OPTIMISTIC TOWER DEPLOYMENT TECHNIQUES

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Abstract-**This paper presents a survey on optimistic tower deployment techniques and what are their pons and cons. It is found that the mobile has become the necessary need of every person in today's world. Even a child cannot live with mobiles. But mobile are only useful when range of their network service provider is also available on it 24*7*365. But till now it is not possible in most of the area. Reason is the cost of Tower as well as towers are not optimally deployed.**

I. INTRODUCTION

Cell tower optimization [1] is a popular technique for determining the location of a mobile device. However, cell tower triangulation methods require the knowledge of the actual locations of cell towers. Because the locations of cell towers are not publicly available, these methods often need to use estimated tower locations obtained through war driving. This paper provides the first large scale study of the accuracy of two existing methods for cell tower localization using war driving data. The results show that naively applying these methods results in very large localization errors. We analyze the causes for these errors and conclude that one can localize a cell accurately only if it falls within the area covered by the war driving trace. We further propose a bounding technique to select the cells that fall within the area covered by the war driving trace and identify a cell combining optimization that can further reduce the localization error by half.

The appearance of wireless communication is dramatically changing our life. Mobile telecommunications emerged as a technological marvel allowing for access to personal and other services, devices, computation and communication, in any place and at any time through effortless plug and play. Setting up wireless mobile networks often requires: Frequency Assignment, Communication Protocol selection, Routing schemes selection, and cells towers distributions.

Cellular telephony is the next and perhaps the most representative example of mobile communication systems. The cellular phone system is characterized as a system ensuring bidirectional wireless communication with mobile stations moving even at high speed in a large area covered by a system of base stations. The cellular system can cover whole country. Moreover, a family of systems of the same kind can cover the area of many countries. Initially, the main task of a cellular system was to ensure the connections with vehicles moving within a city and along highways. The power used by cellular mobile stations is higher than that used by the wireless telephony and reaches the values of single watts, for more details see references.

II. LITERATURE SURVEY

K. Kraimeche, B. Kraimeche and K. Chiang [2] has discussed that N base stations (BSs) at fixed locations are to be connected to a subset of M possible sites for mobile switching centers (MSCs) in a cellular access network. The

MSCs are, in turn, to be connected to a number of local exchanges of the public switched telephone network. Given the BS-MSC connection cost matrix, the MSC-LE connection vector, the MSC equipment cost vector, and the MSC capacity constraint vector, authors formulate the network design problem as a matrix optimization problem with constraints. Authors has introduced a simple exhaustive search algorithm to find the optimum solution matrix.

A. Borgart, has described about an efficient coverage-based flooding scheme for geo-casting in mobile ad hoc networks [3]. Using new methods of optimization with a holistic approach gives the designer a range of design possibilities as well allows for insight into the structural behavior and the geometrical properties of the structure. Results will be shown at the conference. A protocol is proposed that extends existing geo-cast protocols by supporting a novel packet delivery mechanism through the use of efficient flooding. The solution employs coverage information and partitioning the geo-cast region into grids. Using coverage information, only nodes that can reach the new portion of the region, which has not been covered by a transmission, will rebroadcast the packet. This solution is superior to simple flooding since it reduces the number of redundant retransmissions within the geo-cast region considerably.

P. Sondi has illustrated on mobile ad hoc network-based monitoring of battlefields or rescue operations in urban scenarios [4]. The use of satellites allows monitoring of mobile units with high precision in open environments like deserts. But when rescue operations or battles occur in urban context, humans and vehicles may go across or inside buildings, hence impeding satellite-based monitoring. In that case, a good solution for an accurate monitoring is to mount cameras on all mobile units involved in the operation. The images taken can be collected using a Mobile Ad Hoc Network (MANET) connecting all units. These data can be either sent immediately to the headquarter using long range communication or backed up on some of the mobile units for deferred processing. First describe an application that allows real-time and accurate images or video reconstitution of the area covered by the mobile units. The urban area, the mobile units and the application are modeled using the tools provided by the OPNET modeler. Then the illustration on deployment of this application on a 50-nodes MANET where the routing protocol is an extension of the Optimized Link State Routing (OLSR). Finally, the developed application present the performance of the application evaluated by simulation on the MANET described previously.

S. Abdel-Mageid has studied the efficient deployment algorithms for mobile sensor networks [5]. Sensor deployment problem is one of the important problems in Wireless Sensor Networks (WSN) since it represents the first phase that most of the network operations depends on. Sensor deployment strategies can be classified into two classes which are deterministic and autonomous (random) deployment. In the deterministic deployment, the deployment field is assumed accessible as well as the number of sensors is small to be manually deployed in specific locations.

Liang Cheng Shiu has studied on the deployment algorithm based on cutting a triangle for wireless sensor networks [6]. In a large monitored area, the static sensors are deployed by random. It is obvious there are coverage holes and a coverage hole can be polygonal. Because a polygon can be decomposed into a piece of triangles, triangles are considered, and the three nodes of triangles are the static sensors deployed randomly. This presents an efficiently deployment algorithm which is based on the coverage hole is a triangle. The triangle is cut into small triangles which contains at least one interior angles is equal to 60°. These small triangles with 60° angle can be guaranteed full coverage, and the rest area of the triangle is still a triangle. Continue the cutting until the triangle is small enough that the sensors on the three nodes can fully cover the area. As a result, the coverage hole of triangle can be full coverage. Beside, the x-y coordinates of each deployed sensor can be deduced.

A.A. Franklin has studied the node placement algorithm for deployment of two-tier wireless mesh networks [7]. In the deployment of wireless mesh networks (WMNs) the placement of Mesh Nodes (MNs) is an important design issue. The performance of WMNs is greatly affected by the location of the MNs. As it is difficult to place the MNs in a regular pattern in the real deployment, finding the optimal locations in the deployment environment is of much interest for the service providers. For a given possible locations for the MNs and the user density in the deployment environment, the aim to find the locations of the MNs to be used that maximizes the coverage and the connectivity of the network together. Due to high computational complexity of the exhaustive searching algorithm, an efficient local searching algorithm is proposed. Numerical results show that, the local search algorithm can give close to optimal performance with much lower time complexity than exhaustive searching.

Wu Diwen has researched the deployment algorithm to achieve both connectivity and coverage in grid sensor networks [8]. The proposed an algorithm to achieve both connectivity and coverage for multiple target points in grid sensor networks. First the proposed algorithm deals with the local targets block then use the least sensors to make all the sensors connected. This algorithm has the O(n) running time complexity and its result is proved closed to the optimal result.

Hu Liang has studied on the optimal new site deployment algorithm for heterogeneous cellular networks [9]. With exponential growth of mobile broadband traffic, mobile operators are facing the challenge of cost-efficiently evolving 3G/4G network to meet future network capacity demand. Heterogeneous multilayer network deployment is one essential performance-effective and potentially cost-effective candidate solution. Optimal new site deployment algorithms study in heterogeneous wireless cellular networks.

Xiao Jun has researched the hexagonal grid-based sensor deployment algorithm [10]. In some environment, randomly deployed sensor nodes could not satisfy the requirements of wireless sensor network. Therefore, it is necessary to use mobile sensor nodes in some special conditions. And after moving nodes are deployed randomly, they could be relocated according to the real-time situation of network coverage degree. A hexagonal grid-based sensor deployment algorithm has proposed, which use the method of hexagonal grid plot and ant colony algorithm to deploy sensor nodes to the appropriate positions of wireless sensor network. This proposed algorithm not only achieves one hundred percent coverage degree, but also cut the moving distances of mobile nodes. Simulation results prove its validity.

Z. Faigl has studied on a novel transmission network design method for beyond 3g networks [11]. In beyond 3G networks, the adequate design of the transmission network that diverts the data traffic of the NodeBs to the core network is an important challenge. Due to the deployment of new radio access technologies, and the dramatic traffic increase, the network operators tend to apply traffic aggregation techniques within their transmission network to reach higher utilization. It presents a method for the design of microwave transmission network topology and optimal link capacity assignment. The method considers the traffic conditions of the NodeBs; the number, lengths and capacities of the available microwave links; the available number of pylons/buildings with given upper-bound on the number of antennas; the traffic aggregation factor at the NodeBs; the costs of the transmission capacities; and topology constraints. The method finds the network topology and a capacity planning with the less cost within the set of candidate topologies.

C. Stocchi has described the self-optimized radio resource management techniques for LTE-A local area deployment [12]. One of the most promising solutions to improve the performance of wireless networks is the extensive deployment of small size cells, such as femtocells. The expected uncoordinated femtocells deployment makes the Inter-Cell Interference (ICI) management a very critical issue, since it is the most limiting factor in such a scenario, in particular for users in bad conditions. It presents a Flexible Spectrum Usage (FSU) algorithm for Local Area (LA) scenarios that aims at limiting the downlink ICI, so that to achieve high system performance while guaranteeing good performance also to users in worst conditions, thanks also to the use of a power control mechanism. This algorithm behaves in a self-optimized and self-configuring manner, allowing the base stations to react autonomously to changes in the surrounding environment and without the necessity of a preplanned spectrum assignment to the various cells.

H. Moens has researched a technique on the network-aware impact determination algorithms for service workflow deployment in hybrid clouds [13]. In recent years, many service providers have started migrating their service offerings to cloud infrastructure. Sometimes, parts of the service workflow can however not be moved to cloud environments. This can occur due to client policies, or because some services are linked to physical client-site devices. The result of the migration is then a hybrid cloud environment, where part of the services is executed within the client network, while most of the processing is moved to the cloud. Migration to the cloud enables a more flexible deployment of services, but also increases the strain on underlying networks as most tasks are partially handled in a remote cloud, and no longer just in the local network.

Jiang Zhengbo has studied the design of a triple-band scanner for TD-SCDMA network planning and optimization [14]. TD-SCDMA is one of the third generation (3G) mobile communication standards, which is coming into the commercial phase. Along with the network deployment, planning and optimization tools are playing an important role to ensure the network performance. Scanner is one of the important tools, contributing to optimize the wireless network performance via drive test, tower site survey, in-building measurement, base station monitoring, and post processing. The developed "triple-band TD-SCDMA scanner". It has a robust ability of fast measurement on multi cells in the same frequency, benefit from an efficient interference cancelling algorithm.

A. Qadeer has researched the pre-coordination mechanism for self-configuration of neighborhood cells in mobile wi-max [15]. WiMax broadband services successfully providing triple play (Voice, Video and Data) support with combating the challenges of better quality and interoperability. Support for smooth mobility in real time with no wired infrastructure and being surrounded by GSM waves demanding a comprehensive and powerful network. Covering large areas through number of base stations which not only require time to configure but also need resources for implementation with a recurring cost of functionality. Automation is everywhere and to provide novel wireless services it is necessary to come up with some distinct features like intelligent base stations which have the capability of doing automatically integration, installation, configuration, tuning and maintenance. A pre-coordination mechanism for self-configuration of neighborhood cells in mobile WiMax is proposed which uses a software system utility that automatically configures the Wimax neighborhood cells.

Kim Dongkyun has illustrated the stateless broadcasting to support heterogeneous radio ranges in mobile ad hoc networks [16]. A MANET (mobile ad hoc network) requires an efficient network-wide broadcasting service in route discovery as well as in many applications. Recently, many broadcasting protocols have been proposed to avoid the well-known broadcast-storm problem, or to provide reliability over wireless broadcast media. However, since it is assumed that all nodes in the network have the same radio ranges (i.e. homogeneous radio ranges), the protocols do not work in a realistic environment where all nodes have different fixed radio ranges or they use dynamic radio ranges intentionally to save their energy in the network (i.e. heterogeneous radio ranges). Therefore proposed an efficient stateless broadcasting technique to support the heterogeneous radio ranges. An additional area covered through a node's rebroadcasting is calculated by considering different radio ranges of nodes. Then, nodes with larger coverage area will rebroadcast earlier than other nodes with smaller area. When determining rebroadcasting schedule, the DFD (dynamic forwarding delay) concept introduced in DDB (dynamic delayed broadcasting) is exploited in this protocol.

III.CONCLUSION AND FUTURE WORK

This research aims to optimize the cells towers distribution by using spatial mining with Geographic Information System (GIS). The distribution optimization could be done by applying the various optimization algorithms. We can conclude that the tower optimization is complex and time consuming job. In near future this work will be extended by introducing parallel algorithms in tower optimization problems.

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