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Cross-Cultural Interactive Spaces

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Abstract. Culture dependent behaviour affects relations between groups and individuals. During the last decades there has been a dramatic increase in the importance of cross-cultural meetings and negotiations. The objective of our project is to design and implement a system that provides cross-cultural knowledge via mobile devices for people in international business meetings or in international research project meetings. For example, meeting rooms within companies can be regarded as interactive spaces and as being context-sensitive areas. By integrating ubiquitous computing, Semantic Web, RFID technology, context-aware computing and XML Topic Maps we can construct a cross-cultural interactive space that will help people to better understand and adjust to cultural differences that may occur during the meeting.

The research interests of the author are related to research on context awareness and application mobility for Web-based applications. The main focus is to explore and develop human centered Web technologies and to support human activities with these technologies.

1 Introduction

Increasingly, businessmen, project managers, researchers and other professionals are becoming involved in international negotiations and meetings. The meetings can for example be international business meetings or international research project meetings. In addition to meeting agenda, participants also share culturally integrated space. Sometimes it can be difficult to understand cultural-dependent behavior of other parties during a meeting. By understanding some of the main cultural dimensions [5] and by adjusting to cultural differences, people can face the challenge and become better negotiators on behalf of their companies and research organisations.

There exist several frameworks for assessing cultures – one of the widely accepted frameworks [5] consists of four dimensions: individualism/collectivism, power distance, masculinity/femininity, and uncertainty avoidance (Table 1). All dimensions are generalizations and individuals may vary from their society's descriptors. However, these dimensions together with culture-specific characteristics can help people to develop their cross-cultural negotiating skills.

These four dimensions provide a useful framework for approaching meetings, especially when the other parties are likely to have different cultural values. In addition to this larger framework there are several cultural dependent charateristics which persons can face in their everyday meeting life. Example of these are personal space, the role of silence in meetings, body language, fact-based communication, the meaning of the word "yes", the use of the word "I", listening and reading between the lines etc. With the awareness of existing cultural differences, it is possible for a person to modify his/her general attitude and negotiation approach more readily when necessary.

Table 1.Examples of cultural dimensions according to [5]

Dimension	Description of the dimension
Individualism/ Collectivism	Individualism/Collectivism describes the extent to which a society emphasizes the individual or the group. Individualistic societies encourage their members to be independent and look out for themselves. Collectivistic societies emphasize the group's responsibility for each individual.
Power distance	Power distance describes the extent to which a society accepts that power is distributed unequally. When power distance is high, individuals prefer little consultation between superiors and subordinates. When power distance is low, individuals prefer consultative styles of leadership.
Masculinity/Femininity	Masculinity/Femininity refers to the values more likely to be held in a society. Masculine societies are characterized by an emphasis on money and things. Feminine cultures are characterized by concerns for relationships, nurturing, and quality of life.
Uncertainty avoidance	Uncertainty avoidance refers to the extent that individuals in a culture are comfortable (or uncomfortable) with unstructured situations. Those in societies with high uncertainty avoidance prefer stability, structure, and precise managerial direction. Those in low uncertainty avoidance societies are comfortable with ambiguity, unstructured situations, and broad managerial guidance.

The objective of our project is to design and implement an interactive space system that provides cross-cultural knowledge and assistant via mobile devices for people attending cross-cultural meetings. Five main technologies to be applied in our project are ubiquitous computing, Semantic Web, RFID technology, context-aware computing and XML Topic Maps.

2 Main Technologies

2.1 Ubiquitous Computing and Semantic Web

Ubiquitous computing refers to a new computing paradigm that focuses on providing hardware and software means for offering user-friendly information and communication services - anywhere and anytime [8]. The core concept is to support users by means of a digital space that is aware of their presence and context. Knowledge that is exploited in ubiquitous applications is pervasive, distributed, heterogeneous and dynamic by nature. In this respect, ubiquitous applications benefit from the W3C's Semantic Web Activity amd Mobile Web Initiative. Semantic Web provides the infrastructure for the extensive usage of distributed knowledge [6, 9]. Mobile Web Initiative focuses on developing best interoperability and usability practices that make Web access from a mobile device as simple, easy and convenient as Web access from a desktop device [10].

2.2 Radio Frequency Identification

Radio Frequency Identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders [7]. A typical RFID solution consists of a data gatherer, RFID reader, and a data carrier (RFID tag) that is attached to an item or location. An RFID tag is a small object that can be attached to or

incorporated into a product or person. RFID tags contain silicon chips and antennas to enable them to receive and respond to radio-frequency queries from an RFID transceiver.

2.3 Context-Aware Computing

Context is any information that can be used to characterize the situation of an entity. An entity can be a person, a place, a space, time or an object that is consired relevant to the interaction between a user and application, including the user and application themselves. The system is context-ware if it uses context to provide relevant information and/or services to the user where relevancy depends on the user's task or situation. [1]

Example of contexts in cross-cultural meetings are given in Table 2.

Table 2. Examples of contexts

Static Situation	Dynamic Situation	Static Intension	Dynamic Intension
Name, date of birth, sex, nationality, education etc.	Location (country, city, company), time	Preferences	Interests, targets

2.4 XML Topic Maps and Ontologies

Topic Maps are an ISO standard for the representation and interchange of knowledge, with an emphasis on the findability of information. The standard is formally known as ISO/IEC 13250:2003 and its Web version is XML Topic Maps (XTM) 1.0 [4, 12]. W3C's Survey of RDF/Topic Maps Interoperability Proposals is intended to be a starting point for establishing standard guidelines for RDF/Topic Maps interoperability [11].

In topic maps, three constructs are provided for describing the subjects represented by the topics: topic names, occurrences, and associations. In Topic Maps topics can be typed, which provides considerable power for describing the world from which the topics are taken. Occurrences relate topics to the information they are relevant to. Occurrences use URI addresses to identify the information resources being connected to the topic, which means that any kind of information resource anywhere can be connected to the topic. Associations represent relationships between subjects, and like occurrences they can be typed. This allows any kind of relationship to be expressed. The relationships in traditional classification schemes have very little semantic content, whereas in topic maps one generally tries to make the typing of associations as specific as possible.

An ontology is the result of an attempt to formulate an exhaustive and rigorous conceptual schema about a certain domain. The domain does not have to be the complete knowledge of that topic, but an interesting part of it decided by the creator of the ontology. An ontology is typically a hierarchical data structure containing all the relevant entities and their relationships and rules within that domain. OWL is an acronym for Web Ontology Language, a markup language for publishing and sharing data using ontologies on the Internet. OWL is a vocabulary extension of RDF (the Resource Description Framework). In our project we will create a cross-cultural ontology and try to implement it by means of Topic Map approach.

3 Cross-Cultural Interactive Spaces (CCIS) – Case: Japan and Finland

Our CCIS system will help people to better understand and adjust to cultural differences. For example, meeting rooms within companies can be regarded as being context-sensitive areas and appropriately equipped by means of RFID technology for an application. Finland and Japan are the case countries in our project and the meeting types are collaborative research

project meetings between researchers and project management meetings between project teams and participating companies.

The following vision [7], adopted to our project environment, illustrates how project researchers could benefit communicating in cross-cultural interactive spaces applying RFID technology (Figure 1). A person prepares a presentation on her PC that she will give at the research project meeting. She copies the presentation from her desktop computer to her mobile device before going to the project meeting. When she arrives to the meeting space, she scans the RFID tag embedded in a meeting device located in the space. She is now signed into the meeting. By scanning the RDIF tag in the wireless remote control with her mobile device with embedded RFID reader she will get a list of presentations to appear on the space's main screen. By means of the remote control, she selects the appropriate presentation, causing it to be accessed from her mobile device and displayed in the full-screen mode on the projection surface. Other members of the meeting can also duplicate the display from their mobile devices on the room's main screen.

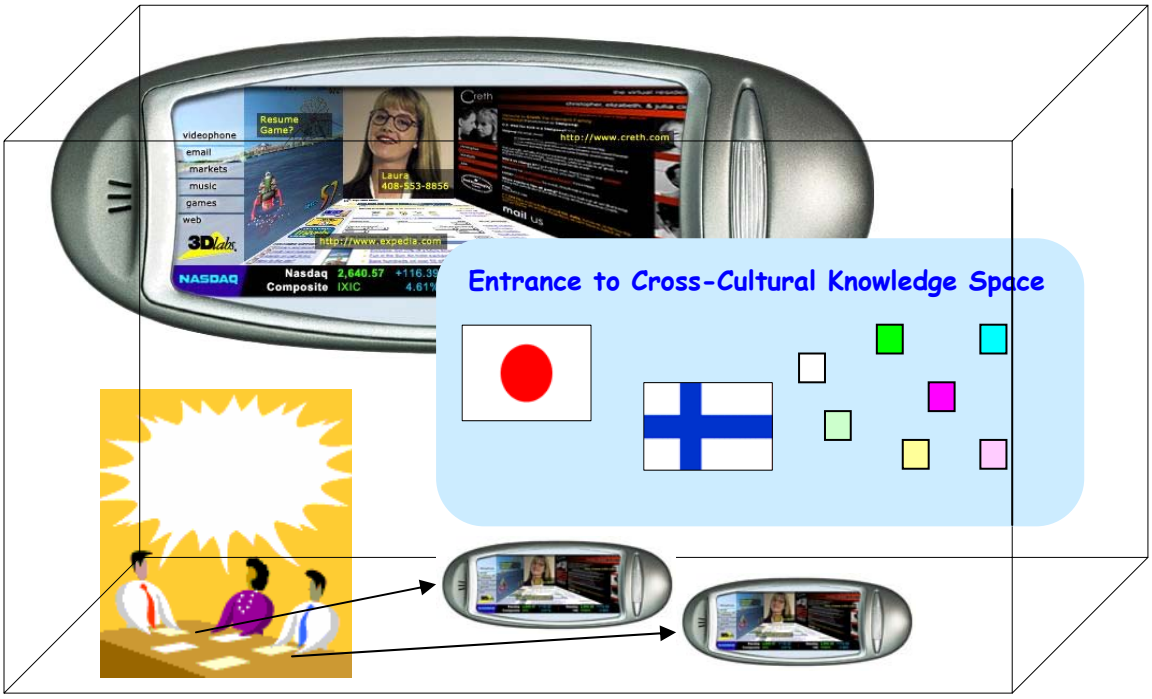

Figure 1. A vision of cross-cultural knowledge space. The system can be on a wall or on mobile devices and participants can be physically and/ or virtually present.

In case of culture-dependent communication problems a person can get the cross-cultural meeting assistant service to her personal mobile device. The interface to the service is a Topic Map. He/she can study it by himself/herself. The service can also be viewed collaboratively on a main screen. A user would need to scan a tagged cross-cultural service object using RFID reader that is embedded in his/her mobile device. When the tag is scanned, the mobile device knows the user intends to show the cross-cultural assistant service in the room. His/her mobile device is then joined to the interactive space. At the end of the meeting, the participants press the 'end meeting' button on the meeting device. The collaborative workspace will be closed.

5 Conclusions

The objective of our project is to design and implement a system that provides cross-cultural knowledge via mobile devices for people at cross-cultural meetings. Our system will help people to better understand and adjust to cultural differences. The main tasks of our project are as follows: (a) defining the conceptual model and basic architectures for the interactive space, (b) defining user-, content- and context-oriented as well as technical requirement specifications for the interactive space, (c) creating a demonstrative cross-cultural ontology (case: Japan - Finland) and related content database, (d) designing and implementing the system architecture for the interactive space and (e) programming, testing and evaluating the results in a laboratory environment. The project is planned to be a joint research project between Tampere University of Technology (Finland), Keio University (Japan) and Kanagawa Institute of Technology (Japan).

The idea of cross-cultural interactive spaces can be exploited in universities and in business schools for students taking cross-cultural studies as well as in city information offices for tourists. Integrating Kansei information (feelings, sensitivity, and psychological reactions) to our cross-cultural assistant service will be an interesting challenge [2, 3].

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