

PAM - A Program That Infers Intentions*
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An Intelligent story understanding program requires a great deal of knowledge about human intentionality. For example, consider the following story:

- (1) John needed money.
- (2) He got a gun
- (3) and walked into a liquor store.
- (4) John told the owner he wanted his money.
- (5) The owner gave John the money
- (6) and John left.

To understand this story, we must realize that John's actions were motivated by a plan to obtain money by threatening someone. Since this interpretation is not explicit in the story, it must be inferred by the understander.

PAM (Plan Applier Mechanism) is a program that understands stories by analyzing the intentions of the story's characters, and relating their intentions to their actions. PAM reads in sentences in English, produces Conceptual Dependency (CD) meaning representations for them, and connects together these CD's to form a story representation. The story representation contains, in addition to the actual events of the story, a Knowledge Structure Interpretation (KSI), which explains why these events occurred.

For example, PAM can understand the story composed of sentences 1-6 above, and produces the following KSI (simplified for expository purposes):

EPISODE:
TYPE: COAL-EPISODE
GOAL SPECIFICATION:
TYPE: DELTA-CONT PLANNER: (JOHN)
OBJECT: (MONEY) STATUS: FULFILLED
PLAN SPECIFICATION:
OBJECT: (MONEY REL (LIQUOR-STORE POSS MONEY))
PLAN: THREATEN ACTION: (...)
SUBEPISODES:
TYPE: GOAL-EPISODE
GOAL SPECIFICATION:
TYPE: DELTA-CONT PLANNER: (JOHN)
OBJECT: (WEAPON)
PLAN SPECIFICATION: ...
TYPE: GOAL-EPISODE

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GOAL SPECIFICATION:
TYPE: DELTA-PROX PLANNEK: (JOHN)
LOCATION: (PROX PART (MONEY))
PLAN SPECIFICATION: ...

RESPONSE:
TYPE: GOAL-CONFLICT
GOAL SPECIFICATION:
TYPE: PRESERVE-HEALTH
PLANNER: (OWNER REL LIQUOR-STORE)
STATUS: FULFILLED
GOAL SPECIFICATION:
TYPE: PRESERVE-CONT
PLANNER: (OWNER REL LIQUOR-STORE)
OBJECT: (MONEY REL LIQUOR-STORE)
STATUS: ABANDONED
PLAN: COMPLY
ACTION: (...)

The whole story is interpreted as a GOAL-EPISODE, or sequence of events describing the pursuit of a goal. The goal is a DELTA-CONT (a transfer of control type goal) of some money from its owner to John. The plan for the goal consists of selecting some particular money (the liquor store's) and then threatening its owner. In implementing this plan, several subgoals had to be achieved: Being near the money (described in the abbreviated DELTA-PROX sub-episode), and possessing a weapon (the DELTA-CONT sub-episode). The ACTION field denotes a pointer to the CD representing the realization of the threat plan.

The RESPONSE shows that the threat caused the liquor store owner to have two conflicting goals, that of preserving his money and that of preserving his well-being. The status of the PRESERVE-CONT goal indicates that the owner has abandoned this goal for the PRESERVE-HEALTH goal, for which he has chosen to COMPLY with John's demand.

In order to produce this KSI, PAM stores its knowledge of goals and plans in the form of condition-action rules. Typically, the application of a rule gives rise to an expectation that is used to interpret future sentences. For example, upon encountering sentence (2) above, PAM accesses the rule: "If a person obtains a functional object, then he intends to use it." This rule gives rise to an expectation that John will use the gun to threaten or to overpower someone. When sentence (4) is encountered, this expectation causes PAM to interpret it as a realization of a THREATEN plan, as opposed to merely expressing one's desire. It is through the use of such expectations that PAM effects contextual understanding.

References

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