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EFFECTIVE HANDOVER MANAGEMENT IN CROWDED FEMTOCELLS

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ABSTRACT

Femtocell innovation is imagined to be generally sent in endorsers' homes to give high information rate correspondences with quality of service. Large number of femtocells will offload a lot of activity from the macrocellular system to the femtocellular system by the effective incorporation of macrocellular and Femto cellular systems. Productive treatment of handover calls is the key for effective femtocell/macrocell joining. For crowded femtocells, best coordinated femtocell /macrocell organize engineering, a neighbor cell list with less number of femtocells, viable call admission control (CAC), and handover forms with appropriate signaling are the open research issues, a proper traffic model demonstrate for the incorporated femtocell / macrocell system is likewise not yet created. In this we exhibit the significant issue of mobility management for the incorporated femtocell/macrocell network. We propose a novel algorithm to make a neighbor cell list with a less, but proper number of cells for handover. We additionally propose detailed handover methods and a novel traffic model for the coordinated femtocell / macrocell network. The proposed CAC successfully handles different calls. Our proposed plans for crowded femtocells will be exceptionally usefull for those in research and industry to actualize

INTRODUCTION

Future wireless network will require high information rates with enhanced strength of (QoS) services with less expense. A Femto cellular system is a standout amongst the most encouraging innovations to take care of the increased demand of expanding wireless capacity by different wireless applications for future wireless communication .Femtocells work in the range authorized for cell specialist organizations. The key component of the femtocell innovation is that clients require no new user equipment the deployment expense of the femtocell is low while giving a high information rate. In this way, the organization of femtocells at a vast scale is a definitive target of this innovation. Without a doubt, a proper designed femtocell / macrocell incorporated system can redirect tremendous amount of calls from congested and costly macrocellular systems to Femto cellular systems. From the wireless administrator perspective, the capacity to offload a lot of traffic calls from macrocellular systems to femtocellular systems is the most critical favourable position of the femtocell / macrocell incorporated system design. . The femtocells are sent under the macrocellular system scope or in a different non-macrocellular scope zone. In the overlaid macrocell scope region, femtocell-to-femtocell, femtocell-to-macrocell, and macrocell-to-femtocell handovers happen attributable to the deployment of femtocells. The frequency of these handovers increase as the quantity of femtocells is expanded. In this manner, powerful handover components are fundamental to bolster these handovers. The productive femtocell-to-femtocell and femtocell-to-macrocell handovers result in consistent development of femtocell clients. Despite the fact that the macrocell-to-femtocell handover is not fundamental for consistent development, effective treatment of this handover sort can diminish immense movement heaps of macrocellular systems by exchanging the calls to femtocells.

The extensive and large scale strategy of femtocells experiences a few difficulties. Handover is one trying issue among a few issues. For productive handover management four variables, to be specific, insightful system bolster, signal control for the handovers, diminished neighbor cell list, and a viable call admission control (CAC) approach are basic. To the best of our insight, finish inquire about outcomes with respect to these issues are as yet unpublished. Be that as it may, a couple look into gatherings have somewhat talked about a few thoughts with respect to handover issues in femtocellular systems. Proposed a handover mechanism in view of the decision made by an element associated with a femtocell access point (FAP). This element considers the client access mode of the FAP, and current load of the FAP to settle on a

decisionr about the target femtocell. Be that as it may, their plan does not consider the formation of a neighbour cell list. H. Zhang et. al. exhibited a handover advancement algorithm in view of the UE's mobility state. They likewise introduced an investigative model for the handover signalging cost examination. Here, we propose some novel ways to deal with comprehend the versatility management issues for crowdedly conveyed femtocellular systems. We present self-arranging system (SAS)elements to bolster the crowded femtocellular systems, detail handover call flows for various handovers, a algorithm to make a proper neighbour cell list (counting the neighbour femtocell list and the neighbour macrocell list), and a proficient CAC to deal with different calls. We additionally propose a novel model for the incorporated femtocell/macrocell situation
FIG-1-----

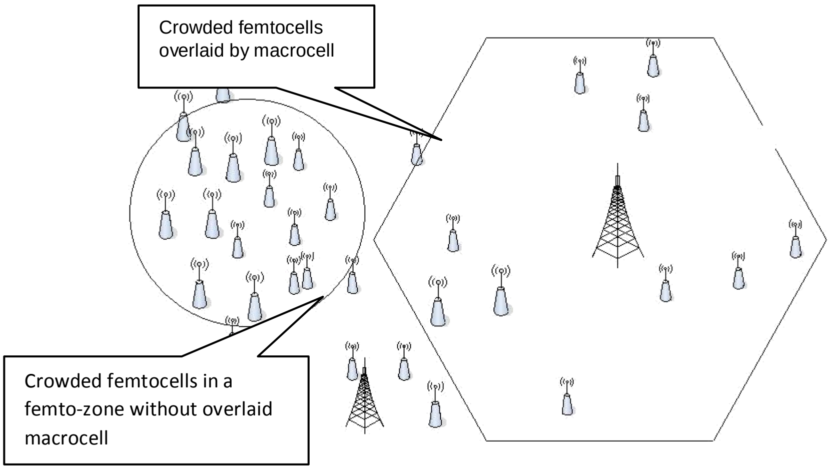

Fig-1. Example of a Crowded Femtocellular Network Deployment Scenario

At the point when the quantity of femtocell builds, the framework models must bolster the proficient management of a large number of FAPs and an enormous number of handover calls. The SAS features can bolster the coordination among the FAPs and in addition among the FAPs and macrocellular BS to execute smooth handover.

The capacity to consistently move between the macrocellular organize and the femtocellular systems is a key driver for femtocell network deploy .Also, handover between two systems ought to be performed with least signalging. Attributable to a few changes of the current system and convention design for incorporated femtocell/macrocell systems, the proposed signal flows for handover methods are marginally extraordinary when contrasted with the macrocellular case.

In a crowded femtocellular system organization, a huge number of femtocells can be sent inside a little scope region. Subsequently, this may exhibit large interference effect. At whatever point a moving subscriber (MS) understands that the received signal from the serving FAP is going down, the MS may get numerous signals from a few of the neighbor FAPs for handover. Therefore, the neighbour cell list lessdon received signal just will contain large femtocell Furthermore; a concealed FAP issue may emerge. The hidden FAP issue emerges when a neighbour FAP is near the MS yet the MS can't get the received signal to some boundary (e.g., a divider) between the MS and that FAP. In this manner, the concealed FAPs will be out of the neighbor cell list if the neighbour femtocell is designed on the basis of received signals. Similar frequencies are likewise material for the macrocell-to-femtocell handover case. The proposed algorithms are fit for giving a neighbor cell list that contains a less number of femtocells and in addition incorporates the concealed FAPs.
The proposed CAC does not separate between the new starting calls and handover requires the

femtocellular systems attributable to accessible resourcess in the femtocellular systems. The CAC gives higher need to the handover calls in the overlaid macrocellular organize by offering a QoS adjustment strategy. The QoS adjustment strategy is just accessible to acknowledge threshold handover calls in a macrocellular organize. In this way, the

Macrocellular system can acknowledge threshold countless calls that are produced in view of the femtocells and the neighbour macrocells. The CAC approach additionally offers two level of signal to noise interference ratio threshold to reduce unwanted macrocell-to-femtocell handovers

The current traffic model ought to be adjusted with the end goal that it can be connected to coordinated systems. We propose a novel traffic model for femtocell/macrocell coordinated systems that is valuable to investigate the execution of femtocell/macrocell incorporated systems.

Network Architecture to Support Crowded Femtocells

From the network operator's perspective, the main requirement for crowded femtocell deployment is that it fits into the network with minimum level of operator involvement in the deployment process while minimizing the impact of the femtocell on the existing network. For this purpose, the femtocell is required to boot up into a network by sniffing so that it can scan the air interface for available frequencies and other network resources. Self organization of radio access networks is regarded as a new approach that enables cost effective support of a range of high-quality mobile communication services and applications for acceptable prices. It enables deployment of dense femtocell clusters, providing advanced SON mechanisms generally eliminating interference between femtocells, as well as reducing the size of the neighbor cell list and scanning for the handover to ensure fast and reliable handover. The main functionalities of the SON for femtocellular networks are self-configuration, self-optimization, and self-healing. Self-configuration includes frequency allocation. Self-optimization includes transmission power optimization, neighbour cell list optimization, coverage optimization, and mobility robustness optimization. Self-healing includes automatic detection and solution of most of the failures. Neighbor FAPs as well as the macrocellular BS and the neighbour FAPs coordinate with each other. Whenever an MS desires handover in an overlaid macrocell environment, the MS detects multiple neighbour FAPs because of the dense deployment of femtocells along with the presence of macrocell coverage. Thus, during the handover phase, it is quite difficult to sense the actual FAP to which the user is going to be handed over to. The location information is exchanged among the neighbour FAPs as well as among the neighbor FAPs and macrocellular BS for building an optimized neighbour femtocell list. The handover processes are facilitated by the SON features of the network.

NEIGHBOR FEMTOCELL LIST

Finding the neighbor FAPs and determining the appropriate FAP for the handover are challenges for optimum handover decision .Macrocell-to-femtocell and femtocell-to femtocell handovers in a dense femtocellular network environment suffer from some additional challenges because of dense neighbor femtocells. In these handovers, the MS needs to select the appropriate target FAP among many neighbor FAPs. These handovers create significant problems if there is no minimum number of femtocells in the neighbor femtocell list. The MSs Use much more power consumption in order to scan multiple FAPs, and the MAC overhead becomes significant. This increased size of the neighbor femtocell list along with messaging and broadcasting a large amount of information causes too much overhead. Therefore, an appropriate and optimal neighbor femtocell list is essential for dense femtocellular network deployment.

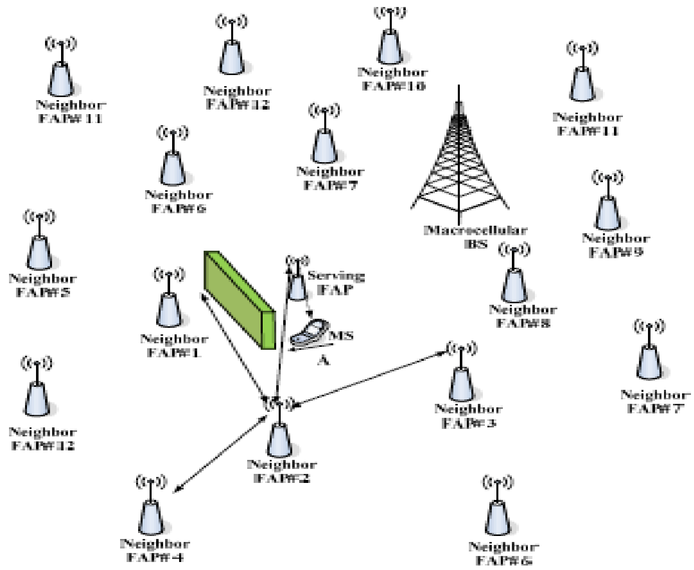

Fig. 2. Scenario of Dense Femtocellular Network Deployment Where Several Hidden Faps and Other Faps Are Situated As Neighbor Femtocells

Whenever an MS moves away from one femtocell or the MS moves around the macrocellular coverage area, the MS detects signals from many neighbor FAPs owing to dense deployment of femtocells while detecting the presence of macrocell coverage. Reducing the size of the neighbor femtocell list is essential to minimize the amount of scanning and signal flow during handover. A large neighbor femtocell list causes unnecessary scanning for the handover. Traditional schemes (e.g., [18, 19]) based on the received signal strength indicator (RSSI) are used for the existing cellular system. However, the neighbor femtocell list based on only the RSSI will contain a large number of femtocell in the list. Therefore, these traditional schemes are not effective for creating the neighbor femtocell list in a dense femtocellular network environment. In addition, missing some of the hidden femtocells in the neighbor femtocell list causes the failure of handover. Our main objective is to create such a neighbor femtocell list for the femtocell-to-femtocell and macrocell-to-femtocell handovers so that the list contains the minimum number of femtocells and considers all the hidden femtocells. The FAPs and the macrocellular BS coordinate with each other to facilitate a smooth handover in our proposed scheme. Fig. 3 shows a scenario of dense femtocellular network deployment where several FAPs are situated as neighbor femtocells. For the MS at position “A,” the MS cannot receive a sufficient signal level from FAP# 1 because of a wall or another obstacle between the MS and this FAP. The serving FAP and FAP# 1 also cannot coordinate with each other. Thus, a neighbor femtocell list based on the RSSI measurement does not include FAP# 1 in the neighbor femtocell list. In this situation, FAP# 2 and FAP# 1 coordinate with each other using the SON features. FAP# 2 gives the location information of FAP# 1 to the serving FAP. Once receiving this location information, the neighbor femtocell list includes FAP# 1. Therefore, the MS can complete the pre-handover processes with FAP# 1, with coordination between the serving FAP and FAP# 1, even though the MS cannot receive the signal from FAP# 1. Subsequently, if the MS moves closer to FAP# 1, receives a sufficient level of signal from FAP# 1, and the received signal from the serving FAP goes below the threshold level then connection is handed over from the serving FAP to FAP# 1. Figs. 4 and 5 show the flow mechanisms for the design of the optimal neighbor femtocell list. Nf and Nc denote the total number of femtocells and cells included in the neighbor cell list, respectively. Our proposed scheme initially considers the received RSSI level to create the neighbor cell list. For dense femtocellular network deployment, the frequency for each of the FAPs is allocated on the basis of the neighboring overlapping femtocells. Thus, the overlapping of the two femtocells does not use the same frequency to avoid interference [6]. The same frequency is only used by femtocells located far enough apart. Therefore, for the femtocell-to-femtocell handover case, the FAPs are removed from the initial neighbor femtocell list on the basis of the RSSI level of only those that use the same frequency as the serving FAP. Finally, hidden femtocells in the neighbor femtocell list are added using the location information coordination among neighbor FAPs or among the neighbor FAPs and macrocellular BS.

PROPOSED ALGORITHM

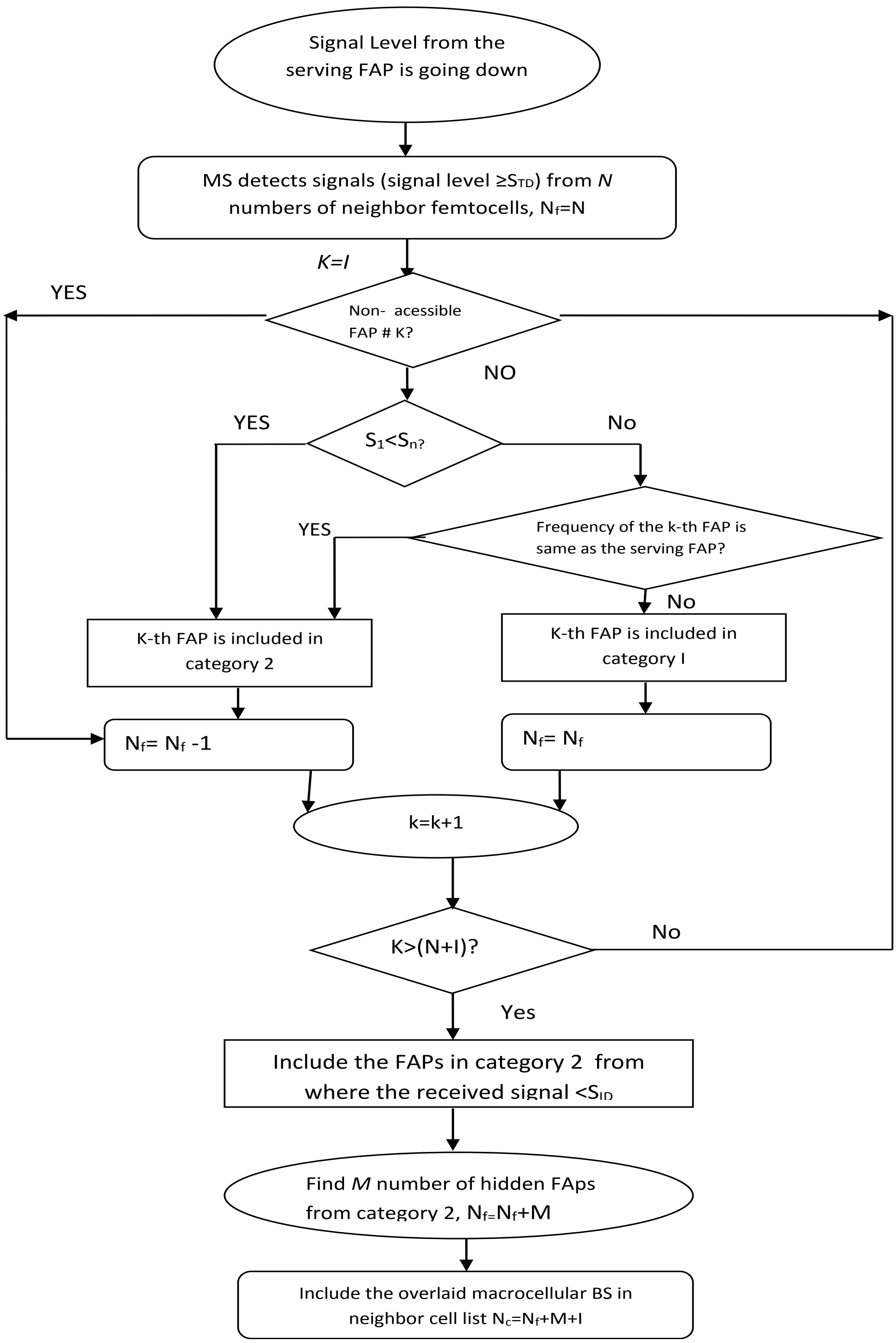

Fig.3: Flow Mechanism for the Design of the Optimal Neighbor Cell List for Handover When the MS Is Connected With an FAP.

Fig. 3 depicts the algorithm for the design of the ideal neighbor cell list for the handover when the MS is associated with a FAP. We utilize two threshold levels of a signal to design the flow components. The main threshold signal level ST0 is the less level of RSSI that is required to recognize the nearness of a FAP. The second signal level ST1 is higher than ST0. This level of RSSI is considered in our proposed plan to develop the neighbor cell list. The paradigm utilized for deciding the value of ST1 is the crowdedness of femtocells. Thusly, by incement in the value of ST1 excess the quantity of crowded Femtocell. So femtocells in the neighbor cell list can be decreased. This activity likewise reduces unnecessary handover and pingpong impact. In the wake of checking the open/closed access framework, the k-th FAP is specifically added to the neighbor cell list if the recieved signal Si from the k-th FAP is more prominent than or equivalent to the second threshold ST1. All N number of FAPs from where the MS gets signs are at first considered to make the neighbor cell list. At that point, for the closed access case, all the non-open FAPs are expelled from the quantity of at first considered femtocells. The frequency portions are considered to discover the closest FAPs for conceivable handover. The coordination among the neighbor FAPs and in addition among the FAPs and macrocellular BS are performed to discover concealed FAPs. Concealed FAPs are those from which the recieved signals are not as much as the second signal level ST1; in any case, these FAPs are near the serving FAP. Despite the fact that these FAPs are near the MS, it gets a low level of signal or no signal from these FAPs attributable to some deterrent between the MS and these FAPs. In this way, the expansion of these hidden FAPs in the neighbor cell list decreases the shot that the MS neglects to impeccably handover to the objective FAP

CONCLUSION

Algorithm shown in fig 3 would be quite effective in quality of service. This algorithm reduces handover failure the proposed CAC successfully handles different calls. Our proposed plans for crowded femtocells will be exceptionally useful for those in research and industry to actualize

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