

Delayed Interpretation using Processing Notes

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Descriptive Keywords and Phrases

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Background

ELI (English Language Interpreter), the natural language analyzer used by the Artificial Intelligence project at Yale (Riesbeck and Schank, 1976, Schank, 1976), builds Conceptual Dependency (CD) forms (Schank, 1975) to represent its semantic interpretations of input texts. By including in the CD forms special elements, called processing notes, ELI can indicate what parts of the CD form later inferencing programs must complete. Three different notes have been developed so far.

The REF note

ELI uses the REF note to guide the instantiation of noun phrases into memory tokens. For example, "he" is analyzed into "(PERSON GENDER MALE REF DEF)" and "someone" is analyzed into "(PERSON GENDER MALE REF INDEF)". "REF DEF" indicates that existing memory tokens should be looked at. "REF INDEF" indicates that a new token is needed.

The SPECIFY note

ELI uses the SPECIFY note to indicate a hole that needs to be filled in. For example, the question "Where is he?" is represented as "I want you to tell me that he is in location SPECIFY." In CD this is:

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(COM (ACTOR HEARER <=> MTRANS TO SPEAKER
      OBJECT (ACTOR (PERSON REF DEF)
              IS (LOC VAL SPECIFY)))
      LEADTO (ACTOR SPEAKER TOWARD JOY INC 2))
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The EQUIV note

ELI uses the EQUIV note to say that an object can be described with several different CDs. For example, "Mary is the one who went to Boston" is represented as "the person named Mary is EQUIV to the person who went to Boston." In CD this is:

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(ACTOR (PERSON NAME MARY)
      EQUIV (PERSON REL (ACTOR PERSON <=> PTRANS
                        TO (CITY NAME BOSTON)))
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A more complex EQUIV note is used for sentences of the form "S1 but S2" where S1 is an action from a knowledge structure (KS) such as a script or a plan (Schank and Abelson, in press). "But" in these sentences means that S2 is contrary to the intentions of the KS. The intentions of a KS are the goals associated with that KS, plus the actions that the KS says will lead to those goals.

The sentence frame "S1 but S2" is represented as "S2 is not EQUIV to any event leading to an event that is a goal of the KS in S1." In CD this is:

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((CON S2
  EQUIV (SPECIFY1
    REL (CON SPECIFY1
      LEADTO (SPECIFY2
        REL (KS
          GOAL SPECIFY2))))))
MODE NEG)
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Conclusion

The addition of processing notes like REF, SPECIFY, and EQUIV allows not only better communication between ELI and the inference programs, but also allows us to represent the meaning of words like "but" which make meta-comments about the texts in which they appear.

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