## Chapter 2.5

# Creating Social Technologies to Assist and Understand Social Interactions

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## ABSTRACT

In this chapter the authors discuss a particular approach to the creation of socio-technical systems for the meeting domain. Besides presenting a methodology this chapter will present applications that have been constructed on the basis of the method and applications that can be envisioned. Throughout the chapter, illustrations are drawn from research on the development of meeting support tools. The chapter concludes with a section on implications and considerations for the on-going development of social technical systems in general and for the meeting domain in particular.

*Assimilation into the Borg Collective might be inevitable, but we can still make it a more human place to live.*
*—Pentland, 2005*

## INTRODUCTION

Socio-technical computing inherits the complexity related to software engineering and system integration whilst embedding the human in the loop. It also inherits the difficulties of understanding and modeling human-human and human-computer interaction in the context of a changing environment (see Clancey, 1997). In this chapter we will outline an approach to the development of Social

Technical Systems, with the focus on meeting support. This approach can be characterized as theory-informed data-driven. In essence the method consists of the following four steps.

- **Step 1:** Collection of a multimodal corpus of social activity signals
- **Step 2:** Description of a myriad of aspects of system relevant activities (annotation) in the collected material
- **Step 3:** Discovery of interdependencies between recorded signals and annotations, annotations and annotations, and signals and signals (e.g. by means of machine learning.)
- **Step 4:** System creation based on knowledge obtained from the previous steps

In the collection and annotation steps, the process relies heavily on the insights provided by the social sciences; in particular sociology, social psychology and linguistics. In return, the annotated collection and the machine learning effort may provide important insights for social theorizing as the annotated corpus provides the researcher with statistics about the occurrence and distribution of certain phenomena and interesting correlations. Increased insight into how people behave can point out problems they encounter in their activities that may be relieved by technologies that are based on this understanding of their activities as derived through Steps 1 to 3. This means that these steps can be viewed both as a way into requirements engineering and as providing the basic data and algorithms to build the tools that can solve some of these problems.

Technology that inherits these possibilities can be said to be social for three reasons. The first is in the way in which the system supports social activities. The second relates to the way the technology can provide insight into social processes which occurs when correlations between phenomena are found. The third reason in which the qualifier *social* relates to the term *technical*

*system* is in how social theories are at the basis of the construction of the technical applications. Given theories on how humans 'operate', technology is equipped with the manual in order to understand and support their operating.

As example case for this chapter our focus is on small business meetings. Currently several projects worldwide are investigating the way technology can support the needs of people in meetings and how it can relieve them of some of the frustrations that meetings seem to impose upon them. Examples in this chapter will be drawn mainly from studies in a series of European projects on meeting analysis and meeting support: M4, AMI, and AMIDA. These projects investigated how human-centred computing techniques can detect and interpret activities of participants in smart meeting rooms and how these techniques can be used to design tools that support meeting participants in their encounters and activities.

This chapter discusses a variety of methodological issues and charts several results showing the rationale behind the scientific drive to develop technological support for social gatherings and events. The chapter also contains a short discussion on ethical issues and potential pitfalls on the road ahead.

## MACHINE INTERPRETATION OF HUMAN ENCOUNTERS

When humans interact, they use their natural skills to sense and interpret signals in the environment in such a way that specific behavioural responses result. In any social encounter, including meetings, every person displays both consciously and unconsciously a pattern of verbal and nonverbal behaviour, which when recognized, reveals his view of the situation and shows information about his internal assessment of the other participants (Goffman, 1955). Recognition and retention of behavioural regularities and patterns identifies opportunities, and can be turned into new insights,

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