Chapter X

Social Coordination with Architecture for Ubiquitous Agents — CONSORTS

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ABSTRACT
We propose a social coordination mechanism that is realized with CONSORTS, a new kind of multi-agent architecture for ubiquitous agents. By social coordination, we mean mass users’ decision making in their daily lives, such as the mutual concession of spatial-temporal resources achieved by automatic negotiation of software agents, rather than by verbal and explicit communication directly done by human users. The prerequisite infrastructure for such an electronic negotiation mechanism is a multi-agent architecture for ubiquitous agents that are grounded in the physical world, by which software agents can trace users’ moving history, understand their intentions and preferences, and negotiate each other, all while protecting users’ privacy through temporal identifiers. The functionality of social coordination is realized in the agent architecture,
where three kinds of agents work cooperatively, i.e., a personal agent that serves as proxy of the user; a social coordinator working as a service agent; and a spatio-temporal reasoner. We also summarize some basic mechanisms of social coordination functionality, including stochastic distribution and market mechanisms.

INTRODUCTION

Social coordination is observed in many scenes in our daily lives. People give way to each other when they happen to pass in a corridor or on the road even if they have not met before. And, when purchasing a train or plane ticket, people often give up their position in line to a really hurrying person. In this chapter, we handle the problem of how such social coordination can be realized as an information service by cooperative software agents that are embedded in social infrastructure.

Based on the rapid development of information technology, we can expect that highly-distributed information processors and sensors will be linked by a network. And, in the near future, they will be grounded to the physical world and embedded in social infrastructure, e.g., rooms, buildings, streets, and roads. In such environments, called ubiquitous or pervasive computing environments, one of the keys to providing several kinds of services for people and society is software agent technology.

The purpose of this research is to show a way to realize a social coordination mechanism in daily life through cooperating agents. By social coordination, we mean automatic negotiation by software agents working as a proxy for users, as opposed to the explicit and verbal communication done directly by human users. We have to pay attention to the difference between social coordination and collaboration. Collaboration means highly-organized activity by human users in order to achieve goals that have not been solved, which usually takes long time to obtain a solution. In contrast, social coordination requires real-time responses, e.g., we have to react rapidly to give a traffic lane to others. On the other hand, the best solution cannot be necessarily acquired through social coordination. Even if the best solution is not obtained, if we can reduce just one percent of the traffic in a city or in a country, it will bring much benefit to the economy and environment.

Reflecting the nature of the problem, social coordination requires different approaches from the ones developed for collaboration, e.g., CSCW (Computer-Supported Cooperative Work), Collaborative Multiagent (Grosz & Kraus, 1996), conventional web-based meeting site, and so on.
Potential Cases, Database Types, and Selection Methodologies for Searching Distributed Text Databases
Hui Yang and Minjie Zhang (2004). Intelligent Agents for Data Mining and Information Retrieval (pp. 1-14).
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