MyMemodules: a Graphical Toolkit for the Easy Creation of Personal TUI

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ABSTRACT

Tangible interfaces are an innovative means to establish links between our memory and information, facilitating access, search and manipulation of digital content. This paper presents MyMemodules toolkit which allows users to easily create tangible interfaces using RFID-enabled everyday objects. Moreover the toolkit provides a graphical representation of the different components (objects, information) the user can assembly, without any programming knowledge, for describing association between physical objects and multimedia content.

Keywords: Tangible User Interface, XML, RFID, Toolkit.

INTRODUCTION

With the constant progress in information retrieval and storage, the amount of information, a person owns and handles, never stops increasing. Worst, information is dematerializing in our daily life and thus, people are often experiencing the "lost in infospace" effect. What we often miss in our daily-life are tangible shortcuts (reminders) to our information, like used to be books in our shelves [1][3]. The process of "remembering" usually consists in associating something with a sensory cue [2]. For example, we may see a picture of a place visited in our childhood and the image recalls memories associated to the same time. It appears that humans easily access and retrieve information when it is linked to other related information or objects. Based on this associative process of remembering, MyMemodules aims at facilitating user interaction with multimedia information by supporting the creation and management of tangible links to digital content.

MYMEMODULES TOOLKIT

Memodules[1] are tangible links between human memory and digital information. Every Memodule is associated to an interaction scenario, which describes the relations between the Memodule (physical object) and the associated information: e.g. every time you approach the seashell (Memodule - souvenir of some Greek holidays) near to the TV, all pictures relative to those holidays are automatically showed on the screen. A scenario is composed of three main components: 1) the Memodule – i.e. the tangible link, 2) the Player – i.e. the device where the information is played, and 3) the Result – i.e. what the user perceives as a result of the interaction between the Memodule and the Player.

MyMemodules toolkit is based on Document Engineering modeling approach [5] which is evolving as a new scientific discipline for specifying, designing, and implementing systems belonging to very different business domains by using XML technology. The toolkit is composed of three main parts:

1. MemoML (Memodules Markup Language), an XML-based modeling language which describes interaction scenarios and scenario's components such as RFID-enabled objects, communication protocols (wireless, Bluetooth, etc.), target devices (mp3 player, beamer, etc.) and actions (play, show, preview, etc.) see figure 1.
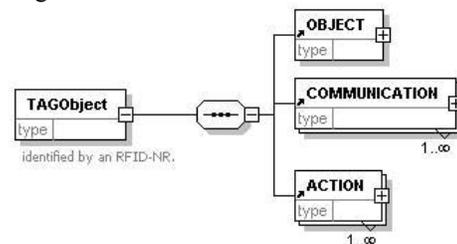

Figure 1 MemoML example

2. MemoEngine which parses MemoML scenario instance in order to identify objects (Memodules and Players), ensure communication processes and execute actions:

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[1] http://www.memodules.ch

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<DEVICE = CDPlayer PATH= /Path/… COMMUNICATION=
WiFi>
<DEVICE = Beamer PATH = /Path/… COMMUNICATION=
wire>
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3. Visual Editor which allows the user to easily describe interaction scenarios via a graphical interface. The interface is composed of three main regions (Memodules - lilac, Player - light blue, Results - light green) which correspond to the three main parts of the scenario as mentioned before. Users can create their scenarios simply dragging and dropping icons representing Memodules, Players and information from the left and right panel within these three regions (see figure 2).

Figure 2 MyMemodules Visual Editor

Icons are described by a type: for instance an icon representing some digital photos belongs to the "information-type" icon which means that it cannot be dragged and dropped neither in the Memodules region nor in the Player region. On the contrary, the icon representing a mobile phone, which can be both a Memodule and a Player, belongs to both "Memodules-type" and "Player-type" and can be dragged and dropped in both the corresponding two regions.

MYMEMODULES INTERACTIVE BOX

The MyMemodules Interactive Box, which is based on phidgets toolkit [4], allows the user to start a scenario and to manage subsequent interactions with digital content. For instance, once the seashell interaction scenario is created via the Visual Editor, a user can show some pictures by approaching the seashell to the Interactive Box (RFID-reader, number 1 in figure 3), moreover he/she can send an e-mail to his/her friend with attached some of those photos by approaching the friend's business card to the MyMemodules Interactive Box.
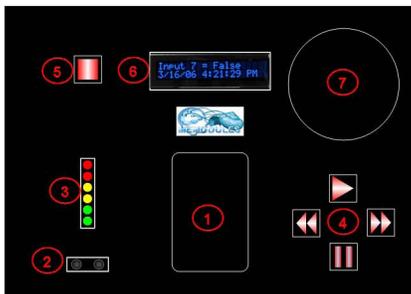

Figure 3 MyMemodules Interactive Box

The Interactive Box is equipped with an infrared sensor which is activated by the user's hand for controlling the volume of sound when playing and some luminous LEDs which give a visual feedback of the user' hand movement (number 2 and 3 in figure 3). Several touch sensors (number 4 and 5 in figure 3) allow the user to interact with multimedia content while playing (play next, previous, stop, etc.). The LCD screen (number 6) shows metadata information about the multimedia content that is played, while the circular touch (number 7) allows the user to speed up or slow down the forward and the backward motion of some video or music playing.

CONCLUSION AND FUTURE WORK

In this paper we have presented MyMemodules toolkit for creating and manipulating tangible interfaces. MyMemodules toolkit uses RFID-enabled everyday objects and it allows users to easily describe interaction scenarios. As future work, we plan to improve the toolkit by integrating more extensively multimodality (in particular the voice) and by extending MemoML language to support multimodal interaction. On this subject, we are currently integrating in the MyMemodules Interactive Box a module for speech recognition which will allow the user to control multimedia content playing (play next, previous, etc.) via vocal commands. Finally, based on the results of ongoing focus group activity, we will draw a set of requirements to improve usability and user-friendliness of the Visual Editor.

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