

Pervasive Displays

Understanding the Future of Digital Signage

Synthesis Lectures on Mobile and Pervasive Computing

Editor

Mahadev Satyanarayanan, *Carnegie Mellon University*

Mobile computing and pervasive computing represent major evolutionary steps in distributed systems, a line of research and development that dates back to the mid-1970s. Although many basic principles of distributed system design continue to apply, four key constraints of mobility have forced the development of specialized techniques. These include: unpredictable variation in network quality, lowered trust and robustness of mobile elements, limitations on local resources imposed by weight and size constraints, and concern for battery power consumption. Beyond mobile computing lies pervasive (or ubiquitous) computing, whose essence is the creation of environments saturated with computing and communication, yet gracefully integrated with human users. A rich collection of topics lies at the intersections of mobile and pervasive computing with many other areas of computer science.

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ISBN: 978-3-031-01356-0 paperback

ISBN: 978-3-031-02484-9 ebook

DOI 10.1007/978-3-031-02484-9

A Publication in the Springer series

SYNTHESIS LECTURES ON MOBILE AND PERVASIVE COMPUTING

Series ISSN: 1933-9011 print 1933-902X ebook

Lecture #11

Series Editor: Mahadev Satyanarayanan, *Carnegie Mellon University*

First Edition

10 9 8 7 6 5 4 3 2 1

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SYNTHESIS LECTURES ON MOBILE AND PERVASIVE COMPUTING #11

ABSTRACT

Fueled by falling display hardware costs and rising demand, digital signage and pervasive displays are becoming ever more ubiquitous. Such systems have traditionally been used for advertising and information dissemination, with digital signage commonplace in shopping malls, airports and public spaces. While advertising and broadcasting announcements remain important applications, developments in sensing and interaction technologies are enabling entirely new classes of display applications that tailor content to the situation and audience of the display. As a result, signage systems are beginning to transition from simple broadcast systems to rich platforms for communication and interaction.

In this lecture we provide an introduction to this emerging field for researchers and practitioners interested in creating state-of-the-art pervasive display systems. We begin by describing the history of pervasive display research, providing illustrations of key systems, from pioneering work on supporting collaboration to contemporary systems designed for personalized information delivery. We then consider what the near future might hold for display networks—describing a series of compelling applications that are being postulated for future display networks. Creating such systems raises a wide range of challenges and requires designers to make a series of important trade-offs. We dedicate four chapters to key aspects of pervasive display design: audience engagement, display interaction, system software and system evaluation. These chapters provide an overview of current thinking in each area. Finally, we present a series of case studies of display systems and our concluding remarks.

KEYWORDS

pervasive displays, digital signage, ubiquitous computing

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Acknowledgments

The research leading to these results has been conducted as part of the e-Campus and PD-NET projects. The PD-NET project acknowledges the financial support of the Future and Emerging Technologies (FET) programme within the Seventh Framework Programme for Research of the European Commission, under FET-Open grant number: 244011. We would like to thank all the staff and students that have contributed to the e-Campus project at Lancaster University.

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December 2013