Using Activity Awareness as a Run-time Interaction Configuration Testbed

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ABSTRACT
This poster presents a system, the MATCH Activity Awareness Monitor, designed as a testbed for investigating research questions related to the run-time configuration of interactive applications. Our approach has the key elements of a rich application domain, viz. multi-user activity awareness, in which to carry out the investigations and an architectural framework for configuration that makes it possible to modify the configuration aspects of the application to suit the demands of different investigations. We present the main features of the system and demonstrate how we take advantage of the rich environment that activity awareness offers.

Keywords
Evaluation function, configuration, activity awareness

INTRODUCTION
The goal of activity awareness is to allow a user to share information about their current status or recent activities with other people. Activity awareness allows the cared for to be informed about the status of friends and relatives, or for carers to be alert to situations that require intervention.

With the typical social networking applications a user can select to add friends who can receive any typed messages that the user enters into the application. However, within a typical assisted living environment there is often the wish to discriminate which types of information as well as what level of detail friends may receive. Activity information can come from numerous sources within the home; in addition to user entered messages we can track the users' location or movement, monitor medication compliance, or home occupancy. Determining which group of people is eligible to receive which activity messages is not a trivial task.

These additional requirements make the configuration of an activity awareness application much more difficult as the user now needs to specify the precise relationship between activity message sources and destinations This poster presents an application to explore these issues.

MATCH ACTIVITY AWARENESS MONITOR FEATURES
A prototype has been developed to explore *activity awareness* between friends, family and coworkers. The goal of activity awareness is to allow a user to share information about their current status or activities with other people.

Early versions ran on standard Windows workstations while the format of the latest iteration of the investigation is an Ultra Mobile PC (UMPC), the Samsung Q1, which is placed in a user's home. The UMPC operates a "digital photo frame" application which displays the user's photos in order to make it a non-intrusive part of the user's home. An illustration of this device is shown in Figure 1.

Figure 1: Samsung Q1 running Photo Frame application

To configure the activity awareness application; the user simply touches the screen and the photo application fades away; replaced by the activity monitoring application.

Accompanying the UMPC installation is a website which allows the users friends and families, with an appropriate account, to receive activity reports and to respond to them.

These activities which can be monitored by the system are a Calendar, Wireless Accelerometer movement sensing[4] for adhoc instrumentation, Webcam movement sensors, Text entries made directly by the user, Abstract buttons based around ideas presented in MarkerClock[5], and Other People; via the website or other users of the application.

The set of valid destinations for delivery of activity messages are a choice of GUIs (both a persistent list as well as a popup option), Speakers which allow messages to be delivered via Speech Synthesis or Auditory Icons

(Earcons), Vibration feedback via one of the Accelerometer devices, Email, and Other People

For example the user can configure calendar appointments to be delivered via Speech synthesis while activities from friends are delivered using a GUI and an sound notification.

The application offers the user different methods of choosing how to configure the activity awareness tasks. We have used a design to supporting configuration in ubiquitous systems[2] involving the concept of *Evaluation Functions*[2] which can be used to unify available configuration techniques within a single framework. This is based on Plasticity[1] where the inputs and outputs used in a system (in this case the activity sources and destinations) can be made at run time.

The approaches we provide here in the form of Evaluation Functions are a selection of Manual, Automatic and Semi-automatic approaches described as follows: (i) Manual; manual approaches take the form of panels which the user selects which devices/people should be used as an activity source or destination. (ii) Recommender; recommender approaches were expressed both as an "automatic" selection method which simply selected the appropriate activity source or destination for you based on local or collaborative user activity and a "semi-automatic" method which suggests configurations to the user but des not make the selection for them. (iii) Context Sensitive; we provide the user with the ability to select which activity sources and destinations should be used based on elements of context[1] such as recent movement or the amount of time since the user last interacted with the application. (iv) Combinatory; allows a logical union of two other selections from the above list.

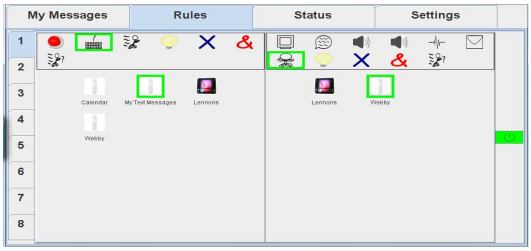

Figure 2: Sample Task Configuration Screen

To summarise, this application allows users to select activity sources and destinations to create an activity monitoring task through selection of evaluation functions and their properties. Figure 2 displays a prototype configuration interface in which typed messages are sent to a friend or family member.

IMPLEMENTATION

The application described above is built on a software framework for rapidly building exploratory applications. The software framework is a component-based system built on top of the Java OSGi[3] framework. In this model each of the sources and destinations of activities is deployed as a "bundle" of code with defined dependencies. This allows for rapid and flexible addition of extra types of activity source or destination. Additionally GUI components are also deployed as bundles within the framework.

Evaluation

A qualitative investigation is underway to determine the criteria that users deem important during configuration of interactive systems. Specific questions we want to answer are; (i) which configuration techniques are preferred and why?, (ii) what process do users undertake when configuring complex systems?, (iii) what relationship exists between privacy, control and flexibility? and (iv) how do users identify and correct unsuitable configurations?

CONCLUSION

This poster presents the MATCH Activity Awareness Monitor. We believe that Activity Awareness is a rich application area for testing configuration and have presented our testbed which uses this application domain in which to explore these the process of configuration. We describe key features in terms of activity awareness. We believe our design and implementation is suitable for rapid prototyping and deployment of configuration techniques.

Two pilot experiments have taken place and preliminary results of user studies using this prototype indicate that a sense of control and feedback are the most important criteria governing acceptability of configuration techniques. Our current study is a longitudinal study taking place over a period of several months within elderly users' homes to explore configuration from an elderly user population over a longer period of time. We hope that this investigation will highlight important issues within configuration and provide insight into the best approaches to address them.

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