# Practical Cognition in the Assessment of Goals

Luis A. Pérez-Miranda (ylppemil@sf.ehu.es)

Institute for Logic, Cognition, Language, and Information (ILCLI, UPV-EHU)

P.O. Box 220, 20080 Donostia-San Sebastian (Spain)

## 1. Practical Cognition

Practical cognition seems to help the agent in the way of constructing strategies and plans in his pursuit of a better situation for him. The goals and objectives of an agent can be of diverse nature, from mere intrinsic desires to sub-goals of already pretended plans. Practical cognition can be seen as the basis on which the process of selecting and executing courses of actions for achieving those goals (using plans or operators) takes place. One of the tasks of practical cognition is to cope with conflict situations of decision-making among agent's potential goals. Because agents have incomplete knowledge about the world, it is inevitable that some of these goals will conflict (Ferguson, 1992; Pryor, 1994). Sometimes an agent is forced to choose among different relevant options that are jointly incompatible to pursue.

Our approach assumes that, not always, but in many cases, the adoption of goals is plan dependent. Generally, it happens that a goal cannot be adopted before the agent realizes that is able to bring a plan about for the occasion. Often an important amount of the value of a goal is directly obtained from the expected utility value of the plan where it is embedded (Beaudoin, 1994). The adoption of a goal is related to three factors: the value of the goal itself, the possibility of constructing a plan pursuing a previously learnt strategy for that goal, and agent's commitments related to previous plans (Pérez-Miranda, 1997).

Once the agent has recognized that a potential goal is obtainable, the next step in determining the adoption of a goal is to detect any adverse effects between that goal and other likely pretended goals derived from previous intended plans or single urgencies that ought to be accomplished without delay. Hence the agent must look for scenarios in which both potential goals and ongoing adopted goals fit together insofar as fulfilling one may be at odds with fulfilling another or with maximum fulfillment of the overall set. We are concerned with explaining how an agent could arrive to manage and fit these factors in a suitable way as to behave, so to speak, following some rational patterns.

## 2. The Filtering Mechanism

The evaluative mechanism proposed here only concerns with those goals that have a motivational or cognitive grounding (or both together). Beliefs are the unique available evidence for an agent to make decisions about whether what he wants to do is or not justified under the circumstances. We think this connection between beliefs (or motivations) and goals can be encoded into an ordered pair, the reason supporting the goal, and be evaluated according to order and strength criteria.

Order among supporting reasons constraints the decision process to only those decisions that are relevant for the agent while just excluding or postponing the others. In particular, high order reasons override low order reasons, ruling them out from the process of assessment. Furthermore, ordering reasons is a way of facing situations of apparent incomparability, for instance, among supporting reasons that are desires and reasons that are beliefs. Strength determines the expected degree of utility derived from adopting or not a goal at a point time given the evidence available.

Our filtering mechanism selects only those goals whose supporting reasons result undefeated according to agent's doxastic states. The mechanism embodies two levels of decision-making attending to the order and strength of the supporting reasons. An agent only would be justified in adopting a goal when the reason that supports that goal results undefeated.

## Acknowledgments

## References

Pérez-Miranda, L.A. (1997). Deciding, Planning, and Practical Reasoning: Elements Towards a Cognitive Architecture. Argumentation, 11, 435-461.

Pryor, L. (1994). Opportunities and Planning in an Unpredictable World. M Phil Thesis (Computer Science), Northwestern University, Evanston, Illinois.

Beaudoin, L.P. (1994). Goal Processing in Autonomous Agents., PhD thesis, School of Computer Science, The University of Birmingham.

Ferguson, I.A. (1992). Toward an Architecture for Adaptive, Rational, Mobile Agents. In Werner, E. and Y. Demazeau (Eds.) (1991). Decentralized AI 3. Proceedings of the Third European Workshop on Modelling Autonomous Agents in a Multi-Agent World. Amsterdam: Elsevier.