

Intentions in Bilingual Dialogue Processing

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I am currently leading a small research project on discourse-level processing for a Japanese-English interpreting telephone system. The interpreting telephone (IT) would allow monolingual speakers of different languages to carry on a spoken conversation. The dialogue management task faced by the IT's discourse component defines unique constraints on the overall IT software system.

The dialogue manager must model five distinct dialogue interactions that arise during operation of the larger IT system.

- (1) the human-human (bilingual) dialogue that constitutes the primary data for the system,
- (2),(3) two human-machine (monolingual) dialogues, each of which alternates input speech of one speaker with the translated output of the other speaker's input, and
- (4),(5) two human-machine dialogues that occur whenever the interpreting telephone system itself (or a component of it, such as the dialogue manager) engages either of the humans in a meta-dialogue to address any disruption for the flow of the primary (human-human) dialogue.

The role of intentions in the IT system varies with the role of the dialogue manager. In processing dialogues of Types 4 and 5, the IT is acting as an agent in a private dialogue with one of the users. It must discern the user's plan and (dynamically) construct and execute its own plan for repairing the dialogue error condition in collaboration with the user. The IT system can influence the user's behavior and intentions through its own behavior.

In contrast, in dialogues of Types 2 and 3 the IT dialogue manager acts as a third-party observer of the human-human bilingual dialogue. The dialogue manager's task is to recognize the evolving plans of the two users in order to analyze source-language utterances adequately for carrying out translation, and in order to make decisions during generation of target-language utterances that reflect the source-language speaker's intentions.

The two users may have shared experience that extends beyond the current conversation. They may, therefore, have intentions that are mutually accessible but not available to the dialogue manager. For instance, these two users may have spoken on the previous day and may now make context-dependent reference to the extended context begun in an earlier dialogue, "Lets go back to the second suggestion we discussed yesterday." This requires a local definition of intentions at the level of the immediate dialogue segment that the dialogue manager has access to.

The ultimate success of the IT system is measured by its ability to create the experience, for each of the two users, of a monolingual dialogue in their own language. Intentions in translation could be viewed as an automatic side-effect of a good translation. I propose instead that, for the purposes of bilingual telephone dialogues, intentions are what get preserved under translation. Using two intention recognizers, one for Japanese and one for English, the dialogue manager will examine a set of alternative translations and filter those that appear not to realize the intentions of the source-language speaker.

These five dialogue types can be represented using an adaptation of the three-tiered discourse representation (defined in my dissertation) that distinguishes three types of information accessed by the discourse interpreter during dialogue processing: linguistic, discourse, and belief information. The framework models the five IT dialogues in parallel, but minimizes redundancy and computational effort through the use of shared structures. A prototype dialogue manager module is currently under development in our group. The sample dialogues for the immediate system development involve a highly restricted domain (conference registration) which defines a very small library of tasks and goals from which to choose. My primary interest in this workshop is in the evidence for intentions for machine translation and a classification of intention types for the various IT dialogues.