

# Investigating Mind Markers in Design Meetings

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In the context of the European AMI<sup>1</sup> project, “Augmented Multiparty Interaction” more than one hundred hours of video and audio data have been collected of groups of four people engaged in a meeting with the task to design a new remote control. The collection of meetings is being annotated on several layers, ranging from speech transcripts to emotion annotation. The main purpose of this data collection within the AMI project is to train, through machine learning techniques, automatic recognizers and interpreters of the data that would be able to deliver automatic meta-data which can be used in browsing and retrieval of new recordings. Besides this technological goal, the data collection will also be useful for the social sciences, particularly for the study of small group interactions.

In this paper I will introduce the some of the annotation schemata that I and several other people have been working on and present an outline of the kinds of research programmes that we are currently pursuing and intend to pursue in the future. Three annotation layers that are of particular importance to the discussion of “emotion” and the process of negotiation in the design meetings are presented in this section. These are the layer that we refer to as the dialogue act annotations, the argumentation scheme and the so-called “emotion” scheme. Each of these layers capture something of the argumentation and negotiation process on the one hand and of the affective dimensions of what is going on, on the other hand.

The *dialogue act coding* manual for the AMI corpus states “Dialogue act annotation is about marking up the transcription according to speaker intention—that is, what kind of thing each person is trying to achieve by what they say.” The scheme in its current form consists of four groups of dialogue acts. These are: (1) Acts that are about information exchange (inform, elicit-inform); (2) Acts about some action that an individual or group might take (suggest, offer, elicit-offer-or-suggestion); (3) Acts that are about commenting on previous discussion (assess, elicit-assessment) and (4) Acts whose primary purpose is to smooth the social functioning of the group (be-positive, be-negative)

The original discussions about the dialogue scheme considered classical dialogue act schemes such as the MRDA scheme (Shriberg et al., 2004) or DAMSL (Core and

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Allen, 1997). But the main inspiration for the scheme came from a social-psychological perspective: the Bales' Interaction Process Analysis scheme (Bales, 1950). This scheme has 12 categories that classify "how the persons communicate, that is *who* does *what* to in the process (time order) of their interaction" (Bales, 1950, p. 92). This comprises the positive actions (1) seems friendly, (2) dramatizes, (3) agrees; the attempted answers (4) gives suggestion, (5) gives opinion, (6) gives information; the questions (7) ask for information, (8) ask for opinion, (9) ask for suggestion; and negative actions (10) disagrees, (11) shows tension, (12) seems unfriendly. One can see that to an important extent the parameters of the Bales scheme are reflected back in the AMI scheme.

What is particularly interesting about this scheme is that instead of from a philosophical tradition it derives from a social scientific perspective. Categories such as "show tension" or "dramatizes" are not particularly studied by Austin or Searle, although they may refer to such stylistic and interpersonal variables in their discussions.

The dialogue act scheme captures aspects of the various actions involved in negotiation and argumentation. It captures some of the typical linguistic actions together with the more ritualistic elements of how people deal with each other on a social level (Goffman, 1981). One could say that it is situated within the point of view of linguistic pragmatics and partly in social psychology. The argumentation scheme, which we will present next, deals mainly with semantic concerns..

We designed an *argumentation scheme* (Rienks et al., 2005) with the intention to capture some of the argumentative relations between the various utterances that make up an argument as part of a negotiation or persuasion round. The nodes in our model consist of "issues" and "statements". An important aspect of statements that needs to be captured is that they can vary in the degree of force and scope. To be able to represent this we introduced the label 'weak statement'. Utterances labelled as "issues" function as a direct request for a response, in the same way as a question is generally followed by an answer. We distinguish three subtypes: the 'Open issue', the 'A/B issue' and the 'Yes-No issue'. The open issue allows for any number of possible replies; possibly revealing positions or options that were not considered beforehand. This contrasts with the A/B issue, that allows participants to take a position for a limited number of positions which are clear from the context. The yes-no issue, in line with the yes-no question directly requests whether the participants' positions agree or disagree with the issue.

The annotation scheme further consists of relations between nodes. Clarification, specification and generalisation relations hold between statements. For the relations between issues and statements we have defined several labels. A typical response to an open issue is to provide a possible 'option' for resolving this issue. For A/B issues, either a particular proposed option is chosen or one or more options are discarded. In response to a yes/no issue a statement can be either 'positive' or 'negative'. Another, frequently occurring option involves expressing 'uncertainty'. A final relation that is important to annotate relates to concessions in Toulmin's model. This we have termed the 'subject-to' relation.

The annotation scheme that is used to describe what people “feel and think” consists of a modest set of labels to describe the *mental states* that we had noticed and after some discussion, agreed upon. These are: *neutral, curious, amused, distracted, bored, confused, uncertain, surprised, frustrated, decisive, disbelief, dominant, defensive, supportive*. This list cannot be said to represent only labels for emotional states. In fact, only *amused* and *frustrated* seem to qualify as a label describing an emotion (perhaps *surprise* as well, although not everyone would agree on that). Some of the labels refer to cognitive processes or meta-cognitive states and epistemic modalities: curiosity, boredom, confusion, certainty for instance. These are important again for the argumentative process. They reflect not how one feels but how one thinks about the matter at hand. Other labels reflect some interpersonal variables: dominance and support. The “mental state” layer allows us to annotate some of the ritualistic dimensions and the affective dimensions also present in the dialogue act scheme, independently (at least in part).

If annotators can agree on certain aspects of the mental state of another person, something that is only indirectly observable. The fact that we, as outsiders, can observe these changes in the mental state of the participants in the conversation means that we have observed particular aspects of their behaviour that we have interpreted as cues to their mental state. These behaviours can be speech acts, argumentative moves, but also facial expressions, posture shifts, head movements, eye movements and gaze, pupil dilations and all kinds of other actions. Most, if not all, of these cues were also observable and interpretable by the other participants in the meeting and will have produced some effect. In fact, they may have been consciously produced and intended to have such an effect. The mind and emotion markers will, to a smaller or larger degree, function as communicative signals, expressing the state of mind of a person with respect to how he or she values what is being proposed in terms of its effect on their beliefs, values and attitudes, motivations for actions and their concerns. The question then is how the three levels of descriptions are related.

## References

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