Adaptation of Content in Personalized Redirection of Communication

Yuping Yang, Heriot-Watt University, UK
M. Howard Williams, Heriot-Watt University, UK

ABSTRACT

With the rapid development of various networks and the growth in mobile communication devices, there is a growing demand to access content ubiquitously and to control information in a personalized way. This paper introduces the adaptation approach adopted in a personalized communication redirection system, which routes communication from the sender to the recipient, whatever his or her location or the communication devices that he or she is currently using, and discusses the evaluation results of the system. Some of these ideas are being incorporated into a pervasive system under development in the Daidalos project.

Keywords: adaptation; communication control; conversion; personalized redirection

INTRODUCTION

In 1992 George Heilmeier provided a perspective of the next generation of computation (Heilmeier, 1992). In this, people and their devices should be able to access information and communicate with each other easily and securely in any medium, any time, anywhere, in a timely, cost-effective way. With the explosive growth of the Internet, a growing number of people can use it at work, at home, and on the road (Barbara, 1999; Kindberg, 2000; Wu, 2001). In addition, other types of networks, such as mobile phones and pager networks, are proliferating rapidly. In the future, users should be able to access communications ubiquitously through a variety of networks and stationary or mobile devices (Kindberg, 2002; Kohtake, 2003; Satyanarayanan, 2001). They should be able to consume the information on their own devices or on peripheral devices located in the environment, such as public or private video screens and headphones. Thus, for the next generation of communication systems, ubiquitous access to communication is a major challenge (Abowd, 2000).

One aspect of this vision is the personalized control over what communications are delivered where and when. To support this vision, a general architecture has been developed for...
personalized redirection and content adaptation in context-aware communications (Yang, 2002, 2003). Based on this, a prototype system, PRCD (Personalized Redirection of Communication and Data), has been developed. It is operational with a full range of functionality that supports greater flexibility in the traffic of data and communications. This involves more flexible routing of both data and communications, including the delivery of messages to a recipient, independent of his or her location and the redirection of data streams to appropriate devices to suit the user.

In the PRCD system, more attention is given to user preferences and device rendering capabilities, and hence, much of the work has focused on data conversion, including format transformation, information filtering, and data splitting. Communication redirection and personalization are both important aspects of the system proposed here. This enables users to interact flexibly in ways that suit them.

The rest of this paper is organized as follows. The second section discusses related work. The third section gives a brief overview of the system architecture. The fourth section describes content conversion, focusing on the whole conversion strategy. The fifth section demonstrates user interface adaptation. In the sixth section, final routing of communication is discussed. The seventh section includes some experimental and user evaluation results from the prototype and discusses issues related to the feasibility, generality, scalability, and ease of deployment of the system. Finally, the eighth section presents conclusions.

RELATED WORK

There have been several research projects in this area. Some of these are described briefly here.

The SPIN (Liscano, 1997) project has designed a seamless messaging system whose goal is to intercept, filter, convert, and deliver multi-modal messages including voice, fax, and e-mail messages. However, it assumes that various data formats can be transformed into a standard text format. Hence, some problems are introduced, because there are some data formats such as images that cannot be converted to the standard text format.

The Iceberg (Raman, 1999; Wang, 2000) project aims at integrating telephony and data services spanning diverse access networks but has concentrated mostly on voice rather than data services. It depends heavily on a pre-existing network infrastructure that involves a large number of nodes called Iceberg Access Points (IAPs), which are difficult to deploy widely. The adaptation technology employed in Iceberg differs from that used here in PRCD. PRCD searches the optimized path and redirects a communication to more than one device. In addition, PRCD represents and stores rich system knowledge in a well-structured format. These features are not addressed by Iceberg, which uses only the format types to describe all converters and simply searches for the first matching path.

The MPA (Mobile People Architecture [Roussopoulos, Maniatis, Swierk, Lai, Appenzeller, & Baker, 1999]) focuses on the problem of personal mobility. It regards the person rather than the device as the communication endpoint. Each person has a globally unique personal online ID. Each personal proxy is associated with a person and performs personal-level routing, accepting communications on a person’s behalf, converting the communications into different application formats, and forwarding the resulting communication to the person. One drawback is that the content adaptation and protocol conversion proxies are located at the user’s home network, which implies that all data must go through the user’s home network, which can cause extra delay if the user is far away from his or her home network.

NetChaser (Di Stefano, 2000) is an agent-based infrastructure for supporting personal mobility in accessing Internet information services. It uses mobile agents that serve as a wrapper layer between the applications and the Internet, providing assistance to the users by following users when they change working terminals. Each application has a specific agent to help the application access the application’s
12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product's webpage:

www.igi-global.com/article/adaptation-content-personalized-redirection-communication/1413?camid=4v1


www.igi-global.com/e-resources/library-recommendation/?id=2

Related Content

A Generic Framework for Bluetooth Promoted Multimedia on Demand (BlueProMoD)
Panayotis Fouliras (2009). Selected Readings on Telecommunications and Networking (pp. 142-156).
www.igi-global.com/chapter/generic-framework-bluetooth-promoted-multimedia/28718?camid=4v1a

Dynamic PL&T using Two Reference Nodes Equipped with Steered Directional Antenna for Significant PL&T Accuracy
www.igi-global.com/article/dynamic-using-two-reference-nodes/75161?camid=4v1a
Multimedia Transmission in Wireless Sensor Networks
[www.igi-global.com/chapter/multimedia-transmission-in-wireless-sensor-networks/135472?camid=4v1a](www.igi-global.com/chapter/multimedia-transmission-in-wireless-sensor-networks/135472?camid=4v1a)

Fuzzy Reasoning Approach for Local Connectivity Management in Mobile Ad Hoc Networks
[www.igi-global.com/article/fuzzy-reasoning-approach-local-connectivity/1423?camid=4v1a](www.igi-global.com/article/fuzzy-reasoning-approach-local-connectivity/1423?camid=4v1a)