Planning Social Activity in SmartRoom: Ontology-based Service Design

Andrey Vdovenko*, Dmitry Korzun*†
*Petrozavodsk State University (PetrSU), Petrozavodsk, Russia
†Helsinki Institute for Information Technology (HIIT) and Department of Computer Science and Engineering (CSE),
Aalto University, Helsinki, Finland
{vdovenko, dkorzun}@cs.karelia.ru

***Abstract*—The SmartRoom system provides a set of services for collaborative work in a room. We extend the service set to support scenarios for planning social activity by SmartRoom participants themselves. Our solution uses Smart-M3 platform and its ontology-based development mechanisms.**

SmartRoom system [1] assists such collaborative work as conference or meeting organized in a digitally equipped room. SmartRoom space provides a common storage for sharing information from many sources. The shared information is semantically related using the RDF model from the Semantic Web. SmartRoom space is implemented based on Smart-M3 platform [2]. The system design supports dynamic construction of services and their delivery to users can follow a personalized and proactive style [3], [4].

For the conference case, participants arrive from different regions. On one hand, organizers are interested in information on the participant geographical diversity. On the other hand, participants are interested in famous places where the conference is held. An important issue for organizers and participants is to make a plan—an agreed program for social activity. We develop supporting services (tourist services), which augment the set of SmartRoom services. Consider the following two scenarios for use in SmartRoom.

Scenario 1. Participant geography. Participants come into the conference room and start their SmartRoom clients. Each client provides certain personal information about its user (user profiles), including regions she is from. SmartRoom accumulates the variety of regions and makes web-oriented search of popular pictures/photos for each region. The links (URL) are stored in the SmartRoom space, providing semantically-oriented information for further use by SmartRoom services. For instance, Agenda-service and Presentation-service display some pictures in the context of current speaker. On the client side, users can browse dynamically generated HTML pages with a list of regions and associated pictures to analyze the geographical diversity of participants. Another example service is a scalable map with associated pictures.

Scenario 2. Planning social activity program. SmartRoom collects points of interests (POIs) nearby. Participants use their clients to browse the POIs with pictures and other tourist-aware information. Each participant can make decisions on her plans related to the social activity of conference: which places are of her interests as well as time of possible visit. It implements a kind of voting or ranking, and the results are used to construct the whole social program. The process is iterative: a participant updates her decision depending on observable decisions from others. Based on the collected decisions the organizers (e.g., chairman) finalize the social program construction. The result is 1) which groups to which places have been formed, 2) timetable, and 3) transfer support.

Importantly that the scenarios assume semantic relation of heterogeneous multi-source information. For instance, in addition to pictures, historical information can be associated with POI. Photos from social networks can be retrieved for given POI coordinates and radius. Relation of a given POI and participant's region can be identified, e.g., the architect of the building was from certain country. This type of relations is realized in a localized manner, in the SmartRoom space.

Consider an example of such semantic relations. Let the conference be held in Petrozavodsk. Participants are coming to the room, and the SmartRoom system assists the conference session. Each participant shares some personal information about herself, including the country (e.g., Finland, Oulu or Italy, Bologna). Using external services, SmartRoom can find

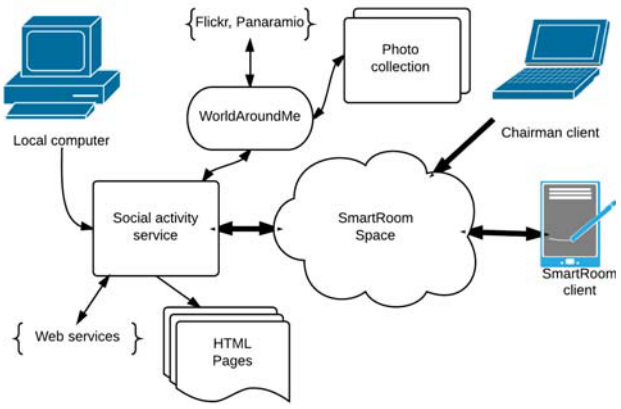

Fig. 1. Architectural scheme for Scenarios 1 and 2: Use of existing tourism-oriented applications and context-aware HTML page generation

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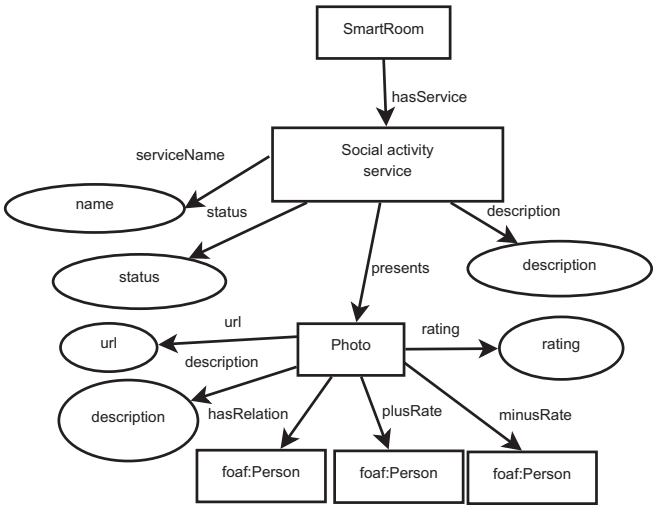

Fig. 2. Ontology for a tourist service

historical references about those places collected from the participants. Also, some similarities can be analyzed in the SmartRoom space. An example relation is when a POI is nearby where a famous person from Oulu lived and a participant is from Oulu too. This relation can be easily kept using the SmartRoom ontology. Another example is when a POI is nearby that matches with some interests of a participant, e.g., POI is a chess museum and the participant is a chess player.

Our architectural scheme for the scenarios is shown in Fig. 1. For an example, the functionality of World Around Me (WAM) application [5] is used for searching photos in social networks. Hence a tourist-aware service 1) makes requests using WAM, 2) generates HTML pages with found pictures, and 3) publishes URLs for clients. Chairman controls the process if needed. Clients subscribe to the service-generated content and deliver it to the users.

At recent development phase we focus on Scenario 2. Ontology-oriented Smart-M3 SDK is used—SmartSlog [6]. We use C# as a basic programming language. The .Net framework supports object-oriented design and has a lot of advanced libraries. Function of searching photos we inherit from WAM [5], thus using Flickr (www.flickr.com) and Panoramio (www.panoramio.com) as public photo collection services. Search is possible for given coordinates and radius.

A tourist-aware service runs on a local computer in the room. At startup the service registers itself in the SmartRoom space. Chairman (on behalf of organizers) can always control the operation from his client: configuration and input data parameters.

The service representation in SmartRoom space follows the ontology depicted in Fig. 2. It extends the core properties of SmartRoom services with object property *Photo*. The property keeps URL of a photo and its description. Importantly that the property supports semantic links between photos and participants. The latter is characterized by source region (Scenario 1) and personal decisions on the social activity program (Scenario 2).

Our initial design supports inclusion of various tourist services into the SmartRoom service set. The key point is diversity of tourist-related information that such services are ready to provide. As one of the best candidates, we consider TAIS system [7]. It realizes an intelligent guiding service suggesting nearby attractions based on the tourist preferences and current situation in the region

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