

CLoc - Clock Interface for Location and Presence

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Abstract. The CLoc is an interactive ambient display artefact based on a clock metaphor that shows the current or past location and activities of each member of a household. The CLoc focuses on support for management of activities and tries to address the increased complexity of activities within a household as well as the growing number of different family constellations. The CLoc is implemented on top of a distributed system prototype that combines a number of different research and technology areas such as interaction, presentation, positioning, planning and presence.

1. INTRODUCTION

Modern lifestyle has made home activities less prominent and social activities outside the home commonplace. Our vision is to incorporate “intelligent” artefacts into homes in order to bring a sense of co-presence between family members. The following scenario illustrates how the the CLoc application could be used:

"It is afternoon and Peter has just got home and started to make dinner. His wife, Anna, has just left her office to go home. Meanwhile, their son, John, has just found out that there is soccer practice at dinner time, which he enters in his phone calendar and synchronises with home. Peter wants to know what the situation is for dinner, and turns around to look at the CLoc on the wall. He sees that Anna's clock hand is pointing to "work" but has started fading and assumes that she has just left for home. John's hand on the CLoc is pointing to "out", he's probably at a friends house. Peter decides to walk over to the CLoc and turns the time knob, so that the time hands show an hour from now. As he is turning the knob, the clock hands move to show the planned location of the family members an hour from now. He sees that John will not be joining them for dinner, as he previously thought."

Results from previous research experiences in the domain of smart home services point at the evolution of homes in a piecemeal fashion [1]. While some have described rich futuristic home services [2], we believe that evolution of homes is going to be a slow process. So far, most work has focused on technological additions to homes and has not taken into account their inhabitants and activities [3]. In the past, our focus has been on solving the problems raised by the configuration of technology-filled homes [4]. The CLoc focuses on aspects such as re-planning help and presence and centre the activity more on families and other groups.

2. THE CLoc INTERACTIVE ARTEFACT

The CLoc interactive artefact is designed to function as a presence display in a home. Our current prototype is constructed with servos (as used in model aeroplanes) moving mechanical clock-like hands (one hand for each member in a family) in front of an LCD screen. There is also a metal panel in front of the screen containing control knobs. The CLoc relies on a distributed back-end system running on a number of devices. The artefact is controlled by the CLoc application. This application is a client of the positioning server (see below) and receives position events and region information for each tracked family member. The application also controls the servos that rotates the hands. Finally the CLoc application controls a fullscreen graphical user interface (GUI). In the GUI, locations are represented by sectors in a background image, while virtual hands carrying the personal information are moved in synchrony with the physical hands controlled by the servos. A PowerMate [6] knob is used to spool back and forth in "time". The knob sends keyboard events to the application. When it is turned, the CLoc shows members activities at that time. After a slight pause the

application returns to the current time.

3. POSITIONING

The positioning infrastructure integrates both passive positioning technologies such as GPS reporting and active positioning such as Bluetooth and wifi scanning in a flexible system that puts minimal requirements on the mobile devices. Devices report location events at regular intervals to a server so as to position vehicles and individuals. GPS positioning uses a Java ME application that acquires location by communicating with NMEA compatible GPS devices and regularly sends information to the server. Information from Bluetooth and wifi scanners at known locations tracking known devices is also gathered.

The server supports the dynamic definition of any number of regions. Client applications can be aware of the continuous streams of positions or notified when vehicles and individuals enter or leave regions. The CLoc represents users through one or several personal mobile devices and defines, for each user, a number of regions that correspond to their regular activities.

4. CONCLUSION AND FUTURE ACTIVITIES

The CLoc is an interactive ambient artefact designed to be put in an active common area of a house. Special emphasis is put on usability in order to support household members of varying ages and abilities. The artefact presents categorised places and regions in order to respect personal integrity.

One part of our design methodology is to use public events as informal user trials. At these activities we get a direct contact with potential users and customers. The CLoc was demonstrated at the SICS Open House in May. Many visitors thought that the CLoc was an impressive artifact and they found it very useful within families and also within working groups. They also thought that the concept of the artifact was very clear. The personal integrity was lively discussed but most of the visitors considered that the personal integrity is respected. We are planning for proper user studies in the near future and one interesting question is related to ethical issues regarding personal integrity and tracking. At the technological level, we wish to implement the calendar handler so as to let users visualise and plan future activities. Also, we are looking into adding support for semacodes [5] in order to let users actively specify their activity. Finally, we wish to adapt our in-house mobile blogging system in order to let people tweak their representation or the representation of activities on the artefact by, for example, the posting of images taken with mobile cameras.

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