ICIDB-2015 Conference Program

International Conference on Information and Communication Technology and Digital Convergence Business (ICIDB-2015)

- Date: Tuesday, November 24, 2015 - Tuesday, November 25, 2015, 10:00am - 5:30pm
- Place: Korea Chamber of Commerce & Industry, 39, Sejongdaero, Jung-gu, Seoul, 100-743 Korea
- Organizer: KASDBA The Korea Academic Society of Digital Business Administration (KASDBA)
- Co-organizer: 재단법인 한국디지털융합진흥원 KOREA INSTITUTE OF DIGITAL CONVERGENCE Korea Institute of Digital Convergence (KIDICO), Social Science Research Institute, Yeungnam University
- Sponsors: NIA 한국정보화진흥원 National Information Society Agency, ERICSSON LG Ericsson-LG Enterprise, DIP Daegu Digital Industry Promotion Agency, TELEFIELD Telefield Inc., IS Park infinite solution IS Park Inc.

KASDBA (사)한국디지털경영학회 The Korea Academic Society of Digital Business Administration (KASDBA)

ICIDB-2015 Program Schedule

■ **Date:** Tuesday, November 24, 2015 10:00 am – 5:30 pm

■ **Venue:** Korea Chamber of Commerce & Industry, 39, Sejongdaero, Jung-gu, Seoul, 100-743 Korea

Time	Program	Place
10:00 am – 10:30 am	Registration	Council Chamber
10:30 am – 11:00 am	Opening Ceremony	
	Welcome message by - **Changsu Kim** (President of KASDBA) - **Ho Ick Suk** (President of KIDICO) - **Kwang Soo Chang** (President of Big Data Future Forum)	
11:00 am – 11:30 am	**Keynote Speech-1** – Professor **Ruth Alas,** Department of Management, Estonian Business School (EBS), Estonia. **Title:** "P*reventive Change: How to Pre-empt Organizational Crises through Innovation and Entrepreneurship*"	
11:30 am – 12:00 pm	**Keynote Speech 2 –** Professor **Joongho Ahn,** Business School, Seoul National University (SNU), South Korea. **Title:** "*ICT Convergence Practice: The Korean Experience*".	
12:00 pm – 1:30 pm Lunch break		
Presentation Session (Tuesday, November 24, 2015)		
1:30 pm – 3:30 pm	Presentation Session-1	Seminar Room - 1
	Presentation Session-2	Seminar Room -5

4:00 pm – 5:30 pm	Presentation Session-3	Seminar Room - 1
	Presentation Session-4	Seminar Room - 5
Presentation Session (Wednesday, November 25, 2015)		
10:00 am – 12:00 pm	Presentation Session-5	Seminar Room - 1
	Special Session	Seminar Room -5
1:00 pm – 5:30 pm	Seoul City Tour	Reception

ICIDB-2015 Presentation Session Details

■ Date: Tuesday, November 24, 2015 1:30 pm – 5:30 pm

■ Venue: Korea Chamber of Commerce & Industry, 39, Sejongdaero, Jung-gu, Seoul, 100-743 Korea

Session-1 (Digital Technology) **Session Chair –** Robin Shrestha (Yonsei University) **Room:** Seminar Room - 1	
Time	**Program**
1:30 pm – 3:30 pm	Perception Analysis for University of San Carlos (USC) as an Educational Institution using Web Mining Authors: Angie M. Ceniza, Christian V. Maderazo, and Mary Jane G. Sabellano, University of San Carlos, Cebu, Philippines
	An Effective Security Model for Removing Untrustful Macros from Offfice Documents Author: Somchai Chatvichienchai, Department of Information and Media Studies, University of Nagasaki, Nagasaki, Japan
	Relationships of Factors for Successful ICT Projects Management Author: Michiko Miyamoto, Department of Management Science and Engineering, Akita Prefectural University, Yurihonjo, Akita, Japan
	Contingent Effects of Information Technology Governance Styles on Decision Areas Authors: Taekyung Kim, The University of Suwon and Junghoon Moon, Seoul National University, Korea
	Application of Semantic Web Technologies for Learning Pattern of Storm Damages Authors: Quang-Khai Tran, University of Science and Technology (UST), Jung-Ho Um, and Sa-kwang Song, Korea Institute of Science and Technology Information (KISTI), Korea
	Too Much Preview, Too Little Sales? Authors: Angela A. Choi, KAIST, Wonseok Oh, KAIST, Jae Yun Moon, Korea University, and Daegon Cho, KAIST, Korea
3:30pm – 4:00 pm Coffee Break	

Session-2 (Digital Business) **Session Chair –** Bumsoo Kim (Seogang University) **Room:** Seminar Room - 5	
Time	**Program**
1:30 pm – 3:30 pm	Considerations to Reflect Lessons Learned from the Execution of the 25 Federal IT Management Reforms on the Deployment of Digital Government Strategy Author: Hong Sik Kim, Korea Polytechnic University, Korea
	The Role of Online Communication on the Social Tie Strength: SNS Fatigue Perspective Authors: Minjung Park, Bomi Choi, and Sangmi Chai, Ewha Women's University, Korea
	A Study on Factors Influencing Repurchase Intentions in Mobile Social Commerce Authors: Jae-Ho Ma and Changsu Kim, Yeungnam University, Korea
	Comparative Analysis of Hypermarket Service Quality Authors: Young Chae Son, and Jongmoo Park, Yeungnam University, Korea
	A Success Strategy of Lifelong Education Center Based on E-Learning Business Authors: Woo-Seuk Kwon and Hyun-Sook Ahn, Keimyung University, Korea
	A Study on Conversion and Application of GUI Design for Games Authors: Sang-Tae Kim, Yeungnam University, and Young-Sang Kim, Cheju Halla University, Korea
	A Study on the Platform Business Types of Smarthome: Based on the Platform Typology Author: Minzheong Song, Hansei University, Korea
3:30pm – 4:00 pm Coffee Break	

Session-3 (Digital Innovation) **Session Chair –** Ali Kashif Bashir (Osaka University, Japan) **Room:** Seminar Room - 1	
Time	**Program**
4:00 pm – 5:30 pm	The Public Perception of Privacy Research and Analysis for Open Data Authors: Chi-Cheng Chung and Shu-Fen Chiou, National Taichung University of Science and Technology, Taiwan, R.O.C., Taiwan
	Green WLAN: Energy-Aware Access Point Management Authors: Rojeena Bajracharya, Rakesh Shrestha, Yousaf Bin Zikria, Syed Rashid Ali, Illaul Ul Rasool, Sung Won Kim, Yeungnam University, Korea
	Symmetric Microstrip Meanderspurline Bandstop Filters Authors: Bhanu Shrestha and Chae Bong Sohn, Department of Electronic Engineering, Kwangwoon University, Korea
	Predicting the Next Successful Movie Through Opinion Mining: The Effect of Online Word of Mouth in Decision Making Authors: Jihoo Bae, Sogang Business School and Bumsoo Kim, Seogang University, Korea
	A Storage, Retrieval, and Application Platform for Ultra-large-scale Linked Data Authors: Yongju Lee, Kyungpook National University, Jeonghong Kim, Kyungpook National University, and Changsu Kim, Yeungnam University, Korea

Session-4 (Digital Convergence Business) **Session Chair –** Gyanendra Prasad Joshi (Yeungnam University) **Room:** Seminar Room - 5	
Time	**Program**
4:00 pm – 5:30 pm	A Financial Performance Analysis of Commercial Banks in Developing Countries: The Case of Nepal SBI Bank Authors: Resham Bahadur Thapa, University of Wyoming, USA, Jisoo Yoo, and Hikmat Bahadur Bhaat, Yeungnam University, Korea
	Perceived Uncertainties, Interfirm Collaboration, and the Moderating Role of Entrepreneurial Orientation: Evidence from the Korean Software Development Industry Author: Joohan Ryoo, Hanyang University, Seoul, Korea
	Developing a Quality Empowerment Framework for the Education System Authors: Hikmat Bahadur Bhaat and Soogwan Doh, Catholic University, Korea
	Fuzzy Logic-Based Dynamic Pricing for Spectrum Trading for Cognitive Radio Networks Authors: Srijana Acharya, and Gyanendra Prasad Joshi, Yeungnam University, Korea
	Detection and Prevention of Bid Shielding in Online Auction Authors: Kazi Mamun, Christine Chan, Craig Gelowitz, Faculty of Engineering and Applied Science, University of Regina, Canada

ICIDB-2015 Presentation Session Details

■ Date: Wednesday, November 25, 2015 10:00am – 12:00pm

■ Venue: Korea Chamber of Commerce & Industry, 39, Sejongdaero, Jung-gu, Seoul, 100-743 Korea

Session-5 (Information and Communication Technology) **Session Chair –** Robin Shrestha (Yonsei University) **Room:** Seminar Room – 1	
Time	**Program**
10:00 am – 12:00 pm	Virtual Clusters for Dynamic Network Service Chaining Authors: Ali Kashif Bashir, Yuichi Ohsita, and Masayuki Murata, Osaka University, Osaka, Japan
	Evaluation of Classifier for Efficient Intrusion Detection System Implementation Authors: Krishna Pandey, ESC Pvt. Ltd, and Junu Koirala, SPI Nepal, Nepal
	The Role of Out-of-Store and In-store Social Interactions in Social Commerce Author: Un-Kon Lee, The University of Suwon, Korea
	A Study of Class Satisfaction for Flipped Learning in the JAVA Programming Course Authors: YoungSang Kim, Cheju Halla University, and ChangSu Kim, Yeungnam University, Korea
	A Study on Application of the Logistics Complex in Incheon New Port: Focusing Case of Hinterland in China Changhee Kim, Sang Hoon Lee, Soo Wook Kim, College of Business Administration, Seoul National University, Korea

Special Session

Session Chair - **Bhanu Shrestha (PhD),** Professor, Department of Electronic Engineering, Kwangwoon University, South Korea

Session Co-chair - **Robin Shrestha (PhD),** Postdoctoral Research Fellow, Department of Electrical and Electronics Engineering, Yonsei University

Room: Seminar Room – 5

Time	Special Session Program
10:00 am – 12:00 pm	On-line Scheduling Algorithm for Real-Time Multiprocessor Systems with ACO and EDF Authors: Cheng Zhao, Myungryun Yoo, and Takanori Yokoyama, Department of computer science, Tokyo City University, Tokyo, Japan
	Design of Compact Size and High Q Resonator with Composite of Folded Meanderline and Spiral Authors: Ki-Cheol Yoon, Bhanu Shrestha, and Kwang-Chul Son, Kwangwoon University, Korea
	Multiple-Antenna Techniques in Wireless Communication-Technical Aspects Authors: Jibendu Sekhar Roy and Anupama Senapati, KIIT University Odisha, India
	Stepped Impedance Resonator Bandstop Filter Bsed on Hairpin Coupling Configuration Authors: Chang-Soon Kim and Tae-Hyeon Lee, Bhanu Shrestha, Kwang-Chul Son, Kwangwoon University, Korea
	Design of Dual-Band Bandpass Filter with Controllable Bandwidth Authors: Tae-Hyeon Lee, Chang-Soon Kim, Bhanu Shrestha, Kwang-Chul Son, Kwangwoon University, Korea
	Hybrid Beam-forming Algorithms for Planar Adaptive Antenna Array Authors: Jibendu Sekhar Roy and Anupama Senapati, KIIT University Odisha, India
	Compact Size and High Q Meanderline Resonator for ITS Application Authors: Kwang-Chul Son, Bhanu Shrestha, Soon Chul Kwon, and Ki-Cheol Yoon, Kwangwoon University, Korea

Green WLAN: Energy-Aware Access Point Management.

Rojeena Bajracharya, Rakesh Shrestha, Yousaf Bin Zikria, Syed Rashid Ali, Illaul Ul Rasool,
Sung Won Kim, Yeungnam University

Abstract—**Over the past few decades, wireless communication has experienced phenomenal growth and has now have become fundamental to daily activities. However, this unprecedented growth comes at a price: due to the always-on usage model, these standards are responsible for a large amount of energy consumption. Optimizing the energy consumption of access points (APs) has become a new challenge for the research community, governments and industries in order to reduce CO2 emissions and operational energy costs. In this context, wireless local area networks (WLANs) that consist of a high-density of hundreds to thousands of APs are being deployed rapidly in corporate offices and universities to satisfy user demands for high bandwidth, mobility, and reliability. Moreover, these networked APs are provisioned for busy or rush hour loads, which typically exceed their average utilization by a wide margin. In addition, these margins are rarely reached and when reached, last only for a short period of time. Thousands of WLANs worldwide compound this problem, as they remain idle for long periods of time, raising serious concerns about energy losses. In response to this compelling problem, this paper presents a set of contributions that address the challenge of increasing energy efficiency in Wi-Fi networks. In particular, we introduce novel energy efficient algorithms for dynamically powering off certain APs by exploiting the knowledge of the distance between the User Equipment's (UEs) and servicing APs while retaining the best user experiences. The network design was mainly evaluated based on the benefits of a centralized structure and the resulting turn off WLAN APs upshot in a network that provides adequate radio signal coverage and the required data rate capacity to serve user traffic demand in the service region. Our proposed algorithms are thoroughly evaluated by means of ns-2 simulations. The proposed solution achieves significant power reduction of the network up to 30 to 40 % compare with always on case without significant reduction of overall network throughput.**

Index Terms— **Wireless Local Area Network (WLANS), Access Points (APs), Energy efficiency, Received signal strength indication (RSSI).**

I. INTRODUCTION

WLANs have become indispensable for flexible Internet connectivity in corporate offices, university, campuses, and municipal downtowns. A number of devices such as access points (APs), switches, and routers for providing and establishing Internet connections have also increased to accommodate the tremendous increase in internet users. With increasing budgets, enterprises have now shifted their deployment objective from providing just basic complete coverage to designing dense WLANs with redundant layers of APs. These redundant APs are dimensioned to provide very high bandwidth in situations where hundreds of enterprise clients simultaneously run bandwidth-intensive and delay-sensitive applications. Although redundant capacity benefits enterprise users during times of peak demands, our recent studies show that peak demand rarely occurs [3]. In fact, only a small fraction of APs are utilized during the day, and even fewer during nights and weekends. The majority of the APs frequently remain idle, which means they serve no users in the network. Additionally, the existing design approaches lack several key elements. First of all, traffic demand and user density are not considered. The coverage-based optimization approaches may appear insufficient for networks where user density and traffic load is high. However, we argue that they will be insufficient in the future WLAN environments with higher user concentration and applications demanding increased data rates.

The goal of this paper is to develop a formal network design model and an efficient solution technique to the WLAN design problem to manage WLAN resources to save energy while ensuring scenario-specific end-user performance guarantees. We focus on access networks, since access devices are the main energy consumers in 802.11 WLANS. So, we propose a novel approach for the energy-aware management of access networks, consisting in a dynamic network planning, that, based on the instantaneous traffic intensity, reduces the number of active access devices when they are underutilized (typically at night e.g. APs, switches and routers). Here the turning on/off decision parameter is dynamically set according to the distance value of client with respect to the access point. As a result, WLAN coverage is still maintained; only redundant coverage is reduced. When user demand increases, WLAN resources are powered on to scale resource and coverage redundancy proportionately. In high-density WLANs, our proposed model strategies will thus reduce energy wastage without adversely impacting coverage and end-user performance. Therefore, in

this paper, a novel demand based WLAN design model has been developed and formulated which ensure coverage and maintain client performance.

II. PROBLEM STATEMENT

During the last decade, the energy consumption of the information and communication technologies (ICTs) sector has become a key issue, from both economic and environmental perspectives. ICT alone is responsible for a percentage, which varies between 2% and 10% of the world's power consumption [1]. The Global e-Sustainability Initiative (GeSI) [2] estimates an overall network energy requirement of about 21.4 TWh in 2010 for European Telcos, and foresees a figure of 35.8 TWh in 2020 without Green Network Technologies (GNTs). Furthermore, the number of enterprise deployments and the average number of APs in each enterprise WLAN is increasing exponentially every year. Although the energy consumption of the Base Station (BS) is much higher compared to the AP, the vast number of WLAN network devices installed worldwide contributes to the enlargement of the energy consumption in wireless access networks.

With increasing budgets, enterprises have now shifted their deployment objective from providing just basic complete coverage to designing dense WLANs with redundant layers of APs. One example of such an enterprise WLAN is installed at Intel Corporation's buildings in Portland, Oregon, where 125 APs have been deployed at distances of about five meters from each other within a single four-floor building. Another example is the Microsoft campus at Redmond, WA, which will soon have a 5000-AP centralized WLAN [3].

If we look at usage patterns of APs, this shows that traffic loads follow a periodic day/night traffic pattern as shown in Figure 1. This reduction of the traffic in cellular network is due to the combination of two effects: i) the typical day and night behavior of the users; ii) the daily swarming of the users carrying their mobile terminals from residential areas to office districts and back. The medium utilization is less than 40% in all settings, even during the busiest times, and much lower during other times. This means that peak usage times are rare and sometimes even isolated to a specific portion of the WLAN. As a result, the energy cost of maintaining the hundreds to thousands of always-on idle APs and wired backhaul switches is significant.

A. Case Studies

Figure 1 shows the traffic generation of an enterprise network at United Nation Regional Office of South Asia (UN ROSA) on a daily and weekly basis where 30 APs deployed to support approximately 100 clients. The figure clearly shows that a large fraction of APs are idle for many hour per day and over an entire week, the fraction is much larger as we can see negligible traffic during nights and weekends. We believe that these results are representative of several other WLAN deployments as well. These results show that WLAN capacity is frequently underutilized. Idle APs in WLANs across the globe directly equate to an enormous waste of energy that is used to keep the idle APs powered on. Based on these observations, we conclude that WLANs must be redesigned with energy-efficiency as a critical design constraint. Such an energy-efficient WLAN infrastructure should appropriately power on and off WLAN equipment so that they stand to save both critical energy, as well as monetary resources.

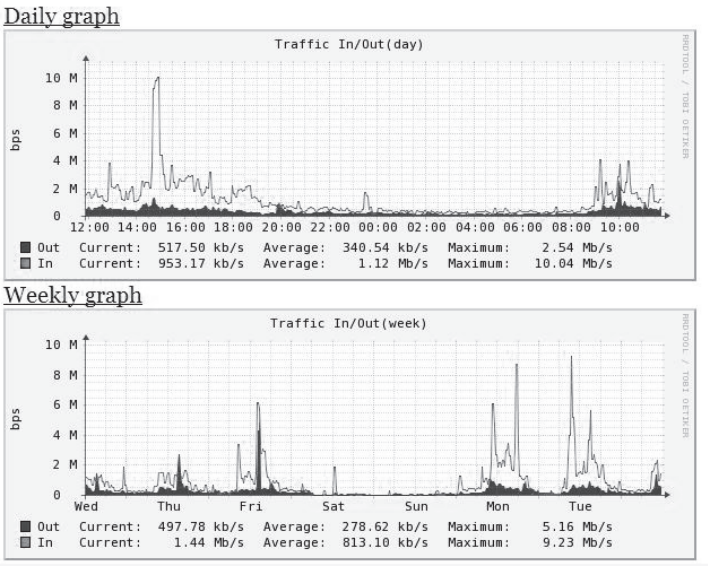

Fig. 1. Analysis of daily and weekly traffic generation rate.

III. PROPOSED ALGORITHM

This section explains a proposed algorithm that could be run in a centralized structure and that adheres to the design requirements. The objective of this algorithm is to simply explore the magnitude of energy savings that can be achieved in its adoption and how it works in a centralization structure. This algorithm does accomplish the objective, and later on, details of how the algorithm is implemented in the prototype are explained.

A. Network Architecture

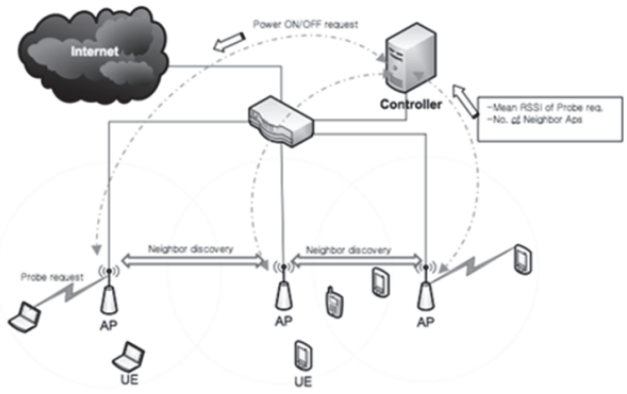

Fig. 2. Proposed Network Architecture

We consider a dense deployed network, where the coverage areas of neighboring cells overlap each other. Our network consists of a set of X cells that have the same coverage radius R and traffic load that has the periodic day/night pattern

Figure 2 shows the architecture of the wireless access network on which the proposed scheme is employed. The network administrator places a controller on the network. The controller receives information from each AP such as mean received signal strength indicator (RSSI) of probe request from User Equipment's (UE), list of neighbor APs, and the number of connected UEs. By using the information, the controller determines whether each AP should be power-on or power-off. The power-on APs and the power-off APs are defined as active APs and sleeping APs respectively. Finally the controller transmits power-on or power-off requests to each AP.

B. Power Saving Scheme

We present power saving schemes, which turn off the redundant APs during low traffic load. The proposed idea is to switch off APs not according to traffic load, but according to the average distance of its users. Therefore, each AP should estimate the distance of its UEs as well as UEs of neighboring APs up to the coverage region. Each AP calculates the average of the above distances. Greater average distance leads to greater average transmission power. Our algorithm proposes to switch off the APs with the maximum average distance value because these APs would increase their AP transmission power to a greater value if, they were switched on.

The proposed APs switch off algorithm works as follows:

1. Discovery of neighborhood Aps.
2. Calculation of average distance between the Aps and UEs in its coverage region.
3. APs having greater number of distant user are switched off .If it exceeds threshold number of the neighboring Aps (which is greater than four) and has less number of connected user.

C. Implementation of switch-off scheme

Once the APs to be switched off have been identified, the question arises about how to implement switch-off. Of course, it is not possible to just switch off the APs, since, even if the traffic is low, a number of users may be accessing the candidate AP with their terminals for voice, video or data services.
In [20], the authors consider three different possibilities.

a. After the switch-off decision is taken, the network waits until no user is accessing the candidate AP, which is thus switched off only when idle. This is the least invasive approach for users, but an obvious drawback is that the time between the switch-off decision and the AP idling may be long, thus limiting the effectiveness of the energy saving approach.

b. As soon as the switch-off decision is taken, no new service requests are accepted by the candidate AP, which can be switched off as soon as all services in progress at the time of the switch-off decision terminate i.e. that some service requests will be blocked. The delay between the switch-off decision and the actual switch-off is less than in the previous case, but still significant, coinciding with the longest residual time of the services in progress at the time of the decision.

c. Immediately after the switch-off decision is taken, users are forced to implement a handover from the AP that is going to be switched off to one of the APs that remain active. This is the most invasive approach for users, but forced handovers are foreseen by WLAN standards, and thus the algorithm is well within the possibilities of present WLANs equipment. Actually, forced handovers are already used by many operators, called as Blacklisting, where access control black lists to enforce a client handoff between APs. One of the examples of this technology used is the MadWifi Atheros chipset wireless driver, which allows an AP to use such black lists of MAC addresses of clients [3]. If the MAC address of a client is present in that list, the AP will not allow the client to associate with it. The advantage of using black-lists on APs is that the clients are forced to associate with only those APs on which they are not black-listed. As a client is moved from a one AP to another AP, the client is added to the first AP's black-list. This forces the client to disconnect from the first AP and associate with the new AP. The important advantage of this approach lies in the fact that the time between the switch-off decision and the actual switch-off can be controlled by the operator, and kept very low, so as to maximize the energy reduction effect.

IV. SIMULATION

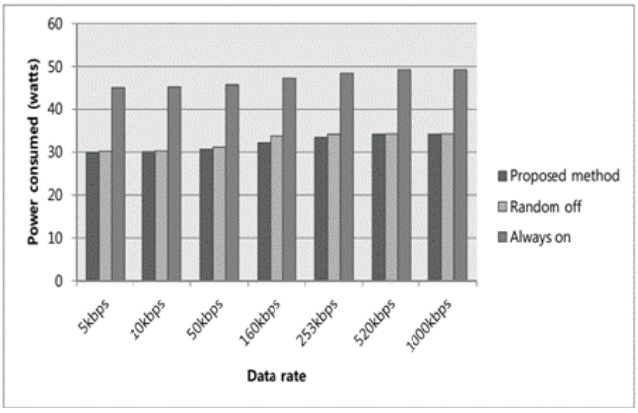

Fig. 3. Analysis of power consumption vs. data rates

In this work, we use Ns 2.35 as a network simulator .From an analysis of the data, we can say that by using a switch off mechanism, we can reduce the energy consumption of the whole network by 40 % of energy saving over a random switch-off. In addition, we also achieved a very small drop in average throughput, even in networks smaller than 3AP. The drop in throughput.

V. CONCLUSION

This paper proposed the power saving scheme by turning off unnecessary APs for wireless access networks where many APs, each providing full coverage and service during peak traffic time, but offering redundant resources when traffic load is low. We introduced a distance-aware algorithm that achieves a significant reduction in power consumption, without compromising the offered QoS. In particular, we proved how important is to efficiently choose the APs to be switched off during low traffic periods, by considering the distance of the UEs from the APs. Our results indicated that we could save up to average of 30% to 40% of the power consumed to operate the network, by decreasing the number of the active APs during low traffic periods. The most important message of this paper is that the energy wasted in large-scale and high-density WLANs is a new and serious concern. We stress those energy-efficient mechanisms for large-scale and high-density WLANs should be designed and developed today – to save energy in future WLANs and thus avoid the escalation of energy wastage.

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