

POSITION PAPER

The deployment of a location tracking system in an office environment: a multi method evaluation.

This position paper deals with a number of topics mentioned in the call for proposals. Overall it describes an experience from conducting a case study of the deployment of a location tracking system in an office environment. A mixed method approach is used and described to study the deployment. A comparison is made between manual observation methods and the location data gathered by the system, to study situated interactions. The user experience of the technology is described through the results of in-depth interviews conducted before and after the technology deployment. Finally benefits and shortcomings of the fieldwork are discussed in the context of the discussion “perfect versus degraded environment”, or the tension between lab based technology deployments and the real world test.

This document outlines the findings of a detailed case study conducted at the headquarters of Nationwide, Swindon, UK during summer 2005. Observations, in-depth interviews and examination of location tracking data were used to build a detailed, both qualitative and quantitative, picture of work interactions and of how attitudes and behaviours are affected by the deployment of a pervasive technology.

We present here the attempts to answer to two questions: *what can location technologies tell us about interaction in the workplace that we can not extract with currently used methods and tools?*, and, *how do workers experience the deployment of a location tracking system in their office environment?*

Investigating the first question implies to pin down the granularity (duration, spread area and location) of social interaction activities in the workplace; to do that we analyse and compare results of manual observations and the location data set gathered by the system. To deal with the raw XYZ data, we have written a program in MATLAB, that isolates different kinds of interaction. We aim to identify patterns of behaviour which, when aggregated, through time, can help us to link social interaction, the spaces where it happens and, hopefully, effectiveness in the workplace.

We also explore attitudes of the workers participating in the study to provide a context in which to analyse the impact of a location tracking system in the relationship between workers and the social dynamics they build through and around their physical environment. To do this we use in depth interviews.

Limitations of the research approach and “open up” issues are outlined for discussion.

The Case study: Nationwide Smart Space pilot study

The Organisation

Along June and July 2005, we conducted a detailed case study at the headquarters of Nationwide, Swindon, UK. Nationwide is one of the biggest financial institutions in the UK. As with many others, Nationwide is today faced with a changing and competitive market in which technology can provide an advantage; thus, technological awareness is a priority for Nationwide and other such businesses. Accurate real time location and tracking technologies are of particular interest to large organisations such as Nationwide. Knowing, in real time, the location of their workers gives companies “the option of measuring, understanding, monitoring and managing their buildings better and the chance to investigate the relationships of the building to the day to day experience of each employee over time” (quotation from a Nationwide internal document).

The Smart Space pilot project

Nationwide set up a highly ambitious and novel technology pilot project in 2005 that continued in 2006, The Smart Building Project. The project had three operational phases:

- Phase I: Install and test a passive RFID security system to monitor numbers of staff moving in and out the pilot area.
- Phase II: Test and apply 'tags' to assets and link the individual tags to cross reference of ownership.
- Phase III: Install and test a location tracking system using active tags and Ultra-Wide Band radio signals to monitor the position and movement of staff within the pilot area.

This paper focuses on the study of the deployment carried out in phase three, in which we studied the spatial and social arrangements surrounding the introduction and deployment for six weeks of an UWB system. We report on the different methods we used to investigate the socio – spatial fabric of the office environment and the conclusions we obtained.

Tools and examples

To analyse the interviews conducted we used N-Vivo. To analyse and map the observations and the location data analysis we used MapInfo Professional, a popular GIS commercial software. Some examples of the latest are included.

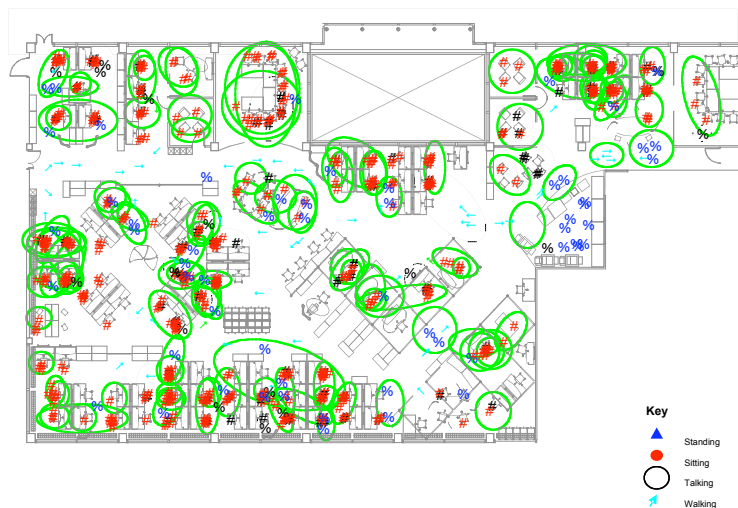


Figure 1 – Manual observation mapped: all observed activities aggregated

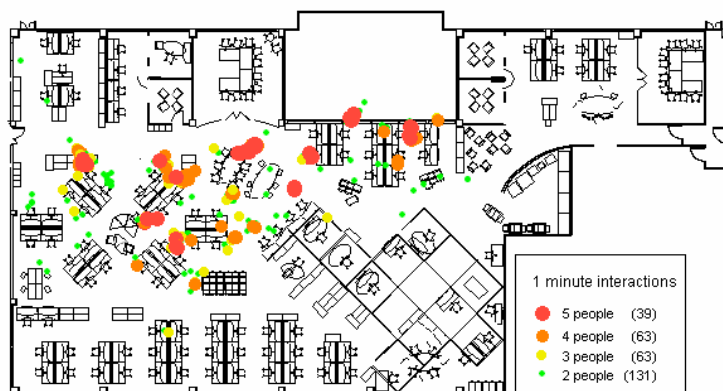


Figure 2 – MATLAB analysis mapped: 1 minute interactions involving cluster of 2,3,4 and 5 people.