC layers are proposed in [8] which are able to give more gain in the physical layer implementation. Even though, it is providing more efficiency which is not supporting the digital precoding domain. The advanced level in the digital precoding is neglected in these papers [10].Multiuser joint precoding is possible when the nodes in the network have equal timescales and synchronization [12].

It is considered to be the large single channel station because of the tight synchronization in the coordinated MU-MIMO[11].Like this special symmetric conditions in the path loss coefficients the fixed point equation can be

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 3, March 2018

uncoupled[21],[22]. These implementations when comes to as a deployment stage brings a larger range of gain. Anyhow, this is also hasimpractical challenges which have to be implemented further in our task.

III.PROPOSED SYSTEM

In this section, we construct the model for multi-cell networks. Multi-cell networks are used toincrease the number of remote locations. In multi-cell networks[14] the pre-beamforming projections are selected across cells together with user scheduling We apply the SDC algorithm on mobility nodes with multi-time scale feature applied. Mobility node is an interdependent computer network device whose location and point of junction to the Internet may frequently be interchanged. The node can change their location, velocity, an acceleration over time. Multi-timescale systems can be greatly simplified by portioning them into a subsystem that evolves on different time scales.

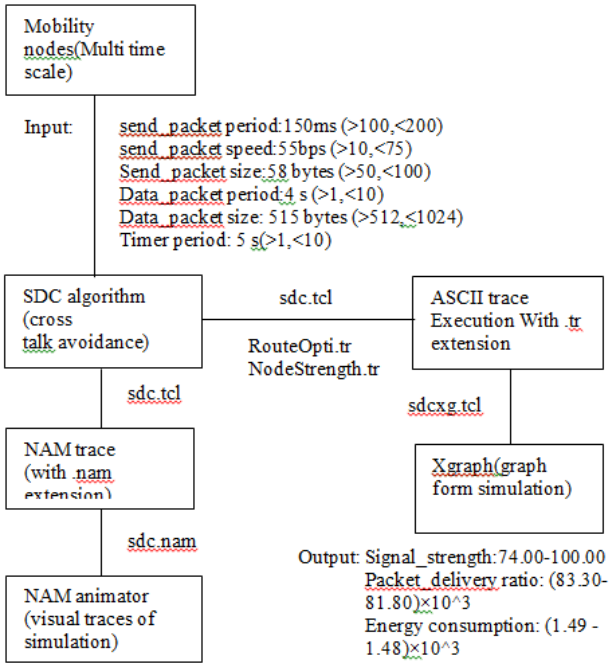

Fig 3.1 Active_SDC System Architecture

Multiple nodes are focused on multiple equal time scales of Intention. The algorithm SDC stands for SINR based Divide and Conquer algorithm. SINR stands for Signal to Interference plus Noise Ratio. SINR is the quantity used to theoretical upper bounds on channel capacity in a wireless communication system. SINR is the way to measure the quality of wireless connections. This algorithm avoids the crosstalk[17] caused by an electronic or magnetic field of one telecommunication affecting the signal in an adjacent circuit. The SDC algorithm used to improve the efficiency and give the high-performance gains in a coordinated fashion across multiple densely deployed transmitters.

The NS2 is an event-driven open source simulator[15] for the communication network. It supports to simulate the bunch of protocols like TCP, FTP, UDP, HTTP, DSR. It simulates both wired and wireless networks. It is a Unix based tool and it uses TCL scripting language. NS2 runs on the Cygwin platform. After installing the NS2 tool the SDC algorithm applied in an NS2 tool. The ASCII code is executed with .tr extension. The algorithm produces both NAM form and graph form of results. NAM is the network animator it produces the result in the form of visual demonstration of mobile nodes and data sharing. The graph-based result produces the graphical representation of the simulation. The NAM based output stored in the form of .nam extension.

The proposed system architecture is to increase the efficiency of data transmission. We use SINR based divide and conquer algorithm to increase the efficiency. The SINR based greedy algorithm[15] is proposed to increase the efficiency of data transmission. The greedy strategy is used in the heuristic method for optimizing[16]. But it has a disadvantage. During data transmission, the packet may be transmitted over the wrong root. So the packets were received by the wrong destination. It causes packet loss. The greedy algorithm did not provide globally optimized solutions. In order to overcome this problem, we introduce the Divide and conquer algorithm. In this algorithm, it accepts only the exact destinations. For example, consider 4 users such as A, B, C, D. The user A wants to send the data to user D. The algorithm should find a right route to the destination. So the node sends a packet to the exact endpoint. So there is no way of data loss. The SINR based divide and conquer algorithm divide the whole problem into subproblems.

The final result of all subproblems is merged and recursively solved of an original problem. We dividing the subsections into several equal distance subsections we may reach a stage where it does not lead further. We use the multi-timescale architecture. In this architecture, it consists two-time scales such as sends and receives in one node. One can send an input and another one can

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 3, March 2018

frequently produce the output. It takes equal time to send and receive. To increase the efficiency of data transmission we have to separate the active state and sleeping state. The divide and conquer algorithm applied to multi-time scale architecture and the TCL script is written over the NS2 tool. The graphical form of output represents the graph-based data flow between source and destination. The NAM animator produces the visual data flow between the source and destination.

IV.EXPERIMENTAL ANALYSIS

NS2 is one of the network simulation tool used for physical simulations in the multi-cell network. To compute performance in any network NS2 tool has been

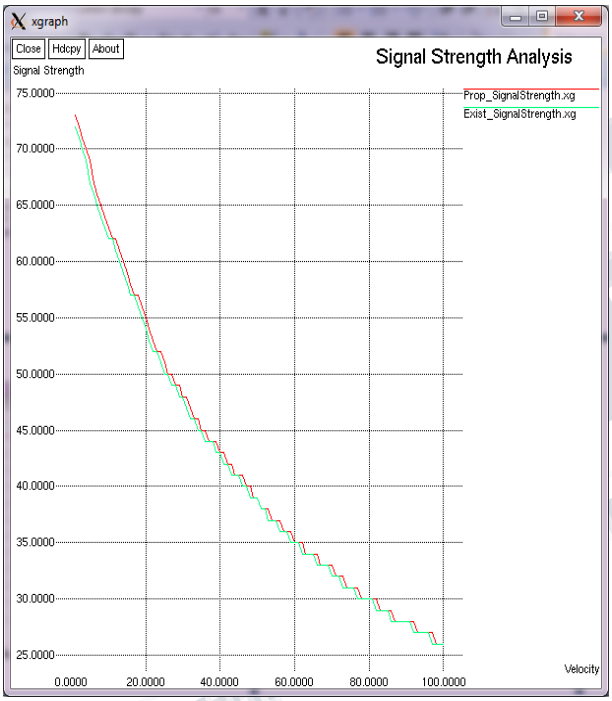

Fig.4.1 Analysis of Prop_SignalStrength.xg and Exist_SignalStrength.xg

used with some suitable algorithms such as greedy algorithm, divide and conquer algorithm and so on with several applicable protocol extensions. Our system performance is experimentally analysed in large-scale regions where a number of access points are deployed. The multi timescale is allocated to those access points to achieve equal time period for transmitting and receiving payloads.

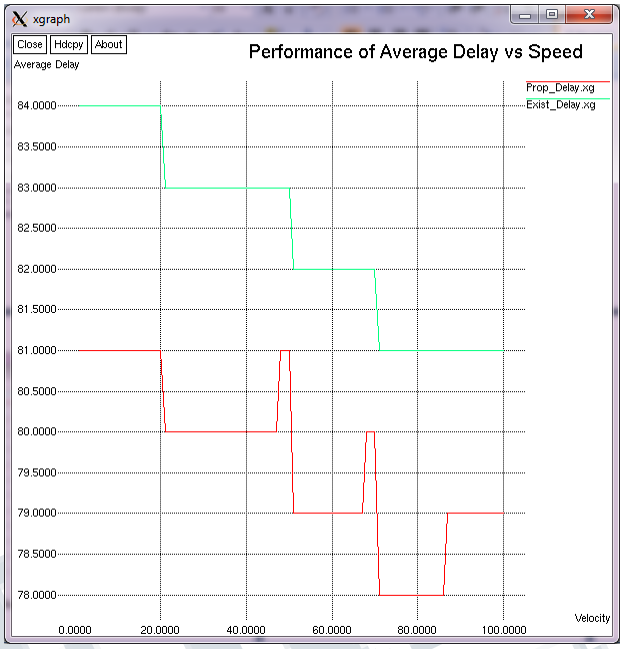

Fig.4.2 Performance of Prop_Delay.xg and Exist_Delay.xg

We calculating the user computation at all the levels like throughput, latency, performance ratio and so on. We wish to prove that our algorithm computation yields a better efficiency than the traditional MIMO approach. The performance of Asynchronously Coordinated Multi-time-scale(ACME) beamforming using the SINR based greedy algorithm is compared with ACME using SDC algorithm. Apparently, our proposed algorithm efficiency is increased.

V.CONCLUSION AND FUTURE WORK

In this paper, we apply the SINR based Divide and conquer algorithm to increase the efficiency of data sharing between two nodes. It overcomes the problem occurred in SINR based greedy algorithm. It avoids a data loss and improves the throughput. Also, it prohibits a packet delay between source and destination. An important result of this study is performance gains and it used to guide the deployment of future wireless networks.

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