

Efficient Novel Power Spectrum Trading Design for CRN Using Internet Service Providers

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ABSTRACT: Mobile users are usually closer to the ISP's wireless access point, the energy and spectral efficiency of mobile networks are enhanced. Achieving optimal mobile traffic offloading in EST scheme minimizes the energy consumption of the macro BSs is NP-hard. Proposing a heuristic algorithm to approximate the optimal solution with low computation complexity. Heuristic algorithm is at least 50% of that achieved by the brute-force search. Simulation result demonstrates the performance and viability of the proposed EST scheme and the heuristic algorithm. The merits of both mobile networks and ISPs' networks are exploited by the EST scheme. Here the networks are operating based on licensed spectrum, which is not accessed by unlicensed users.

KEYWORDS: Efficient Energy Consumption, Security

I.INTRODUCTION

Wireless sensor network have applications that ranges from health care to tactical military. Monitors the environment or system and physical parameters such as temperature, pressure, humidity. Wireless Sensor Networks mainly consists of sensors and these sensors are low power, limited memory, energy constrained due to their size. Sensors can also be deployed in extreme environmental conditions and may be prone to enemy attacks. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and communications bandwidth. Studying of environmentally sustainable computing or IT is called green computing, which includes new electronic products and services with optimum efficiency and also with all possible options towards energy savings. Elements of such as solution may comprise items such as end user satisfaction, management restructuring, regulatory compliance, disposal of electronic waste, telecommuting, virtualization of server resources, energy use It is an environmental friendly. The main objective of green computing is to reduce the hazardous materials and also to maximize the energy efficiency.

II.BACKGROUND AND RELATED WORK

In the Wireless networking literature, there are distinct works that are proposed to reduce the energy consumption .The following section deals with most representative work that is related to proposed work

In 2013 D. Fooladivanda and C. Rosenberg [1] Assuming that the macrocell and the picocells belong to the same operator and they are operated in the same licensed frequency band using a OFDM system. The macrocell and all the picocells within it use the same scheduling policy based on maximizing the minimum user throughput. Based on SINR (Signal to Interference and Noise Ratio) the simulation results show that the network's throughput is compared to another association rule. The problem turns out to be an Integer Non-Linear program that is NP-hard. Solving it exactly

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for relatively large size systems with no simple association rule. Here the context of resource allocation is low. In 2012 S. Corroy, L. Falconetti, and R. Mathar[3] Studing cell association for the downlink of multi-cell networks and deriving an upper bound on the achievable sum rate . A dynamic cell association is heuristic, which achieves performance close to optimal. Finally verifying results through numerical evaluations and implementing the proposed heuristic in a LTE simulator to demonstrate its viability. The macro node not improves load balancing, due to the bias, certain UEs are connected to the Pico node while they receive a stronger signal from the macro node and the improved load balancing may not always compensate the degradation in Signal to Interference. The cell association and the resource scheduling are performed on two different frequency basis. The OFDM resources must be allocated for each time transmission interval (TTI) .The cell association however only depends on long-term signal measurements and the number of active UEs in the system. A new association only takes place when UEs terminate or start a transmission or when the long-term measurements have significantly changed and Noise Ratio (SINR) that these UEs encounter .Protocols used are OFDM transmission and then techniques are Cell Cluster and then algorithms are Fixed range heuristic. In 2012 H.-S. Jo, Y. J. Sang, P. Xia, and J. Andrews [2] The HCN is modeled as a multi-tier cellular network where each tier's base stations (BSs) are randomly located and have a particular transmit power, path loss exponent, spatial density, and bias towards admitting mobile users. Its compared to macrocells, picocells would usually have lower transmit power, higher path loss exponent (lower antennas), higher spatial density (many picocells per macrocell), and a positive bias so that macrocell users are actively encouraged to use the more lightly loaded picocells. Protocols used are Heterogeneous Cellular Networks and then techniques are Poison point process and then algorithms are Base Station Biasing Algorithms. We also derive the average ergodic rate of the typical user, and the minimum average user throughput the smallest value among the average user throughputs supported by one cell in each tier.

In 2010 R. Madan, J. Borran, A. Sampath, N. Bhushan[4] The LTE-Advanced, multi-tier network roll-outs, involving RRHs, picocells, femtocells, as well as relay stations underlying the existing macro cellular layout are envisaged. These low-power overlaid Base Stations (BSs) can be either operator deployed or user deployed, and may coexist in the same geographical area, potentially sharing the same spectrum. Deploying such small cells aims at offloading the macrocells, improving indoor coverage and cell-edge user performance. The low power nodes such as picocells. Protocols used are Internet Protocol and then techniques are Inter-Cell Interference Coordination and then algorithms are LTE-Advanced standardization. The RN can have two distinct modules: a donor module for the backhaul connection that is placed, for example, close to a window, and a coverage module for the access link that is placed where coverage is needed, for example, in the center of a house.

In 2009 L. Decreusefond , T.T. Vu,P. Martins[5] Air conditioning is being replaced by fans or passive air flows whenever possible. Several programs are aiming to deploy solar, wind, or sustainable bio fuels technologies to 118,000 new and existing off-grid base stations. Network optimization upgrades currently can reduce energy consumption by 44% and solar-powered base stations could reduce carbon emissions by 65%.As a conclusion, there are many investigations about how to save energy but no model seems to in order to evaluate quantitatively the energy consumption.

The power of a battery to maintain a functioning network during a given time. the data being sensed by the nodes in the network must be transmitted to a control center or base station.where the end-user can access the data. There are many possible models for these micro sensor networks. protocol and then techniques are Mobility techniques and then algorithms are Clustering Algorithms.

III. PROPOSED WORK

In this paper, we propose a novel mobile traffic offloading scheme by leveraging cognitive radio techniques referred to as energy spectrum trading is prosed. The EST scheme exploits the merits of both mobile networks and ISPs' networks. One of the advantages of the mobile networks is that the networks are operating on licensed spectrum, which are not accessed by unlicensed users. Therefore, by proper spectrum management, mobile networks are able to provide their subscribers a variety of services with different QoS levels. However, as compared with the hotspots deployed by ISPs, the BSs of mobile networks are usually sparsely deployed. Such deployments are not efficient in terms of the

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energy and spectral utilization. One of the merits of ISPs' hotspots is that they are densely deployed, and are able to provide high speed data rates to their subscribers. However, operating on unlicensed spectrum, The Quality of data services may not be guaranteed. The EST scheme enables mobile networks to offload data traffic to ISPs' networks to improve energy and spectral efficiency, and allows ISPs' hotspots access to the licensed spectrum to provide ISPs' data services with different QoS levels. here the primary BS (PBS) is defined as the macro BS owned by the mobile network operator while the secondary BSs (SBSs) are referred to as the hotspots owned by ISPs. We assume both the PBS and SBSs are able to dynamically access the spectrum by leveraging cognitive radio techniques. There are two types of users: primary users (PUs) and secondary users (SUs). PUs are subscribers of the mobile networks while SUs are subscribers of ISPs. Different SUs may subscribe to different ISPs. The energy spectrum trading server manages the spectrum sharing and mobile data offloading between the mobile networks and ISPs' networks. The PBS has the exclusive access to the licensed band. However, owing to the wireless channel fading between the PBS and PUs, providing high data rates to the PUs, especially to those located at the cell edge, is both bandwidth and power consuming. As compared with the PBS, the SBSs which are closer to the PUs may experience less wireless channel fading and have higher spectral and energy efficiency in providing data services to the PUs. In the EST scheme, the PBS shares a certain amount of licensed bandwidth with SBSs while SBSs provide data services to PUs within their coverage area using the allocated bandwidth. Since SBSs are close to PUs, the SBSs can satisfy PUs' QoS requirements by utilizing only a portion of the allocated bandwidth. The residual bandwidth can be utilized to fulfill SUs' data rate requirements.

For the EST scheme enhances both the energy efficiency and the spectral efficiency of mobile networks. However, minimizing the energy consumption of the PBS in the EST scheme is not trivial. On the one hand, in order to minimize the power consumption, the PBS has to maximize the number of users offloading to SBSs. Meanwhile, since the total amount of licensed spectrum is limited, the PBS aims to minimize the amount of bandwidth allocated to SBSs because the less bandwidth allocated to SBSs, the more bandwidth is reserved for the PUs associated with the PBS, and therefore the PBS consumes less power. On the other hand, the PBS has to give the SBS sufficient incentives in term of the amount of licensed spectrum to incentivize SBSs to provide data services to the PUs. Therefore, solving the power consumption minimization (PCM) problem is to find user-BS associations and bandwidth allocations to minimize the power consumption of the PBSs while satisfying PUs' minimum data rates and SBS's bandwidth requirements. In fact, the PCM problem is an NP-hard problem. If the power consumption of the PBS is reduced, the PU is associated with SBSs; otherwise, the PU is associated with the PBS. In proposed a novel mobile traffic offloading scheme by leveraging cognitive radio techniques referred to as energy spectrum trading (EST). The EST scheme exploits the merits of both mobile network and ISPs' networks. The primary BS (PBS) is defined as the macro BS owned by the mobile network operator while the secondary BSs (SBSs) are referred to as the hotspots owned by ISPs. The PBS and SBSs are able to dynamically access the spectrum by leveraging cognitive radio techniques. As compared with the brute-force search, the heuristic algorithm achieves at least 50% power consumption savings when the PBS experiences heavy traffic load from cell edge users. To provide security and efficient energy consumption Creating a environment with primary user and secondary user . The primary user's of mobile networks while the secondary user of internet service provider. Both user's can either primary base station or secondary base station. Communication between sender and receiver is established Sender transmit message to the receiver.

Primary Base station and secondary base station provides connectivity between sender and receiver. The licensed bandwidth and low transmit energy. The power consumption and the spectrum usages of mobile networks and both the energy efficiency and the spectral efficiency of mobile networks. Both users can transmit either through Primary base Station or secondary Base station. The registration for primary base station and secondary base station. Create a user name and pass word and then login to be continued the process both user can access the registration. The power consumption consists of two parts: the static power consumption and the dynamic power consumption.

The static power consumption is the power consumption of a BS without any traffic load. The dynamic power consumption refers to the additional power consumption caused by traffic load on the BS. Heuristic_algorithm is used for energy reduce as well energy consumption. Data rates are essential for transmitting messages without any delay and collision. High data rate requires messages to transmit quickly reduce the data traffic of the network. Security it can be used the encryption and decryption techniques. The mobile networks operating on licensed user, which are not accessed

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by unlicensed users. To provide high data rate and security. The traffic intensity is very low. The proposed system for reducing energy consumption and to provide high speed data rates to their subscribers with QOS. The mobile networks operating on licensed user, which are not accessed by unlicensed users.

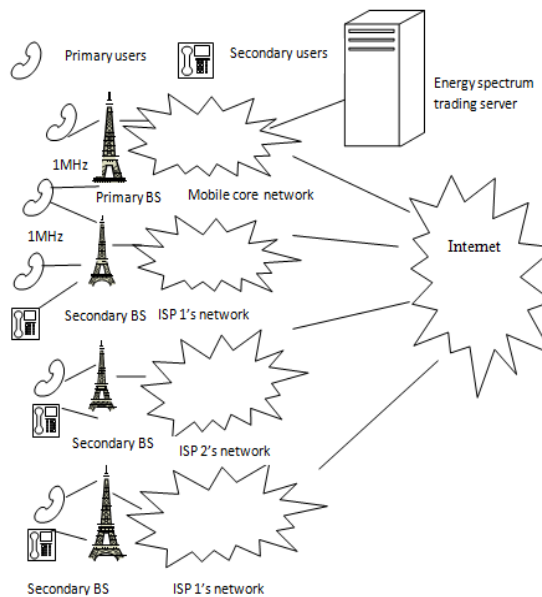


Fig 1. Overview of Create a environment primary user's and secondary user's.

Creating a mobile environment with primary user and secondary user. There are two types of user. Primary user(PUs) and secondary user(SUs). PUs are subscribers of the mobile networks while SUs are subscribers of ISPs. Different SUs may subscribe to different ISPs.

IV. WORKING MODEL

Setting up the Environment

Here an environment for mobile network has been created. It consist of primary base station(PBS) and Secondary base station. Primary base station is owned by mobile network operator and secondary station is owned by internet service providers.

User Registration

Registration of both sender and receiver has been done in this model. Registration is the main thing in mobile network. After registration only both sender and receiver can start communication. Each user's login id and password has been saved in the database. Each time user's login and password has been checked before starting communication.

Communication establishment

In a wireless network, Communication establishment between sender and receiver is mainly done with complex coding. We can transmit data from source to destination. only after making communication between them.

Primary base station provides a connectivity between sender and receiver.

- Both user can transmit either through primary base station or secondary base station.

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Reduction in Energy Consumption

In this paper concentration towards less energy consumption has been paved. The dynamic power consumption refers to the additional power consumption caused by traffic load on the BS. Heuristic_algorithm is used for reducing energy consumption and for making low traffic intensity.

Providing High Data Rate and Security

Data rates are essential for transmitting messages without any delay and collision. High data rate requires messages to transmit quickly reduce the data traffic of the network. Security can be provided by means of encryption and decryption techniques as well as by cell biasing algorithm.

for $i=1$ to $|U|$ do

if $\phi_{k,i} \leq w_{min}$

$i, k = \text{argmin}_{j \in S} \phi_{j,i}$ then

Assign the i th PU in the user set US;

else if

$\phi_{k,i} > W, k = \text{argmin}_{j \in S} \phi_{j,i}$ then

Assign the i th PU in the user set UP ;

Else

Assign the i th PU in the user set UT ;

Return UP , US, and UT .

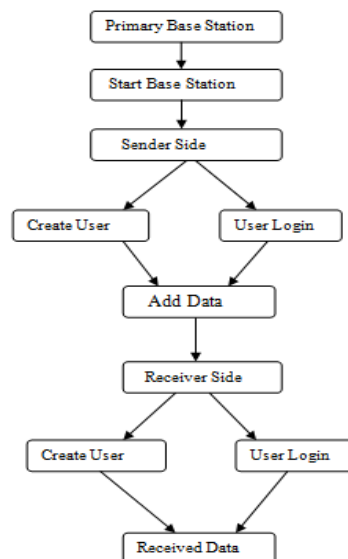


Fig.2. Overview of System design for primary Base Station

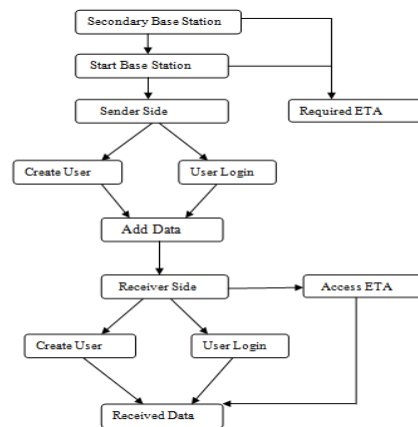


Fig.3. Overview of System design for Secondary Base Station.

V. CONCLUSION

The composing of the A novel energy spectrum trading (EST) scheme has been proposed, which enables the mobile traffic offloading between the mobile networks and the ISPs' networks by leveraging cognitive radio techniques. Communication between sender and receiver is established. Sender transmit message to the receiver. Primary Base station and secondary base station provides connectivity between sender and receiver. Data rates are essential for transmitting messages without any delay and collision. High data rate requires messages to transmit quickly. The proposed technique concentrate on energy by means of heuristic algorithm.

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