Portraying individual and group experiences

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Abstract. This position paper describes the use of a radio frequency identification system to support group awareness. We collect location data of group members working on a certain floor in a building. The acquired spatial data is used to derive abstract online representations, which provide a context for the group members' own activity. We focus on three application scenarios that show different use of location information to portray individual as well as group experiences for a community of co-located workers.

1 Introduction

The radio frequency identification (RFID) is very promising, because it is an unobtrusive, practical, cheap, yet flexible technology [1]. There is an expectation of 8 billion tags in the EU in 2008. Access control, animal identification, immobilizer systems, and production processes are current application areas. We explore the possibilities of RFID systems in the area of computer supported cooperative work and focus on the provision of awareness about ongoing activities in an office environment.

RFID is promising, because it supports the automatic acquisition of certain activity information of group members and it avoids the unequal distribution of additional work within the group [2]. Activity information is often visualized and conveyed to group members in 2d graphics. PeopleGarden [3], for example, uses the flower metaphor to create data portraits of individual users and their activity on a message board. The garden metaphor combines these data portraits to represent the overall online environment. Viégas [4] studied the dynamics of Wikipedia, presents the change of articles in the history flow visualization, and discusses collaboration patterns which have appeared in the visualizations.

2 Acquiring Location Data

The configuration of our RFID system consists of a few reader units in master slave architecture. We started our experiments with five readers. One reader is selected to be the master. The master communicates with the other readers. Communication between tags and readers takes place by inductive coupling. The tags we were using were about coin size and could be easily attached to a bunch of keys.

If a user carrying a tag passes by several readers, then the distance between tag and readers could be estimated. Due to the disturbance of the magnetic field in office environments, this estimate is not precise. Therefore, we acquired a lot of test cases, where we exactly knew the distances from tags to readers. The comparison of these test cases with the measured distances (similarity) results in a sufficient precise prediction of the tags location data [5]. Fig. 1 visualizes location data on a floor plan.

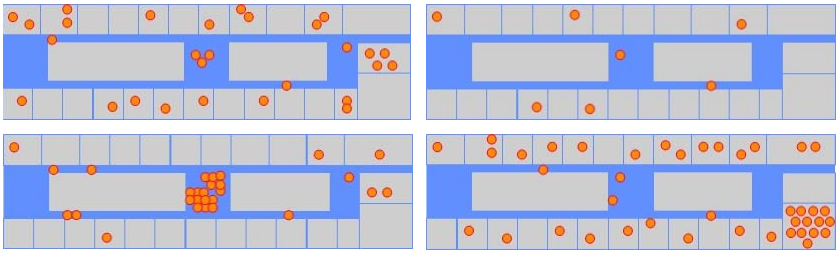

Fig. 1. Four distributions of people on a floor (idealized). The location data is used to generate abstract representations

3 Application Scenarios

Have I forgotten to participate in a meeting? Is there a celebration going on? Is there a chance to meet colleagues at the coffee machine? Such questions and similar ones could be answered easily using current location data combined with the ‘usual purposes of rooms’ (interpretation) stored in a knowledge base.

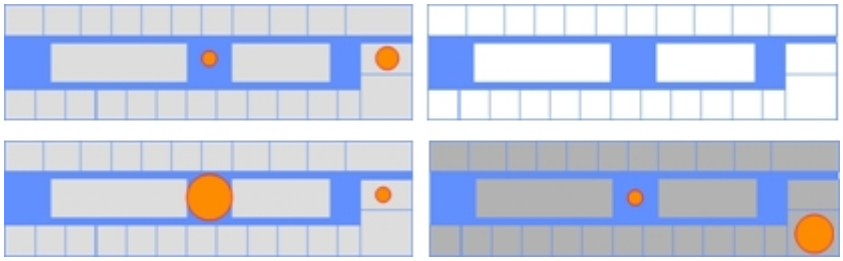

Fig. 2. Indication overall occupancy rate, events, chance encounters, and meetings

Fig. 2 shows a floor plan indicating the overall occupancy rate and ongoing ‘meetings’. Gray scales are used to indicate different occupancy rates (25%, 50%, 75%, 100%, and more than 100%). Circles of different sizes indicate a gathering of people. The size of the circle is altered according to a classification of the number of peoples (at least 2, but at the most 3, 5, 10, 15, etc.). Tool tips, which are activated, when the user moves the mouse over a circle, show a short textual message. Examples are: ‘About 3 colleagues are meeting at the coffee machine’ and ‘Large meeting in the seminar room’.

In the second application scenario the history of location data is used to derive movements of individuals as well as groups. Which places are most often visited by nearly all colleagues? Answers to this question provide hints for the placement of important information that could be displayed in these busy places. The display of movements could also help in deciding for well-placed labs, seminar rooms, etc.

What was my personal path, when I visited a certain institution? Think of a visualization that shows the path on the floor plan enlarged according to the time spent in the different locations. This presentation could help to remind oneself of interesting exhibits, chance meetings, or lab visits.

The replay of activities is the third application scenario. It provides a condensed overview of what has happened today or other certain time periods. In the TOWER project [6] DocuDrama [7] was developed, a tool that replays activities in an online collaborative environment. The online environment is represented as a landscape, different containers and objects are coloured differently and located according to space syntax rules [8]. The group members are represented by avatars, which enact the events occurring in the online environment. The avatars are placed on the areas, where the action took place (c.f. Fig. 3). There are several filter mechanisms which can be employed to provide a condensed and interesting story.

Fig. 3. TOWER landscape with avatars replaying actions that took place in an online collaborative environment

Similarly, the location data could be a basis to present short stories about workers and visitors in an office environment. This presentation use data on movement, paths, and time spent in certain locations to show overviews of what has happened yesterday, today, or last week. Such visualizations could help to answer questions like: What is the best time to meet someone at the coffee machine in the afternoon?

4 Conclusion

In this paper we have presented three application scenarios that visualize graphically ongoing activities in an office environment. Basis for the visualizations are location data which is acquired by an RFID system. The resulting visualizations could be conveyed to the members of the office environment or could be displayed in the office environment itself. In the latter case, additionally meeting places are introduced into the office environment, which further foster knowledge exchange and community building.

One advantage of the RFID system for all application scenarios is the automatic capturing of information (no additional effort for users is required) about the

cooperative environment. This information is used in visualizations to provide a context for the users own activity. A drawback of the approach is the disclosure of personal data, which is alleviated by their imprecise nature. A model of reciprocity could be used to lower privacy concerns. We recommend a participative design process and methods from CSCW to design and evaluate such systems.

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