The Pan Cretan Forum as a case study for boundary spanning artifacts

Providakis Antonios
Dept. of Informatics Engineering
Technological Education Institution of Crete
Stavromenos 71004, Heraklion, Crete, Greece
ant.providakis@gmail.com

Charalampakos Orestis
Dept. of Informatics Engineering
Technological Educational Institute of Crete
Stavromenos 71004, Heraklion, Crete, Greece
orestischaral@gmail.com

***Abstract*—** Pan Cretan Forum for the promotion of the Cretan products is an important event for the local economy of the island. It helps the cooperation between local hoteliers and farmers of the Cretan land. These two groups perform consecutives short-term meetings during the days of the Forum. Multiple roles have to work together to make the Forum successful. Our goal in this work is to develop a prototype system to fulfill the needs of this forum. Through this system we want to emerge the need of different artifacts which have to be combined so the participants in this forum can collaborate. Those artifacts exist at the boundaries of our system and make it functional.

Keywords- Distributed Cognition, boundary artifacts, Social Translucence, virtual work

I. INTRODUCTION

Pan-Cretan Forum is one of the most valuable events for the cooperation of the primary and tertiary sector in Crete. It brings together the immediate producer with the place where his products will be consumed. At the event, a hotelier sits at a table with a producer and discuss about the needs and the demands in a possible agreement. In addition, the members of the forum have the opportunity to attend a product exhibition held by the producers in the space of the forum.

The remediation of this forum could take place with the transplantation at the virtual world. Virtual world and virtual teams expand the boundary that is set by the colocation need in physical collaborations. Computer-mediated teams have seen a tremendous increment in the past years because they can trespass the boundary of space and work in geographically distributed teams.

The design of this remediation in a computer-supporting-collaboration prototype system is the main theme of this paper. Different roles which the participants have, create additional boundaries in our approach. Therefore, the collaboration between different roles in our case study, will take place with the use of several boundary artifacts. Boundary artifacts are used as the glue which connects the different parts of the collaboration.

The paper is structured as follows: In Section II we examine the theoretical links and motivation, the lenses where we saw through to approach the problem and its solution. In Section III, we will present the foundation of our system and its architecture. Web 2.0 and its possibilities for interaction and collaboration are in the core of the system. The implementation and use case scenario will be discussed in the Section IV. In the last section, we discuss about the conclusions of this work and its aspects.

II. THEORETICAL LINKS AND MOTIVATION

A. Theories in CSCW.

J. Grudin and S. Poltrock identify four distinct roles of theory in CSCW: (a) There is some traditional theory development through hypothesis-testing, (b) A theory's use as a referent can support efficient communication among people familiar with its terminology and constructs, (c) A theory can motivate or justify system architectures or development approaches, and (d) Theory can serve as a guideline or checklist for researchers or systems developers [1]. C. Halverson defines four attributes that theories in CSCW should fulfill: (a) descriptive, (b) rhetorical, (c) inferential and (d) application power [2].

In the early 2000s, Distributed Cognition was examined as a new foundation for Human-Computer interaction. Through the lenses of distributed cognition theory, we can analyze the interactions between many different roles of a system, either a physical system or a computer-supported system. Distributed Cognition theory examines the cognition that takes place in a whole system, human and non-human. The boundaries that Distributed Cognition sets include cognitive process wherever it may occur in the system. It is an appropriate theory to examine the role of the technologies and the artifacts, under which circumstances and rules they interact with the human agent. A major issue in the distributed cognition is the representation that every participant perceives so he can fulfill his tasks [3][4].

Language-action perspective was presented by Winograd and Flores in 1986. They saw the perspective as the guide to generate questions for the designer to answer during the development of the system. The basic concept of LAP approach is that communication is the main motivation for people to act. It stands on Speech Act Theory which was brought by Austin (1962). Winograd and Flores made a basic example of a LAP diagram in which a participant in the system makes a request and another participant either accept or decline to commit or making a counter-offer to the first part. Making circles between the first and the second participant a conversation is taking place. This conversation can come to an end whether the goal of the communication is achieved or if it

cannot be fulfilled by one of the two parts. Using the language as an activity and not as the media to exchange information a LAP could support different scenarios in a collaborative work [5].

B. Virtual work, Roles and Agencies on human and non-human actors

Those representations and how the participants operate on them, is the main concern in Bailey's, Leonardi's and Barley's work. We refer to Virtual work, in general, when those digital representations "replace" physical objects, or represent different people and groups. Working with, on, through or within representations is the main categorization of the "how the work is done" by the authors. By "with" they mean the work between team members that operate with the digital representation of one to another via an e-mail or in a web-conferencing tool. By "on" they mean the work that is done on a distributed artefact among the team members, like a common spread sheet. In remote control virtual work authors introduce the "through" aspect of operation in which the technology is used to manipulate the digital representation and affect the real world. Finally, in simulation, according to authors, users operate "within" a representation so they can experience a real case scenario. In this case representation substitutes a real object or a person [6].

As we can conclude so far, digital representations refer to human or non-human agents. But what these agents are able to do? The capacity of action is a fact for human agent but there is also in non-human agents. Based on the design, materials have their own capacity to fulfill tasks based on the representations they perceive. As in real world, an organizer can inform the user about his free time, invoke him to use free time differently according to his needs, notify him about a future appointment or task. If it is a work organizer, it will act differently from a school organizer, for instance. Its purpose determines the way that the artifact will be designed and act, and it will determine material's agency [7].

In a collaborative environment, different groups and people get together to work around the same issue. Every participant has his point of view, his representation according to its role in the collaboration, its group role. It is clear that we import the sense of boundaries that split the different groups and their representations. Boundaries are enforced by the technology such as the registration and the account in a system or they are enacted to distinguish the different roles of the participants and their acts. Boundary artifacts are used to co-ordinate the participants and help them co-operate [8].

C. Social Translucence

People with same interests, in the same group, would appreciate the opinion of a co-participant. In the virtual world, it is not a fact that we can take in mind the acts of other participants. Social translucence in digital systems makes visible the social information. In virtual work, social awareness could lead users towards a specific direction, saving time. On the other side, users are responsible for their actions because they are known to the public [9].

III. PROTOTYPING AN E-COLLABORATION SYSTEM FOR THE PAN-CRETAN FORUM

The needs of an e-collaboration system could find answer in the theoretical frames that have been presented in the previous sector.

A. The roles at the collaboration

Three distinct roles are participating at the collaboration. Each one of them has different needs, make different decisions and acts.

1. THE FOUR CHAMBERS

The Pan-Cretan Forum is conducted by the four Chambers of Crete. The participants may be their members. Their role in the system is to supervise the consortium and analyze statistics about the event.

2. THE HOTELIERS

Hoteliers seek for the best Cretan products in the lowest prices. Hoteliers have interest on specific categories of products. To achieve this goal, each hotelier must meet with the local producers of those product categories, one at a time. This meeting must have a form of discussion and the ability of file-sharing.

3. THE PRODUCERS

Producers' goal is to make as many appointments as possible with potential clients (i.e. hoteliers). In those meetings, they can come to a deal. In addition, they can exhibit their products. Producers also have been tagged with specific categories of goods that they produce.

B. The Boundaries of the system

The design of the system, consists of different boundaries the users have to cross in order to collaborate (see Figure 1).

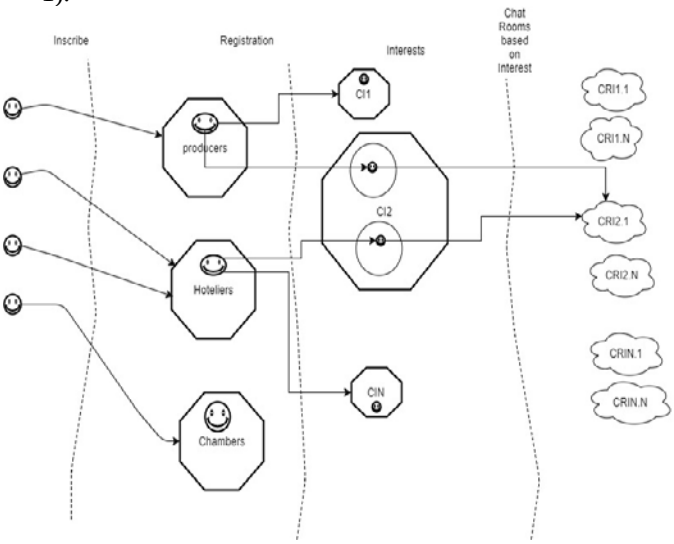

Figure 1: Boundaries spanning scheme

The inscribed boundary, requires a digital account in order to be trespassed. It is the main border that whoever crosses it

for the first time, has to select his role in the Pan-Cretan Forum as it is presented above.

The second boundary is about the grouping based on interests. Hoteliers with interests on specific products are grouped with the equivalent producers. Hoteliers may have multiple interests so they can participate in more than one groups simultaneously. The same stands for the producers.

The third and last boundary refers to the one-to-one meetings between producers and hoteliers from the same common group of interest.

C. Boundary Artifacts

1. Scheduler

Scheduler is a distributed artifact among the participants. From the hotelier point of view, its purpose is to organize the appointments in the given time. Also scheduler notifies the hotelier for the upcoming appointments.

Producer's representation of the scheduler has a different purpose, mostly. It notifies the producer about the free time-slots for an appointment with hoteliers who are interested on his products. Similarly, it is also a notification mechanism for the upcoming meetings.

A Dialogue for Action can be used to describe the interaction between the participants. The producer interacts with the empty slot on the hotelier's timeline and request for an appointment. The hotelier can either accept the appointment or reject the request. Until the meeting is conducted both, hotelier and producer, have the ability to withdraw to their obligation for a meeting (see Figure 2).

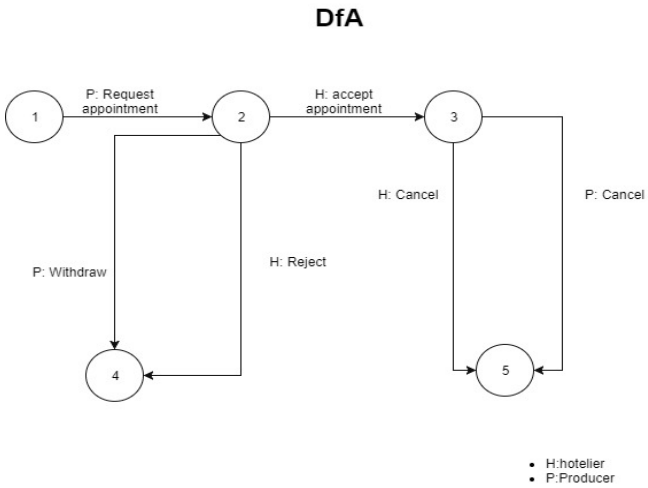

Figure 2: DfA for Scheduler

2. Chat Rooms

The meetings take place through Chat Rooms. When an appointment is on time, the producer and the hotelier could attend a virtual room where they can interact. An instant messaging mechanism and a file-sharing mechanism are used for communication.

Chat Rooms support tagging mechanism so the collaborators can mention the emergent themes of their conversation.

3. Forum overview

Chambers operates as a supervisor of the forum. They gather information about the meetings and the deals that have been made. Forum overview is used to visualize the information, interests and emergent themes, which have been created in Chat Rooms.

D. Social Translucence

Social awareness could be very useful to hoteliers and producers. Every participant is being evaluated by the people he had been in touch with. The total rank helps a hotelier to prefer a meeting with a highly ranked producer and vice versa. A high rank implies better products or prices, or a prudential interlocutor.

Social awareness is also used in exhibition area to show endorsement on a specific product of a farmer.

Social translucence is used in the main entrance to inform the incoming user about the number of the participants. This mechanism promotes the prestige of the forum.

IV. CASE STUDY IMPLEMENTATION

For the needs of this work, a prototype is designed and developed for the implementation of the Pan-Cretan Forum.

To cross the first boundary, each user has to sign in the system (see Figure 3). Sign in with Google, Facebook or twitter account can be also used for the entrance to the system.

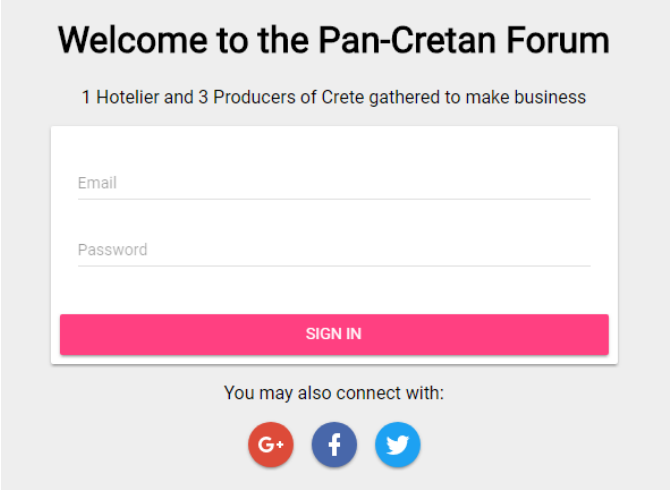

Figure 3: Sign in

A registration (see Figure 4), since one of the three roles that we described in the previous sector, is necessary to distinguish the users. The subscription to main interests is also used to group users. For instance, a Hotelier who is interested in tomatoes will be grouped with the producers of tomatoes, etc.

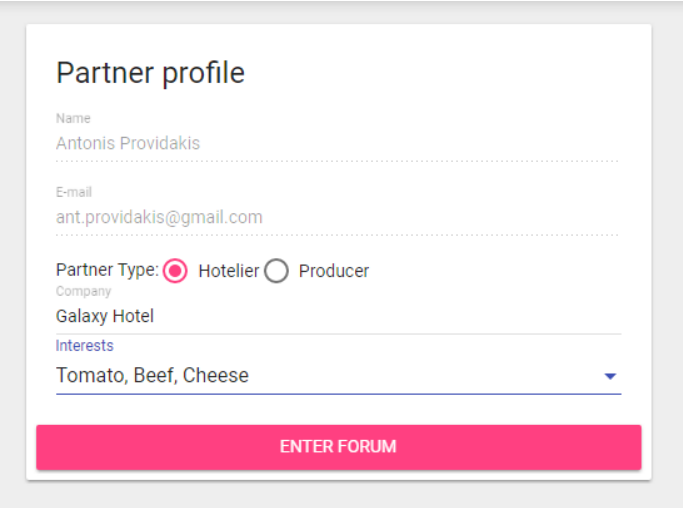

Figure 4: Registration

The product exhibition lives in the main area of the Web-App (see Figure 5). Every user can browse around based on his interests or products. Social awareness in a heart form (i.e. social like) is used to give rank on products and producers. Also, on the right side a short presentation of the scheduler reminds the user for the upcoming meetings.

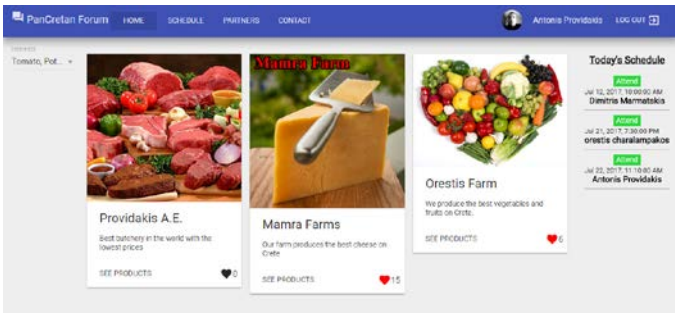

Figure 5: Exhibition area and "today's schedule" mechanism

Scheduler is used for the arrangement of the meetings. It is "standing" between a Hotelier and a producer. A producer can interact with a free time-slot at the scheduler to make a reservation for an appointment with a hotelier (see Figure 6).

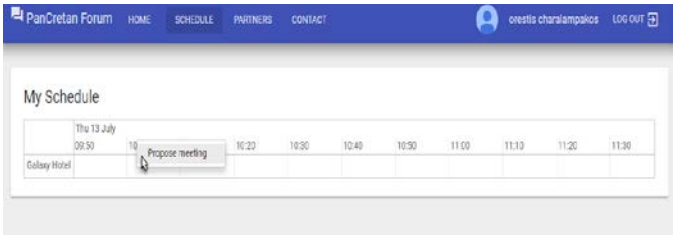

Figure 6: Scheduler from producer's point of view

Hotelier can either accept or reject the proposed meeting.

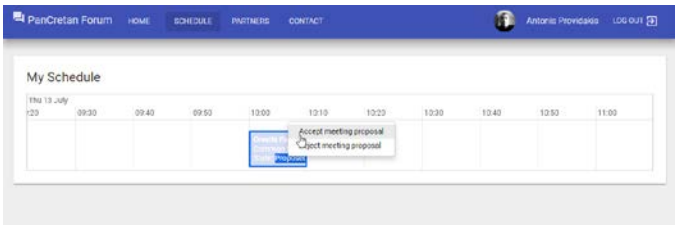

Figure 7: Scheduler from hotelier' s point of view

Chat Room is another distributed artefact of the system. It is the intermediate in the communication of the participants. The communication takes place with a Chat Room. They can exchange instant messages, share photos and other media. The tagging mechanism is used to tag each meeting/conversation with the emergent themes that were discussed along with the main interests (see Figure 8).

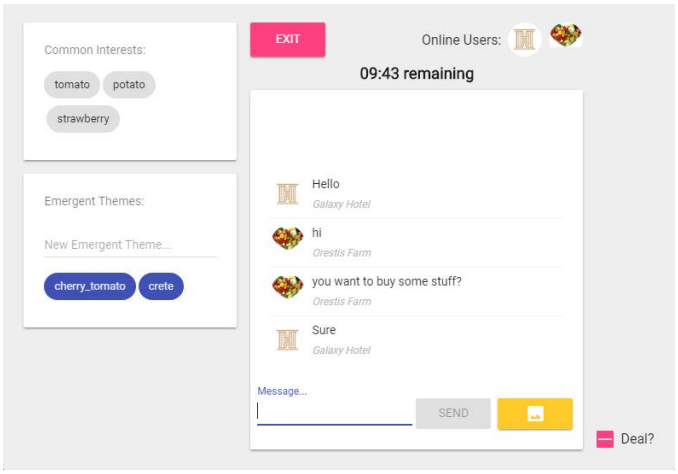

Figure 8: Chat Room

The participants also operate on a "Deal" checkbox to submit the outcome of their appointment. The outcomes of the meetings could be used by Chambers to examine the results of the Forum.

Chambers use the forum overview to gather the emergent themes of the forum. Through this representation the user "Chamber" has the perception of capability. A Tag Cloud visualises the themes that have been discussed in the meetings (see Figure 9, top). Community network shows the participation on the forum and its associations (see Figure 9, bottom right). Pie chart summarize the number of meetings that ended to a deal (see Figure 9, bottom left).

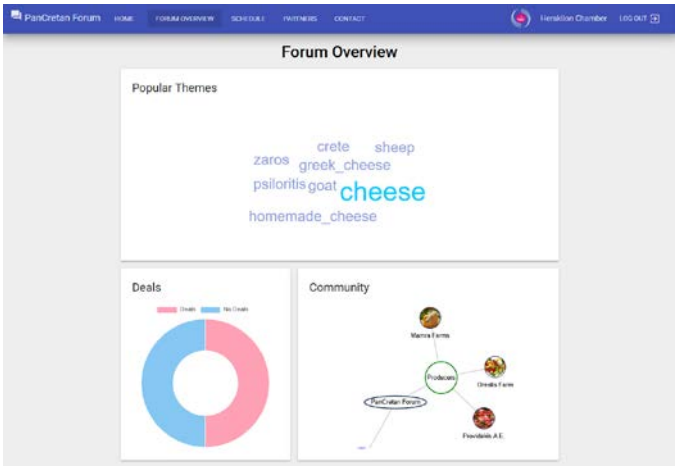

Figure 9: Forum Overview

V. Discussion and Conclusions

The main subject that we examined in this paper was the use of boundary artifacts in an e- collaboration system. Pan-Cretan Forum was an appropriate example which includes many different roles and approaches.

The implementation of this system was made by developing embedded boundary artifacts. Those artifacts were used by the participants to operate with them, on them, and through them so they can fulfill the collaboration.

References

[1] Grudin, Jonathan, and Steven Poltrock. "Taxonomy and theory in computer supported cooperative work." The oxford handbook of organizational psychology 2 (2012): 1323-1348.

[2] Halverson, Christine A. "Activity theory and distributed cognition: Or what does CSCW need to DO with theories?." Computer Supported Cooperative Work (CSCW) 11.1 (2002): 243-267

[3] Hollan, J., Hutchins, E., & Kirsh, D. (2000). Distributed cognition: toward a new foundation for human-computer interaction research. ACM Transactions on Computer-Human Interaction (TOCHI), 7(2), 174-196.

[4] Nardi, Bonnie A. "Studying context: A comparison of activity theory, situated action models, and distributed cognition." Context and consciousness: Activity theory and human-computer interaction (1996): 69-102.

[5] Winograd, Terry. "A language/action perspective on the design of cooperative work." Human–Computer Interaction 3.1 (1987): 3-30.

[6] Bailey, D. E., Leonardi, P. M., & Barley, S. R. (2012). The lure of the virtual. Organization Science, 23(5), 1485-1504.

[7] Emirbayer, M., & Mische, A. (1998). What is agency?. American journal of sociology, 103(4), 962-1023.

[8] Akoumianakis, D. (2014). Boundary spanning tactics and "traceable" connections in cross-organizational virtual alliances: A case study. Journal of Enterprise Information Management, 27(2), 197-227.

[9] Erickson, T., & Kellogg, W. A. (2000). Social translucence: an approach to designing systems that support social processes. ACM transactions on computer-human interaction (TOCHI), 7(1), 59-83.