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The QoS Assured Handoff Decision in Heterogeneous Content Distribution over Wireless Network

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Abstract- The high generation wireless system increasing their capability to provide high data handover rates, quality of services and continuous mobility. Certain advances in wireless technologies have been evolving various wireless network .This network offers certain transmission of wireless data with the number of transmission method. A heterogeneous wireless network includes personal, local and wireless broadband network .Out of these technologies WiMax and WiFi are major techniques which perform high speed communication over the network. Dynamic clustering with different mobile terminals have to be done for better implementation. Dividing each node into certain slots we form the channels. A dynamic channel assignment (DCA) policy is Hybrid-DCA is planned in a clustered ad hoc network. But when the mobile nodes are moved outside the coverage area of its base station, it is required to switch some other network, process worked as handoffs. Working with same network called horizontal handoff and work with dissimilar network called as vertical handoffs .To support the mobility on the network handoff mechanism is conceptually used with the required techniques to follow. This paper addresses certain handoffs between the dynamic clustering with mobile terminals.

Keywords-DCA, CDMA, TDMA, HYBRID-DCA,CBCA, WiMax, WiFi

1. INTRODUCTION

In traditional mobile spilling networks such as 3G wireless networks, all mobile nobles jerk image display from a server [1]. Such image distribution will lead to high streaming cost with problem of throughput i.e., network bandwidth and lifetime. When different mobile terminals are connected to the server for the same content then the server have some charge of finding the client and have to redirect all other clients to the user who own the data. Remaining scheme makes use spanning tree algorithm which finds out the first member who gave the invitation first, and these clients are treated main, then added user desires are diffused to this user who keeps the figures from server. This method raises the problem in the server, and kinds the running progress with reduced class. As linked to this prims method algorithm will describe more memory spaces and takes more time to execute certain procedures of execution of content distribution. With the start of the Internet of Things (IoT) and universal computing, the need has arisen to design protocols which connect the wireless sensor network to Internet. Pervasive computing, where computers interact with and make results with the user, needs sensing data to make the respective decisions. Subsequently, the Internet is the most widespread network, which connects WSNs to the Internet to spread sensed data is essential for making ubiquitous computing into reality

Here, we are using concept of cooperative clustering [4] with all the mobile terminals according to the energy distribution of each terminal. Comparison will take place with the cooperative and non-cooperative clustering with its energy value and certain timing of execution. [1][2] To make it fast we provide direct access to the client who keeps the data without preceding the request to the server. For the dynamic channel assignment (DCA)[3][4] method, the channels are not allocated early to any users. The DCA can adjust repeatedly to variation in both space and time [3].

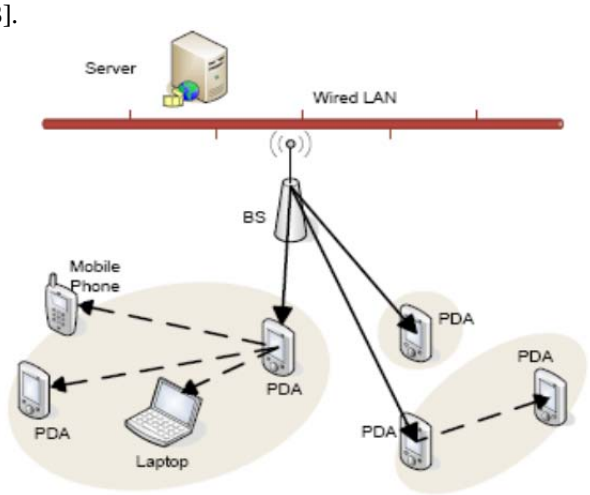

Fig 1: Cluster Network Architecture of Mobile Terminals [1]

As there is dynamic distribution [1][2] of data, the geographic location of each mobile terminal must be changed so that there must be a decision algorithm to decide the good choice for node to get specific results. This paper presents an overview of handoff process with the certain multimedia distribution with better energy efficiency .The criteria involved in VHD[4][6][7] i.e vertical handoff decision parameters, analysis and various research issues[3][6][7].DCA provides both QoS and resource efficiency. This is totally based on CBCA and Hybrid-DCA. For efficient working of this technique MADM algorithm is introduced.

Rest of the work over different schemes and techniques was described in certain sections as: In Section 1,it will describe about cluster architecture with different steps to implement clustering techniques with cooperative methods.

Section 2 will describe about the dynamic channel assignment with different algorithms to be implement for better network. Section 3 will describe about Cooperative clustering and handoff strategies .Finally Section 4 will describe about the performance evaluation and study.

2. LITERATUER RIVIEW

In [1][2][3],a helpful wireless network building is proposed to reduce energy consumption in mobile terminals and get better efficiency of bandwidth consumption. Again the concept of cooperative clustering is introduced with the clustering of mobile terminals and the DCA (dynamic channel assignment) techniques.

We divide each node with time slots to form channel [2][4][5], so the strategy called dynamic channel assignment is introduced for better implementation over it. In [7][8],describes the ubiquitous wireless technologies such as WLAN, WiMAX and 3G which helps us the reduction of data rates, mobile internet and diversity of wireless communication technologies. Moreover all the remaining of handoff mechanism was done with [16][17][18][19].

3. RELATED WORK

3.1 CLUSTER ARCHITECTURE

A cluster structure enables the 3-D reuse [3][4][5] of resources and raises the system performance. A clustered network is a network whose nodes are separated into groups or clusters in which broadcasts can be arranged in a contention-free method. The clustered organization, nodes originally organize all of them into connected clusters whose combination of members is all network nodes [4][6]. Every cluster contains a cluster head [1], one or more doorways, and zero or more normal nodes that are neither cluster heads nor gateways. The cluster head schedules communications [2] and allocates resources within the bunches. Entries connect head-to-head clusters. A doorway may straight connect two clusters by substitute as a associate of both, or it may incidentally connect two clusters by acting as a member of one and starting a link to a member of the other. As nodes move about the network [3][4], cluster membership must be updated accordingly to ensure proper preparation of shows. To make the most of availability of communications [5], all nodes must be capable of implementing the collection head and entryway roles if elected to do so. In ad hoc networks, cluster-based control structures subsidize to enhanced efficacy of reserve use by making settings for different change [3]:

- Handling wireless broadcasts among various nodes to reduce channel disputation.
- Forming routing backbones to reduce network diameter.
- Abstracting network state information to reduce its quantity and variability.

Clustering techniques will introduce cooperative method where all the mobile terminals form the clusters. Clustering is nothing but grouping the data .Cluster heads will form the mobile cloud. Base station will connect to the mobile cloud from which data can be send or receive directly and processing is over the base station. Implementation of cooperative clustering can be done in 3 stages:

- Stage of transferring data to base station.
- Stage of dividing data into certain parts according to the clusters and mobile terminals.
- Stage of transferring and exchanging data with clusters.

3.1.1 Color –Based-Cluster-Algorithm:

In [4], the author proposed CBCA. It forms the cluster structure suitable for channel allocation by solving coloring problem use different channel with different color. In CBCA formed cluster there are cluster head, gateways and ordinary nodes. The cluster head is responsible for exchanging the channel status information, and uses DCA algorithm to allocate channels. The CBCA formulate the Graph Coloring Problem as a typical separating tricky: subdividing objects into some clusters to improve an objective function. After the cluster head election is finished, all nodes except cluster heads become ordinarynodes first, and broadcast “ordinary node”. Thus a node would know how many neighbor clusters it directly connects to. This all CBCA algorithms works step by step i.e.:

Certain attributes have to be defining according to which we can do clustering with the mobile terminals in a certain network.

Attributes are:

- Number of mobile terminals
- Number of clusters
- X and Y coordinates
- Energy of each mobile terminals

In above output we can see the clustering example with certain mobile terminals. Clustering will be done according CBCA algorithm [4] and energy values of all coordinates [2][3].Here the nodes was assigned with certain color values i.e. red, green ,blue and cluster head was shown with yellow color.

3.1.2 Hidden Terminal Problems in CBCA

The hidden terminal problem has been shown to cause severe system performance ruin in wireless multi-hop ad hoc networks [7–10]. In [2], a CDMA ad hoc network is considered. Codes assigned to a cluster are subject to the constraint that they cannot be the same as the codes assigned to neighbor clusters codes allotted to neighbor clusters. However, such a technique may be too conventional. The existence of gateways agrees us to figure out more indeed whether there exists a hidden terminal problem between neighbor clusters. Therefore, a more intricate way can be active so that the network reclaim can be increased.

3.2 DYNAMIC CHANNEL ASSIGNMENT

As there is dynamic networking concept and wireless communication of mobile terminals so the geographic location of each terminal must be change according to the different attributes. For that dynamic channel allocation needs to there for better throughput.

This will also divided into certain categories as:

3.2.1 Greedy-Based-Dynamic–Channel-Allocation(GBDCA)

The GB-DCA was first proposed in [4] for the use in cellular mobile networks. It was shown to reduce the call blocking probability and increase the traffic-carrying capacity of the entire network. It animatedly gives the channel based on a greedy method. GB-DCA uses exhaustive searching for co-channels. However, this algorithm is based on the cellular network where wireless communication is limited to within the same cell. In this situation, only national prison cell are ceased from with the same cyphers (coloring problem). In put on this idea to multi-hop ad hoc systems, the unruly is unalike and converts stiffer.

3.2.2 Channel Segregation Dynamic Channel Assignment(CSDCA)

The CS-DCA was proposed in [5] for use in cellular mobile networks. The key point of the channel segregation is that each cluster head builds a table where a priority function is stored for every code. A cluster head tries to use the codes with the highest priority in assigning channels. In this paper the channel assignment is found according to the X and Y coordinates and these values are evaluated with respect to the energy value of each node. Score term was evaluated with parameters i.e energy and distance.

3.3 CO-OPERATIVE CLUSTERING

Cooperative clustering contains the group of cluster which exchange contents which are distributed over network. Cooperation mainly done between the mobile terminals in the group of cluster during downloading process. This makes it energy efficient and cost effective for all the applications.

- Cooperative communication is mainly used to reduce transmission power and minimizing total energy consumption [1].
- In cooperative clusters ,whatever data should be send from base station to mobile cloud be distributed and processed cooperatively through the cluster heads[1][4].
- Multiple Description Coding technique can be used for cooperative model [1].
- Cooperative clustering achieves the synchronous execution and obtains the clustering solution with less time [5].

3.3.1 Steps for Clustering according to mobile terminals and cluster number:

- Maximum value of X and Y coordinates have to be defined.
- The mobile terminals with its ‘x’ and ‘y’ coordinates were done with respect number of clusters and energy coordinates.
- Clustering will be done in a step by step manner.
- Here we define maximum value of energy coordinates i.e 100.
- One random variable has to be defining according to which we can estimate all the mobile terminal energy value.
- This estimated value we have to store in variable, which is used while finding cluster head.
- After this the cluster number can be determined by using **ceil** function which rounds the element according to the cluster number and maximum number of coordinates.

3.4 HANDOFF MECHANISM

In today’s wireless communication, the popularity is surges with trials of certain agility of all networks. Mobility was obtained by a handoff mechanism. In coming, the workers of wireless skills will not be for the certain attribute they can choose one of the accessible systems depending upon the requirement at that second. The internet expertise outside fourth generation is known as network generation in wireless network which will offer sustenance for mixed access machineries.

3.5 TYPES OF HANDOFFS

Process of computation of data in wireless communication to maintain the certain continuity with its signal strength direction, and decision making.

3.5.1 Horizontal Handoffs

Handoff between one or more different base stations (BSs) of the similar network is called Horizontal Handoff. In handoff the mobile node changes after one cell to extra of the same area to maintain the signal quality

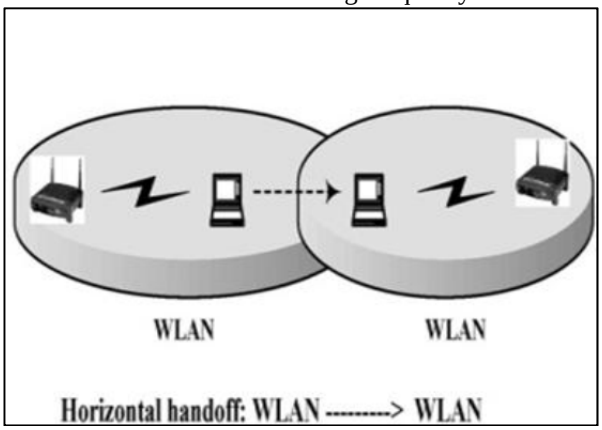

Fig: 2 Horizontal Handoffs [5]

3.5.2 Intra System Handoffs:

The horizontal handoff between two base stations (BS), under the equal BSC is recognized as Intra system Handoff.

3.5.3 Intersystem Handoffs:

In Intersystem, handoff, done with the different base station (BS) of different BSC. It takes residence in intra system when a mobile terminal proceeds the delimited monarchy of single admittance router and seams into the planned colony of further admission router with the same network [3][7].

3.6 VERTICAL HANDOFFS

Vertical Handoff occurs among diverse network technologies such as between access point and a base place of a cellular network as shown in figure 3, handoff is again classified into ascendant, downhill, upright level transportable trick meticulous system assisted and web measured mobile assisted handoff.

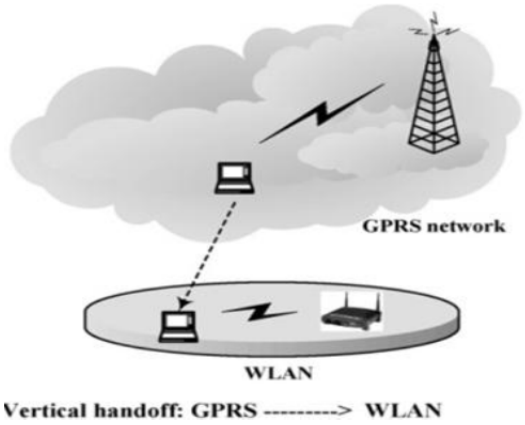

Fig 3 : Vertical Handoffs [5]

3.6.1 Classification of Handoffs according to handoff decision :

- Network Controlled Handoff(NCH)
- Mobile Controlled Handoff(MCH)
- Network Controlled Mobile Assisted handoff (NCMA)
- Mobile Controlled Network assisted handoff (MCNA)

Certain criteria works for implementation of vertical handoff:

3.7 PERFORMANCE EVALUATION AND ANALYSIS

As we done cooperative clustering with certain (dynamic channel assignment) DCA schemes we get certain outputs as:

Communication within same range:

- When communication is done with the clusters within same range then there is no need of routing.
- When the communication will be done with the different range then the routing will be done according to the range of cluster.

Handoff mechanism in cooperative and non-cooperative clustering:

- Handoffs are done with the clusters within different range.
- This is totally dependent on the network where we are performing communication.
- According to the network area and cluster number we can decide rather to do routing or not.
- This handoff mechanism mainly focuses the mobility management between the different nodes.

4 RESULTS AND DISCUSSION:

Considering the whole part of above research work, we identified the cooperative network is more effective in the cooperative distribution rather than in non-cooperative mode. Our aim is to develop such network area which is compatible to describe the dynamic data dispersal to the different clustering nodes over a several data. Again there is high issue of energy efficiency and the discontinuity of data which we overcome by using the supportive clustering and handover of terminals.

Here we are evaluating terms in different sections such as ,clustering of mobile terminals on the basis of different factors such as: energy value of each node with respect to the certain distance values, X and Y coordinates according to the value of each node with the several X and Y axis, cluster number ,color of cluster node according to the color-based-cluster-algorithm(CBCA) which defines the several node over the different coloring technique. Energy values of each coordinates.

Below table describe about the component values which we evaluate while doing clustering:

Example: Number of nodes: 30
Number of cluster: 3

Following table shows the evaluation of 10 node values with different parameter

Nodes No.	X-coordinate	Y coordinate	Color of node	Cluster no	Energy value of node
Node1	135.72	236.67	G	2	0.190
Node2	166.67	129.97	G	2	5.84
Node3	132.59	252.88	G	2	61.83
Node4	222.48	280.69	B	3	32.53
Node5	223.80	261.87	B	3	43.33
Node6	156.47	195.80	G	2	46.90
Node7	54.99	67.80	R	1	41.20
Node8	4.59	225.20	R	1	6.21
Node9	159.51	162.83	G	2	61.01
Node10	130.87	24.32	G	2	28.40

Fig 4: Graph for values with clustering evaluation

The above output will shows the exact values for the clustering algorithm with the effective coordinates. After this part the main term comes as the connection orientation with the source and destination and the values in which the handoffs can done with the respective value. In the handoff section the values of each cluster is changed according to the cooperative communication of each terminals. The following graph gives us the exact description about the resultant terms.

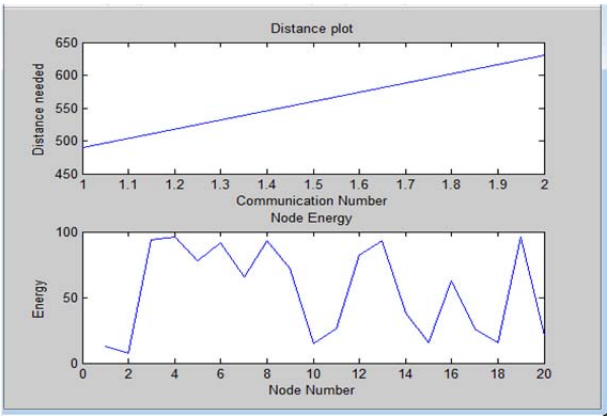

Fig 5: Score and Energy value graph

The score plot gives us the value from the distance and energy consumption and can be given as:

Score = Distance/Energy

Where, score gives the value for all the terminals evaluation a

Energy = energy value for overall computation

Distance = Mean distance of every cluster.

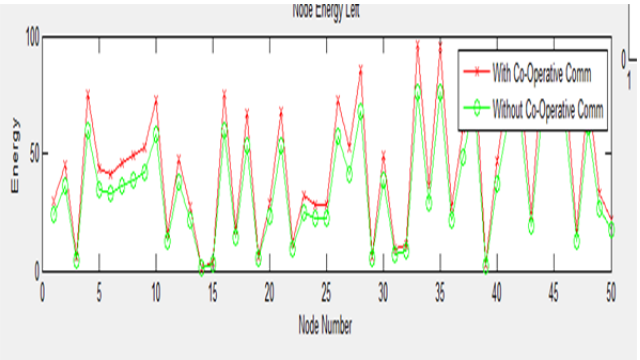

Fig 6: Graph for Cooperative and non-cooperative evaluation

5 Conclusion And Future Scope

Wireless communication growing in wide range day by day and determining the data communication while doing the overall networking distribution. Above research work we are done with certain results that are described in section: 4 and from that we can conclude that the dynamic distribution of information is mainly focus on the several areas such as communication of nodes, signal strength while communication and the efficiency which doing the distribution.

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