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WantEat: interacting with social networks of smart objects for sharing cultural heritage and supporting sustainability

L. Console and G. Biamino and F. Carmagnola and F. Cena and E. Chiabrando and R. Furnari and C. Gena and P. Grillo and S. Likavec and I. Lombardi and M. Mioli and C. Picardi and D. Theseider Dupré and F. Vernerio¹ and R. Simeoni and F. Antonelli and V. Cuciti and M. Demichelis and F. Franceschi and M. Geymonat and A. Marcengo and D. Mana and M. Mirabelli and M. Perrero and A. Rapp² and F. Fassio and P. Grimaldi³ and F. Torta⁴

Abstract. *WantEat* is about interacting with everyday objects that become intelligent hubs for accessing and sharing the cultural heritage of a territory. Objects are smart in the sense that they share knowledge with users, interact with them in a personalized way and maintain social relationships with users and other objects. When interacting with an object, a user is also introduced to the social network of its friends; the user can explore this network to discover new interesting information, services, objects, people. The objects we consider belong to the realm of gastronomy, including food items, shops, restaurants, cooks, recipes, etc. On the one hand, this allows people to get deeply in touch with the culture of a territory, making people aware of its traditions and supporting a sustainable gastronomy; on the other hand, the approach supports networking and the promotion of local quality productions and economy.

1 The PIEMONTE Project

The PIEMONTE project originated from the idea that socially smart objects could play the role of gateways for enhancing the interaction between people and a territory with its cultural heritage. If objects could speak they could tell people about the world around them, the place where they are, its history and traditions. This world is made of relationships involving people and other objects, which evolve along time, given the social activity of the objects. The objects we are interested in are those from the realm of gastronomy, including food products, market stalls, restaurants, shops, recipes, as well as geographic locations and actors such as cooks, producers, shop owners, etc. Interacting with a food product (e.g., a bottle of wine) is a way of getting in touch with the cultural heritage behind that wine, made of stories and traditions, and with its social network, made of a territory, grapes, producers, shops as well as people who talked of it or who liked it, recipes well matched with it, other products (e.g., a cheese the wine is traditionally drunk with). Thus the idea is to build a new model of sustainable gastronomy, where people are aware of the territory they live in or visit, of its resources, history, traditions, of the good, clean and fair food coming from the territory and of the actors

¹ Università di Torino, Dipartimento di Informatica, Italy, email: lconsole@di.unito.it

² Telecom Italia, Reserach and Prototyping, Italy, email: rossana.simeoni@telecomitalia.it

³ Università di Scienze Gastronomiche, Italy, email: p.grimaldi@unisg.it

⁴ Slow Food, Italy, email: torta@slowfood.it

and the processes in the food chain; a model where biodiversity is preserved and where networks of actors can share experiences. The project produced a number of significant results. In this paper we will discuss *WantEat*, a suite of applications that we developed and experimented in field trials.

2 WantEat

WantEat is a suite of applications we designed for achieving the goals discussed above. It includes: *WantEat mobile*, a smartphone application for interacting with social networks of smart objects; *WantEat Web*, a web companion application; *WantEat Back-shop*, an application for stakeholders to get feedback about objects' and users' behavior; *WantEat video*, a tablet version of *WantEat mobile*, focusing also on multimedia information. The applications connect to a *WantEat application server* where object intelligence is implemented. In the following we focus on the mobile application and on the server (for more details see [1] and <http://www.piemonte.di.unito.it/>).

2.1 WantEat-mobile

WantEat-mobile is a smartphone application that introduces a novel and peculiar paradigm for supporting the user interaction with social networks of smart objects. This interaction is made of two main phases: getting in touch with an object, and interacting with it to share information and explore its social network.

Getting in touch A basic assumption of our project is that infra-structuring of the environment must be minimized. We aim at supporting interaction with everyday objects, with no embedded electronics or tags. Thus, we developed a number of ways of creating the contact between a user and an object (fig. 1(a)): (i) *Taking a picture*: The user frames the label of a product with the camera; the label is recognized (fig. 1(b)); (ii) *Geopositioning*: The user can start the navigation by getting in touch with a place (e.g., a village) and thus with the objects related to the place, i.e., the objects around him; (iii) getting a *Recommendation*; (iv) searching or (v) exploring bookmarks.

Interacting with the object and its world: The wheel. Once a contact with an object has been established, the user can interact with it and access its social network. Since we aim at using objects as gateways for accessing the cultural heritage of a territory, we designed an interaction model which allows users to explore the world starting



Figure 1. Example of the wheel on an iPhone.

from a contacted object. We developed a “wheel” model (fig. 1(c)), where the wheel can be seen as the square of a village, i.e., the traditional meeting place; here the user can interact with the object and its friends, exchanging information and knowledge, being introduced to and exploring their social networks.

The object the user is interacting with is in the centre of the wheel. The user can get in touch with it by simply touching it. The selected object tells the user about itself, providing both general knowledge and information synthesized from the interaction with other people (including tags, comments, ratings) (Figure 1(d)). The user can, in turn, tell something to the object: in particular, she can add her tags, comments and ratings or can bookmark the object (Figure 1(g)). These actions contribute to (i) adding the information to the object in focus and (ii) influencing the social relations between objects.

As described above, the object in focus is surrounded by a wheel (Figure 1(c)) that provides access to the social network of its friends (both people and objects). Each friend belongs to one of four sectors; the partition into sectors depends on the object in the center. In the example in Figure 1(c), the object in focus is a food product; the first sector “Territorio” (Territory) contains the friends related to the territory, the production and supply chain (e.g. producers, shops, production places, etc.). The sector “Persone” (People) contains people that are friends of the object in focus (e.g. people who bookmarked it or who wrote a comment on it); the sector “Prodotti” (Products) contains other food products that are friends of the object in focus (e.g. a wine that goes well with a cheese); the sector “Cucina” (Cuisine) contains entities related to cuisine, such as restaurants, recipes, etc.

Each sector can be expanded by touching it; the expanded sec-

tor fills the screen and the items in the sector are displayed as small circles in a ring (see Figure 1(e), where the “Territorio” sector is expanded), similar to the dialer in an old style telephone. The items are ordered based on the user model and on their type (maintaining items of different types and preferring those more suitable for the user). The items can be explored by rotating the ring, in the same way as dialing on the old style telephone. One item at a time is enlarged and the relation it has with the object in focus is highlighted in a small box. See again Figure 1(e), which shows that the object in the center of the wheel (miniaturized in the bottom right corner of the screen) is produced in (“prodotto in”) the place (“Valle di Lanzo”, i.e. Lanzo valley) enlarged in the sector. Information about the enlarged item can be displayed by touching it. The user can continue exploration by changing the object in focus. This can be done by simply dragging the enlarged item toward the wheel miniature in one of the corners (Figure 1(f)). At this point the whole wheel is recomputed and displayed to the user.

Evaluation with users. We adopted a user-centered approach involving end-users since the early stages of the project. Stakeholders have been involved during the requirement phase. Prototypes of the applications have been tested with users during design. In October 2010 the system has been presented at the Salone del Gusto (an event organized by Slow Food in Torino every two years, with about 200000 visitors). Users could borrow smartphones and test the application. We analyzed users’ behavior and collected 684 questionnaires getting positive evaluations. In September 2011, a second evaluation was performed at Cheese 2011, a food fair focusing on cheese. About 150 users, with the application installed on their smartphones, participated to a treasure hunt game to discover some specific cheeses and their territories. Also in this case the feedback was positive. Details of the results of the evaluation can be found on the project web site.

Object intelligence: the application server. Object intelligence has been obtained by combining in an appropriate way different AI technologies, ranging from ontologies (making objects aware of their properties and allowing them to link with similar objects) to user modeling and adaptation (allowing objects to personalize their interaction with each individual) to automated generation of social relations (allowing objects to dynamically create social relationships among each other) to recommender systems (allowing objects to provide recommendations to users).

3 Conclusions

AI technologies played an important role and were critical for the success of *WantEat*. On the one hand, the focus on natural interaction and the design of a playful interaction model were appreciated by all the users; on the other hand, the mix of technologies we adopted in order to make objects socially smart contributed to the richness of the interaction between people and objects. Particularly interesting is also the use of ontologies as the common layer supporting many reasoning tasks. In this sense we think that our application can be regarded as a model of the use of advanced AI technology for supporting sustainability of a territory, favoring the participation of all the actors, promoting cultural heritage and supporting networking among people, which were the initial goals of our trajectory.

REFERENCES

- [1] L. Console et al., ‘Interacting with social networks of intelligent things and people in the world of gastronomy’, *ACM Trans. on Interactive Intelligent Systems*, (conditionally accepted for publication 2012).