Survey on different type of hand off used in cellular system

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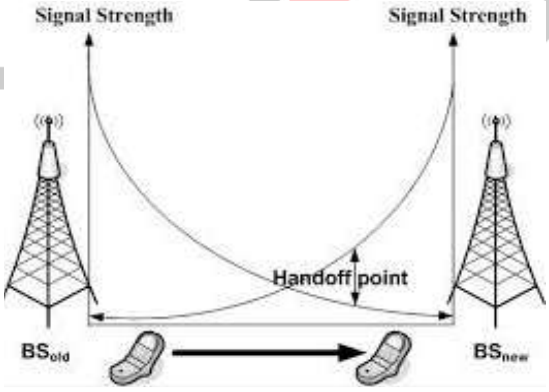
***Abstract*: Mobility in a cellular system play important role and the most important feature of a wireless cellular communication system. Continuous service is achieved by supporting handoff (or handover) from one cell to another. Handoff is the process of changing the channel (frequency, time slot, spreading code, or combination of them) associated with the current connection while a call is in progress. Handoff is divided into two broad categories—hard and soft handoffs. They are also characterized by "break before make" and "make "before break" .in hard hand off current cell connection is break before new cell connection is established in this call dropped chances are more as compare to soft hand off .but in soft hand off call dropped chances are cell because it provide connection to new cell before breaking the connection to the current cell. . Poorly designed handoff schemes tend to generate very heavy signaling traffic and, decrease in quality of service (QoS).in this paper we study about the different hand off used in cellular system to increase the quality of service or increase the battery life time of a user .using vertical hand off IWO algorithm for heterogeneous network.**

***Keywords*: QOS, RSS, MN**

INTRODUCTION: Mobility is the most important feature of a wireless cellular communication system. Usually, continuous service is achieved by supporting handoff (or handover) from one cell to another. Handoff is the process of changing the channel (frequency, time slot, spreading code, or combination of them) associated with the current connection while a call is in progress .there are two type of hand off soft hand off and hard hand off .in soft hand off new source or cell is used before leave the current source or cell in this call dropped chances are less but in hard handoff connection of current cell break before make the connection from new cell in this call dropped chances are more as compare to soft hand off Wireless Communication is the type of communication in which information is transferred from one place to another without any physical links. Wireless communication offers mobility, reliability and scalability to the users. Mobile devices that are used as source of wireless communication have the advantage that they can be used anywhere i.e. even at remote places. Also, wireless communication is preferred over wired networks because of their easy use and maintenance. One problem with wireless communication systems is handoff. The problem of handoff usually occurs when the users moves from one cell to another. The inability of the next cell or base station to take call causes call dropping and this is what leads to the problem of handoff. Mobility is promissory factor in wireless cellular communication systems. It is provided using handoff as handoff enables call transference from one cell to another when a user is moving.



Hand off in Mobile Networks

Network-Controlled Handoff in network control hand off protocol the network makes a handoff decision based on the measurements of the mobile station at a number of Base station . , the handoff process (including data transmission, channel switching, and network switching) takes 100–200 ms information about the signal quality provide at a single point in the network Network-controlled handoff is used in first-generation analog systems such as AMPS (advanced mobile phone system), TACS(total access communication system), and NMT (advanced mobile phone system).

Mobile-Assisted Handoff- in a mobile-assisted handoff process, the MS makes measurements and the network makes the decision. In the circuit-switched GSM (global system mobile), the Base station controller (BSC) is in charge of the radio interface management. The handoff time between handoff decision and execution in such a circuit-switched GSM is approximately 1 second.

Mobile-Controlled Handoff- In mobile-controlled handoff, each MS is completely in control of the handoff process .This type of handoff has a short reaction time (on the order of 0.1 second). Mobile station measures the signal strengths from surrounding Base stations and interference levels on all channels. There are two type of hand off horizontal and vertical handoff
Vertical and Horizontal handoffs are also given priority, accordingly as voice and data calls. To prioritize the handovers, the channel reservation approach is used in the cellular network. Vertical handover voice calls are given the highest priority among both the handover calls by limiting the number of accepted horizontal handover calls, when voice calls are greater than or equal to the threshold. To increase the capacity and QoS of cellular cost effective ways. In a horizontal handover, the main concern is to maintain the ongoing service even if the IP address changes because of the movement of the mobile node. The ongoing service is done either by dynamically updating the changed IP address or by hiding the change of IP address .Vertical handover takes place when the mobile node moves over heterogeneous access networks. The used access technology is also changed along with the IP address in the vertical handover, as the mobile nodes moves across different networks which use different access technology.

Parameters in Horizontal and Vertical handover shown in table

parameter	Horizontal hand off	Vertical hand off
Ip address	Changed	changed
Access technology	No change	changed
Network inter face	No change	Can be changed
Qos	No change	Can be changed

Advantage of vertical hand off –
1. Vertical handovers use different access technology.
2. Vertical handovers use multiple network interfaces.
3. Multiple IP addresses are used in Vertical handovers.
4. QoS parameters can be changed in Vertical handovers and multiple parameters are used.
5. Multiple network connections are used in Vertical handovers.

Heterogeneous wireless networks are an integration of two different networks. For better performance connections are to be exchanged among the different networks using seamless Vertical

Handoff The evolutionary algorithm of invasive weed optimization algorithm popularly known as IWO has been used in this paper, to solve the Vertical Handoff (VHO) and Horizontal Handoff (HHO) problems. This integer coded algorithm is based on the colonizing behavior of weed plants has been developed to optimize the system load and reduce the battery power consumption of Mobile Node (MN). Constraints such as Receiver Signal Strength (RSS) battery lifetime, Mobility load and so on are taken into account. Individual as well as a combination of a number of factors are considered during decision process to make it more effective. Mobile communication is one of the fastest growing sectors in the global scenario. The number of users has increased heterogeneous networks a MN should be able to move from one radio access network to another by performing a Vertical Handoff. During handoff, it is very important to carefully adjust the bandwidth allocation and reallocation which provide better Quality of Service (QoS) for the existing users.
Integration of WLAN and cellular networks has additional advantages in terms of mobility, coverage area and bandwidth. WLAN technology provides high bandwidth at low cost and also supports low speed mobility. These features of WLAN make it a suitable technology for deployment at hot spots in heterogeneous

Literature survey

[1] This paper provided an effective mechanism to guarantee the performance of handoff, including a mobility-aware scheme, temporary connection and quick registration .The main contribution of this paper is that the proposed mechanism is implemented not only in our test based but in a real industrial environment. The results indicate that our mechanism not only improves the accuracy of handoff triggering, but also solves the problem of ping-pong effect during handoff. Compared with the Wireless HART standard and the RSSI-based approach, our mechanism facilitates real-time communication while being more reliable, which can help end-to-end packet delivery remain an average of 98.5% in the scenario of mobile IWSNs.

[2] In this paper Analyzed and implement a MAC layer handoff mechanism for WSN by introduce best algorithm for reducing handoff time. More we introduce the best mechanisms to manage handoff from Mobile node (MN) side. At the end of the paper we will show how, with our approach, it is possible to reduce the mobile node handoff delay effectively. Every result shown in the analysis is done both in simulation and real-time implementation of our algorithm. As our result shows that, the total handoff delay time we have is the best time duration achieved in handoff handling of mobile sensors. Physical environment test is done for sensor applications working in hospital, considering that sensors in such environment are used for very sensitive data
Communication it is very important to analyze our algorithm both in real environment and simulation.
[3] This paper provide two triggering options, the RSSI and the Link Loss. In addition, we propose a new handoff decision scheme named Burst Loss Algorithm (BLA) compared with the traditional RSSI-based decision option. We evaluate the four resulting

combinations of the triggering and handoff options with respect to the end-to-end packet loss and the total power consumption and at the same time determine the effectiveness of each solution by measuring and relating the number of handoff triggers and the actual hand off super formed. The results show that a combination of hand off decisions outperforms any single-based handoff decision.

[4] This paper provided Quality of Service (QoS) and real-time mobility handoff mechanism in WSNs .The healthcare area of wireless sensor networks (WSNs) to enhance mobility station research is recognized as important issue. Body area sensor networks (BASNs) are type of WSNs aim to be deployed on persons in order to collect physiological parameters for healthcare monitoring purposes. In these applications, the lack of BASNs/WSNs connectivity is not admissible. This research drafts a fuzzy handoff algorithm and correspondent fuzzy rules for taking reliable handoff decisions in WSNs.

[5] This paper provide an FLMC approach for reduce the bandwidth**.** Handoff in Wireless Sensor Network as the process where a mobile node changes the destination addresses of its data packets from one access point to another. Mobility Management is an essential problem for wireless communication especially in wireless sensor network. The RSSI approach (Received Signal Strength) is an arbitrary unit; is an indication of the power level being received by the antenna. The RSSI is high, then it produces the stronger signal. However, when Handoff is performed by RSSI, produce the high rate of packet loss. To tackle this problem a generic approach Fuzzy Logic Mobility Controller (FLMC) is used to reduce the bandwidth and it is placed in each source sensor node. It is proposed to aid mobile sensor nodes to decide whether they have to perform the handoff to a new position or not. The FLMC has shown significant benefits compared to other conventional solutions in terms of packet delivery ratio, energy consumption, throughput and bandwidth. To further reduce the power consumption the nodes are formed as clusters. In this technique the node with minimum weight value is chosen as cluster head. By using fuzzy logic, if any cluster member decides to leave from a cluster means then its mobility will be predicted. This technique uses RSSI and node's velocity and calculates the residence time of the Cluster member. Authentication is performed when the handoff process is initiated.

[6] This paper presented a review of the handoff techniques Wireless Communication plays a significant role in today's communication system because of its ease, scalability and mobility. It helps transferring information from one place to another reliably and at higher speed. One problem that is faced during wireless communication is handoff. Whenever handoff occurs in a communication system, the performance of the system degrades. Handoff is an importance that is to be considered while evaluating the performance of a communication system because this affects the mobility of any system. Mobility is important to user because it affects the quality of call that is provided to the user.

[7] This paper presented an advanced handover technique is presented, in terms of adding new and critical parameters, as well as combining between the present UE trajectory and the HeNB cell location. A polynomial function is used to predict the future UE position while the cosine function along with distance are used for the selection of an appropriate target cell. The proposed algorithm is evaluated and then compared to the present work based on the handover number, number of signaling measurements packet delay ratio, packet loss ratio, and system throughput. Simulation of the LTE- Sim demonstrates that the proposed algorithm significantly reduces the number of handovers, the transmission measurement number, the packet delay ratio, and the packet loss ratio and increases system throughput.

[8] This paper proposed the vertical handoff decision depends on coverage area of the network and the velocity of the mobile user. We have determined application-wise critical speed for particular coverage range of network during which handoff is beneficial. In our work, we have considered applications like HDTV, MPEG-4, and H.261 in heterogeneous network of UMTS (Universal Mobile Telecommunication System) and WLAN. The simulation is performed using Network Simulator NS-2 with NIST (National Institute of Standards and Technology) mobility module.

[9] This paper present a sequential sensing-based spectrum handoff policy for multiple-user cognitive radio networks. First, we select the appropriate candidate channels for each secondary user, then their associated optimal sensing order together with the best target hand off channel is determined through sequential sensing based on Dynamic Programming (DP).Note that many spectrum handoffs will occur during one secondary user transmission and our objective is to minimize the total number of spectrum handoff. The sequential sensing-based spectrum handoff policy is evaluated through a comprehensive simulation study. The results reveal significant improvements in the system performance by reducing the number of spectrum handoff over conventional approaches. Moreover, our proposed DP method can significantly lower the computational complexity compared to exhaustive search and common DP (performing sequential sensing over all the channels in the system using Dynamic Programming)

[10] This paper provided a fuzzy-based solution and a comparison with the analytical solution results is established. Handoff mechanisms are implemented entirely in software, which increasingly becoming infeasible. Therefore, this work attempt to follow the top-down co-design approach providing hardware prototype which leads to reduce the power consumption and support high processing speed.

[11] This paper proposed SHIP scheme for forward-link that, overcomes the need for synchronization and increases the capacity of the network. Through both analytic and simulation studies, we show that SHIP achieves significant performance improvements .We derive analytic expressions of the power capacity relationship for two-dimensional (2-D) and one-dimensional (1-D) cell models. By comparing our scheme with the hard handoff, we empirically show that the capacity increases by about30% and 20%, respectively, for the 2-D and 1-D cell. The simulation results show that SHIP saves up to 30% of the total power consumed by the antennas .

Conclusion

Due to spectrum limitation and to avoid congestion in a network, heterogeneous communication networks are used like GSM, WiMax, Wi-Fi, WLAN etc. With the use of heterogeneous network, minimum handoff can be achieved but rise of call drop during handoff is increased. To avoid this and smooth operation of vertical handoff various works are published. We consider the IWO

algorithms for heterogeneous network. This is intelligent and adaptive handoff method which manages the load balancing in the network and energy consumption of MU battery consumption

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Comparison Table

Reference	Work
[1]	A mechanism is implemented in a real industrial environment. The results indicate that this mechanism reduce triggering and ping pong effect.
[2]	Analyzed and implement a MAC layer handoff mechanism for WSN by introduce best algorithm for reducing handoff time.
[3]	Provided two triggering options, the RSSI and the Link Loss and proposed a new handoff decision scheme named Burst Loss Algorithm (BLA) compared with the traditional RSSI-based decision option.
[4]	Quality of Service (QoS) and real-time mobility handoff mechanism in WSNs .The healthcare area of wireless sensor networks (WSNs) to enhance mobility station Body area sensor networks (BASNs) are type of WSNs aim to be deployed on persons in order to collect physiological parameters for healthcare monitoring purposes.
[5]	FLMC approach for reduce the bandwidth .To tackle this problem a generic approach Fuzzy Logic Mobility Controller (FLMC) is used to reduce the bandwidth
[6]	A review of the handoff techniques Wireless Communication plays a significant role in today's communication system
[7]	advanced handover technique is presented, in terms of adding new and critical parameters, as well as combining between the present UE trajectory and the He NB cell location
[8]	Vertical hand off decision depends on coverage area of the network and the velocity of the mobile user.
[9]	A sequential sensing-based spectrum handoff policy for multiple-user cognitive radio networks.
[10]	provided a fuzzy-based solution and a comparison with the analytical solution
[11]	SHIP scheme for forward-link that, overcomes the need for synchronization and increases the capacity of the network.