On the Expressive Competencies Needed for Responsive Systems

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ABSTRACT

Subtle emotions and their expression often arise in the context of managing involvement levels and turn-taking in task-oriented interactions. This paper presents some thoughts regarding their importance for effective and efficient interaction, their essentially real-time nature, and their relation to social conventions.

Keywords

reflex, attitudes, feelings, social conventions, real-time, communication

RESPONSIVENESS

In human-human interaction, people sometimes are able to pick up and respond sensitively to the other's internal state as it shifts moment by moment over the course of an exchange. Table 1, taken from [6], suggests what some of these feelings might be. A literature survey and systematic inventory appears in Cowie et al. (2001).

People who can do this are generally known as good communicators and sensitive listeners. We would like computer systems ultimately to be able to do the same.

One exploration of this was a semi-automated tutoring-type spoken dialog system [6]. The system inferred information about the user's 'ephemeral emotions', such as confidence, confusion, pleasure, and dependency, from the prosody of his utterances and the context. Then, for each user utterance, the system adopted an appropriate "emotional" posture, such as being business-like, patiently supportive, encouragingly supportive, sharing in the user's triumph, being reassuring, and so on. This was conveyed by selecting an appropriate acknowledgement form, such as *yes*, *yeah*, *mm-hm*, *right*, *okay*, and *that's right!*. Although the differences in meaning between these expressions are quite subtle and hard to identify, even after careful analysis, users prefered the system with this ability to use these expressions appropriately.

In building this system the initial aim was only to mimic human behavior, on the belief that the pleasantness of dialog was due, in part, to successful exchanges of in-

I want to express my thoughts
  (by taking a turn soon)
I'm uncomfortable
  (with this topic)
I'm amused
  (by your story)
I'm frustrated
  (that I've not been able to convince you)
I'm pleased
  (that you appreciate the irony in my words)
I'm missing something
  (so you need to be more explicit)
I need a moment
  (to digest that statement)
I know what I'm talking about
  (so just listen a minute)
I'm not committed to any opinion
  (so you're welcome to keep talking)
I'm bored
  (so let's talk about something else)
I'm concerned
  (that I'm not expressing myself well enough)
I'm really interested
  (in your opinion on this)
I'm aware of that already
  (so we can go on to talk about something else)
I'm getting restless
  (so let's close out this conversation)
I'm feeling a twinge of irritation
  (at the tone of your last remark)

Table 1: Examples of Feelings that Occur as 'Ephemeral Emotions' in Dialog, as suggested by studies of prosody, back-channel lexical items, disfluency markers, and gestures, as they occur in tutorial-like dialogs, casual conversations and narrations (Bavelas *et al.* 1995, Ward and Kuroda 1999, Ward 2000)

formation about the participants' states, in real time as they change moment-by-moment during the dialog. However it became clear that doing so was in fact also functional: endowing the system with this sort of subtle emotional expressivity can not only make interactions more pleasant, it can make them more effective and more

efficient.

In particular, it seems that these sorts of expressions often convey attitudes regarding the flow of conversation and the general cast of the conversation, with implications for conversation control functions, such as determining who will speak how much and how slowly and at what level of detail. To summarize these meanings in terms of a communications engineering metaphor, they are out-of-band, and like out-of-band signals in communications systems, they are generally priority messages, status indicators, and control signals relating to the transmission of the main message [9].

DISCUSSION

While "subtle expressivity" is necessarily an imprecise term, it is worth attempting to roughly characterize what is involved.

It is often **task-related**: in comparison to expressions of classic emotions such as anger, fear, and joy, it can be closely related to task achievement.

It is often purely **communicative**, rooted in guiding and responding to the user, rather than in manifesting some deeply felt internal state. Producing subtle expressions usefully, or even just avoiding inappropriateness, may require a system to monitor and direct the dialog at a very fine grain, and involves dimensions of interaction different that those usually handled by user models or by dialog managers.

It is often a reflection of correctly following **social conventions**, rather than being doing anything clever, creative, or distinctively original. This may need to be programmed at a near-reflex level, where system expressions are directly determined by prosodic, gestural, and contextual properties of the user's actions. In a sense, it may be part of a low-level reactive sub-system, in the spirit of models where appropriate social behavior is explained and implemented without use of inference about the other's internal state, and without implementing any internal state for the agent [2, 4, 7]. On the other hand, even if subtle expressivity is reflex-level, when building a system it is often useful and appropriate to relate it to the expression of feeling or emotion. Certainly, when trying discuss peoples' perceptions of system behavior it is hard to avoid explaining it in terms of intentions and emotions.

It is often highly **real-time** -constrained. At least in some applications, if subtle expressions appear within the window of acceptability they are convincing and effective, but if they come even a fraction of a second too late, users may fail to relate them to the proper context, and their meaning can be weakened or changed.

It is of course **subtle**, by definition. This has several implications, including the difficulty of measuring their value. One technique that is sometimes useful is to have users evaluate them off-line, in a second evaluation phase. That is, after interacting with a system, if the user can then observe a video or audio recording of his own interaction, while following along on a automatically generated transcript, he may be able to more accurately judge the quality of of the system's contributions. This technique can be an effective way to amplify weakly-detected user preferences [5].

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A competency framework defines the knowledge, skills, and attributes needed for people within an organization. Each individual role will have its own set of competencies needed to perform the job effectively. To develop this framework, you need to have an in-depth understanding of the roles within your business. To do this, you can take a few different approaches: Use a pre-set list of common, standard competencies, and then customize it to the specific needs of your organization. Use outside consultants to develop the framework for you. Create a general organizational framework, and use it as the basis for other frameworks as needed. Developing a competency framework can take considerable effort. The Competencies for Professionals Working in EI/ECSE in Oregon address the individual role of: 1) Specialist, 2) Assistant, and 3) Supervisor. This document addresses the EI/ECSE Specialist competencies and includes the following eight competency areas: 1. Typical/Atypical Child Development 2. Assessment 3. Family 4. Service Delivery 5. Program Management 6. Service Coordination 7. Research 8. Professional Development Values/Ethics. Competency area # 1. Typical / atypical child development. Specialist. Outcome. Develops and applies appropriate systems to regularly monitor child progress and make program changes accordingly (e.g., data collection tools, consistent data collection, review of data for decision making). 4.11. This competency model is designed to serve as a resource for HR professionals interested in developing proficiency within each critical competency, from professionals just entering their HR career to those at the executive level. In other words this competency model can help you, the HR practitioner, develop a road map to achieve your HR professional goals. · These are behaviors demonstrated by individuals at the highest level of proficiency on the indicated competency. PROFICIENCY STANDARDS. · These are standards for proficiency at the four career stages (early, mid, senior, and executive). This list of competencies consists of 62 common (and commonly required) competencies in work and career. Use this competency list to inspire and prepare you for a job interview or performance review. A competency list is frequently used by organisations to ascertain the competencies staff need to have. It goes without saying that this can vary from role to role or from role group to role group. A competency list is often used when hiring staff, though also when it comes to career development or growth within the organisation. You can also work out for yourself what your competencies are, what you're good at, what you're naturally capable of doing well and which competencies you could do with working on or paying some attention to.