

Don't Give Yourself Away: Cooperation Revisited

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1 Introduction

Most of our research in human-computer interaction assumes that humans and computers cooperate. And although there is research on adaptive interfaces, most of the time the user has to adapt to the interface by using rather unnatural devices, follow interaction protocols, speak clearly, etcetera. Here we explore human-computer interaction where there is not necessarily cooperation and where it may be in the interest of the user to hide his intentions or feelings.

People often hide their feelings, they often hide their thoughts, and they often hide information. People often behave differently depending on when they are alone or when others are around. People sometimes want to hide from others; they are not always in need of an audience, bystanders or partners.

People have their own interests and preferences. Depending on them, and their personality and their mood, they voluntary or involuntary give away part of themselves during interactions. People do not always want to be forthcoming. Moreover, they play roles. Implicit or explicit decisions are made about the roles they want to play, what they want to disclose, and how much effort they will make in attempting to understand a conversational partner. Also, too much interest from others in our own motivations is not appreciated. We don't want other people to read our mind.

It is not always in our interest to be cooperative. Being cooperative, just as being polite, can sometimes help us to get closer to an interactional goal. We can flatter our conversational partner, we can purposely misunderstand our partner in order to make a humorous remark, and we can play the devil's advocate, and nevertheless be cooperative. We play along with the rules of a conversation or negotiation game and therefore we are cooperative despite possible elements of competitiveness. In these situations Grice's maxims on cooperation, i.e. assumptions a listener is supposed to have about the interaction behaviour of a speaker, seem to be violated, but the relevance of the behaviour can be explained from a pragmatic, conversational point of view, rather than from a sentence level point of view. Conversational partners can achieve their goals although they can have different interests.

Obviously, there is not necessarily a balance between capabilities of conversational partners. Partners differ in background, knowledge, attitudes and personality. A partner can be more determined to reach a certain goal, a partner can have more social intelligence and be able to read the mind of its human opponent better than he or she is able to do.

2 Disappearing Computers and Interfaces

Interface technologies now include speech and language input, haptic input, and vision input. Home and recreational computer use is important and requires interfaces where there is a user access layer where user friendliness, ease of learning, adaptiveness, and fun to use are main design issues. But there is more. Since we can have sensors embedded in the environment, including walls, furniture, devices, robots and pets, the environment has become intelligent and it can perform not only reactive, but also pro-active behaviour, trying to anticipate what the inhabitant is doing and doing this by perceiving activities and verbal and nonverbal behaviour. Embedded sensors include cameras, microphones, location and movement sensors, and sensors

that collect and distinguish various types of physiological information and brain activity patterns. Information about the behaviour of the inhabitants and their implicit and explicit addressing of the environment can be fused and interpreted in order to support the inhabitants. In these environments humanoids and pet-like devices can play a useful role in observing inhabitants and interacting with them. Agent-modelled virtual humans can have specific tasks in the sensor-equipped environments (e.g., be a friend, assist in cooking, take care of house security, assist in health-care and fitness, be an opponent in games or sports), they can represent human beings (e.g., family members that are away from home), and they can communicate with each other, distributing their knowledge about the environments' real and virtual inhabitants.

3 Not Giving Away Your Intentions or Feelings

There is the underlying assumption that we are acting and behaving in a smart environment that is inhabited by agents that perceive your acting and behaviour and that may profit from the knowledge that is obtained in that way. And, they may have goals that do not necessarily match your interests. Agents may collect information that threatens your interests and provide that information to others. Where can we hide from the simulated social intelligence of our environments?

However, these are not the main issues we discuss. Rather we look at our behaviour during natural interactions and our reasons to hide information, i.e., not to be forthcoming or, even, aiming to mislead our (artificial) interaction partner. In future ambient intelligence environments, are we still able to provide our conversational partners with incomplete and sometimes wrong information about ourselves, our intentions and our feelings just as we are able to do and are used to do, in real-life situations nowadays with, among others, the aim to support smooth and effective conversation and interaction?

In our research on continuous interaction modelling (rather than 'turn-taking' interaction) we designed and implemented applications where it turned out, that is, not necessarily designed that way, that in these applications their users (or conversational partners) felt there sometimes were advantages in not displaying their intentions and feelings. This became clear in our research on a so-called Sensitive Artificial Listener (SAL), developed in the framework of an EU FP6 Network of Excellence on the role of emotions in the interface, in which we participated, in our research on an interactive virtual dancer, an interactive virtual conductor, and an interactive virtual fitness trainer. In these applications both the nonverbal interaction behaviour and the fact that during interactions all conversational partners continuously display nonverbal interaction behaviour, made clear that continuously decisions are being made about what you would like to become displayed to your interactional partner. Examples that emerged in our applications are: using humour to temporarily mislead your conversational partner, not being sincere by feigning interest in a conversation, not yet wanting to show your fatigue to your fitness trainer or colleagues, and feigning movements in virtual reality entertainment game.

4 Conclusions

In the full paper [1] we discuss natural situations for cooperative and non-cooperative behaviour. In particular we discuss the friction when on the one hand our smart environments and processing technologies not only allow, but also invite natural interaction behaviour, while on the other hand the processing technologies are able to extract more information about our intentions and feelings from this natural interaction behaviour than we would like to become known. How to deal with partners that have not necessarily been designed to help us, how to deal with partners, e.g. in games and sports that are opponents rather than friends? Preliminary ideas on these topics will be illustrated with examples of our research on nonverbal interaction with virtual humans.

References

- [1] A. Nijholt. Don't Give Yourself Away: Cooperation Revisited. *Proc. Symp. Logic and the Simulation of Interaction and Reasoning at the AISB 2008 Convention Communication, Interaction and Social Intelligence*, 3-4 April 2008, Aberdeen, UK, 41-46.