

The Equator Component Toolkit: Managing digital information flow in the home

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ABSTRACT

This paper describes a system intended for installation into the domestic environment. This system allows for items of digital media, such as emails, to be *pushed* onto a set of display devices located around the home. The system allows domestic residents to dynamically configure associations between particular sources of digital information and particular LCD screens, and is currently working in a laboratory-based setting. The paper describes our motivation in constructing this system, and introduces evaluative work that we are currently involved in.

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General terms: Design, Human Factors

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INTRODUCTION

The modern home is awash with a varied set of digital media. Large volumes of emails arrive in email accounts, text messages are sent back and forth between mobile phones, and residents browse the web and register with RSS feeds, perhaps searching for items of news that are of interest to them.

Yet the necessity of having to *poll* digital services for information creates inefficiencies in domestic routines. For example, a resident may relocate themselves to a workstation, log in, connect to the internet and browse their email account, yet find no new interesting emails to read. To an extent, existing services that allow new emails to be *pushed* onto mobile phones can ameliorate these problems, yet such services are often limited purely to email delivery, and may be expensive and difficult to configure.

As an alternative, we have been investigating the potential of pushing digital media onto a number of small but visible displays located around the home. We hope that this will allow residents to monitor the arrival of new information, and our hypothesis is that this will allow them to construct more efficient routines relating to the use of this digital

media. It should be noted that this idea of shifting display facilities away from the desktop is not new, having featured in previous work on ambient displays (e.g. [2]) and situated displays (e.g. [1]). However, one area of this work that we believe is new is our focus on mechanisms that allow residents to dynamically configure and reconfigure the information sources that are pushed onto a particular display. As such, it is these configuration mechanisms which are focused on in this paper, which also describes evaluative work that we are currently involved in.

SYSTEM OVERVIEW

The displays used in our prototype system are a set of PhidgetTextLCD devices, each of which is capable of displaying two rows of twenty characters, which we have found to be readable from a distance of roughly three metres. An example of a PhidgetTextLCD device is shown in figure 1 below.



Figure 1 –PhidgetTextLCD device

These devices are intended to be distributed around the home, and to be used for displaying summaries of media such as emails or items from RSS feeds. However, until wireless USB facilities become available, we have been forced to drive them from a number of small, unobtrusive PCs which have been equipped with wireless networking devices, and which we hope will be easily-integratable into a number of domestic settings.

In addition to these displays, our system makes use of one central touch-screen device, which is running an interface called the *display editor*, a screenshot of which is shown in figure 2 below. This is the interface which allows residents to configure the data sources that are associated with each LCD display, and to do so, they must connect an edge through the interface to specify the association. Available data sources are represented as icons in the left half of the display editor, and available displays are represented as icons in the right half of the display. Example data sources

that we have integrated into our system include email accounts and RSS feeds, and edges, once connected between a source and a display, can be removed and reconnected at will. In figure 2 below, the connection indicates that any new emails received by a particular email account should be displayed onto the connected LCD device.

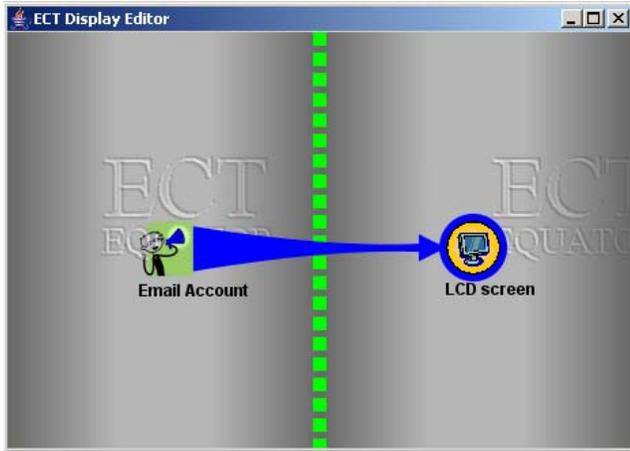


Figure 2 – Display editor configured with a data source representing an email account, which is connected to one LCD device

PERFORMING INITIAL SYSTEM CONFIGURATION

The display editor is intended as a simple interface, suitable only for the task of configuring connections between data sources and displays. As such, initial system configuration tasks (such as providing details of an email account to connect to, and establishing a connection with an LCD device attached to a networked computer) have to be performed through a different interface, called the graph editor, for which there is insufficient space in this paper to describe. This interface is more complex than the display editor, and we expect that in initial deployments, an expert user will use this interface to setup a number of data sources and displays. For further details of facilities provided by the graph editor, the interested reader should consult our project website [4]

DEPLOYING THE SYSTEM

We currently have a test system set up in our lab, which is configured to allow email accounts, RSS feeds, SMS (as received by a GSM modem) and sampled environmental information (such as the current temperature in a room) to be used as data sources. Along with LCD devices, we are experimenting with display of media onto mobile phones, PDAs, and through speech synthesis. Now that our test system is working reliably and is relatively easy to install, we are beginning to perform initial deployments into two homes, so that we can begin to gather initial data in order to guide our future research. We believe that there are a number of interesting research questions that relate to this installation process, which include:

- what kinds of information sources do individuals ask to be created? In the case of email, for example, do they prefer a single, unfiltered data source representing their email account, or multiple, filtered data sources, each of which either represents an individual or a group of people who regularly email this account?
- how do they decide where each of the devices included in the installation should be physically located?

Once installed and working, we have questions that relate to the use of the system, and which include:

- how often do people reconfigure the linkages between available data source and data sinks?
- how often do people change the physical location of relatively mobile devices such as the PhidgetTextLCD screens?
- how do people organize icons in the display editor, and how easy do they find the display editor to use?

We also have more generic questions about the impact of the system, such as:

- how does the presence of the system affect their daily routines? If these routines are affected, is this for better or worse?
- how enthusiastic are they about the system as a whole, and would they install it permanently if given the chance?

The approach that we have planned for gathering information to help us answer these questions is primarily ethnographical, and is likely to employ observations, interviews and the analysis of log files. Such log files are recorded automatically by our system, and include information about system events, system configuration changes and user interface interactions. To assist in the analysis of logs, we have been experimenting with Replaytool [3], a generic software tool with a plug-in architecture which allows a reviewer to replay logs produced by other systems.

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