Variable Wi-Fi Power: Reducing the Power Consumption of Wireless Mobile Devices using Distance-Oriented Power

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**ABSTRACT**

In this paper, we describe the formatting guidelines for ACM SIG Proceedings.

**Categories and Subject Descriptors**

D.3.3 [**Programming Languages**]: Language Constructs and Features – *abstract data types, polymorphism, control structures.* This is just an example, please use the correct category and subject descriptors for your submission*.*

**General Terms**

Your general terms must be any of the following 16 designated terms: Algorithms, Management, Measurement, Documentation, Performance, Design, Economics, Reliability, Experimentation, Security, Human Factors, Standardization, Languages, Theory, Legal Aspects, Verification.

**Keywords**

Keywords are your own designated keywords.

# INTRODUCTION

Wi-Fi is becoming the prominent network interface for data communication in smart devices (e.g., smartphones) because of its low/free cost, high throughput, relatively large range, and ubiquitous accessibility [1]. The utility of mobile devices is directly impacted by their operating lifetime before on-board batteries need to be replaced or recharged. In advanced mobile computing platforms such as PDAs and smart-phones, the wireless communication subsystem accounts for a major component of the total power consumption [3][4] due to the communication centric usage of these devices. Furthermore, these platforms are increasingly being equipped with multiple radio interfaces to handle a variety of connections, ranging from Bluetooth for personal-area links, Wi-Fi for local-area connectivity, and GPRS for wide-area data access. However, the Wi-Fi network still has several inefficiencies in terms of high energy consumption, unfairness between collocated nodes, and poor bandwidth utilization. For example, the Wi-Fi transmitter has to finish the transmission of the packet even in the case when the receiver flags the packet as corrupted at early stage of the transmission. Another example is the overhead of the low rate transmission of Wi-Fi control packets (RTS/CTS/ACK) [1].

Previous researches have explored the idea of switching among multiple radio interfaces in an attempt to reduce overall power consumption: By using the appropriate wireless interface for the current application workload, and keeping the others effectively turned off [2], and enhancing data communication performance over Wi-Fi networks by using the mic/speaker in smart devices as a parallel communication channel [1] has been proposed.

To Address the above problems, we introduced an energy-efficient distance-oriented variable Wi-Fi protocol. It provides a simple method of variable transmission power control to wireless devices without scarifying connectivity.

# Motivation and Related Works

# Variable Wi-Fi Power

# Evaluation Results

# Conclusion

# REFERENCES

1. Bowman, M., Debray, S. K., and Peterson, L. L. 1993. Reasoning about naming systems. *ACM Trans. Program. Lang. Syst.* 15, 5 (Nov. 1993), 795-825. DOI= <http://doi.acm.org/10.1145/161468.16147>.
2. Ding, W. and Marchionini, G. 1997. *A Study on Video Browsing Strategies*. Technical Report. University of Maryland at College Park.
3. Fröhlich, B. and Plate, J. 2000. The cubic mouse: a new device for three-dimensional input. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (The Hague, The Netherlands, April 01 - 06, 2000). CHI '00. ACM, New York, NY, 526-531. DOI= <http://doi.acm.org/10.1145/332040.332491>.
4. Tavel, P. 2007. *Modeling and Simulation Design*. AK Peters Ltd., Natick, MA.
5. Sannella, M. J. 1994. *Constraint Satisfaction and Debugging for Interactive User Interfaces*. Doctoral Thesis. UMI Order Number: UMI Order No. GAX95-09398., University of Washington.
6. Forman, G. 2003. An extensive empirical study of feature selection metrics for text classification. *J. Mach. Learn. Res.* 3 (Mar. 2003), 1289-1305.
7. Brown, L. D., Hua, H., and Gao, C. 2003. A widget framework for augmented interaction in SCAPE. In *Proceedings of the 16th Annual ACM Symposium on User Interface Software and Technology* (Vancouver, Canada, November 02 - 05, 2003). UIST '03. ACM, New York, NY, 1-10. DOI= <http://doi.acm.org/10.1145/964696.964697>.
8. Yu, Y. T. and Lau, M. F. 2006. A comparison of MC/DC, MUMCUT and several other coverage criteria for logical decisions. *J. Syst. Softw.* 79, 5 (May. 2006), 577-590. DOI= <http://dx.doi.org/10.1016/j.jss.2005.05.030>.
9. Spector, A. Z. 1989. Achieving application requirements. In *Distributed Systems*, S. Mullender, Ed. ACM Press Frontier Series. ACM, New York, NY, 19-33. DOI= <http://doi.acm.org/10.1145/90417.90738>.