The "What" problem: 
the emergence of new goals in a robot

Riccardo Manzotti, Marco Villamira

KTEL, Institute of Environmental and Human Sciences
IULM University, Via Carlo Bo, 8, 20143, Milan
riccardo.manzotti@iulm.it

Biological and cognitive systems have the capability of developing new goals during phylogenes is of species or during ontogenesis of single individuals. A goal is an event that is more likely to happen again because of the structure of an agent. This definition is equally applicable both to artificial and natural agents.

On the other hand, current artificial cognitive systems focus on how achieving a given fixed set of hard-wired goals. They search an optimal solution of a problem, given a set of goals and a set of optimization criteria. They look for "how" to achieve a given goal. Natural agents develop new goals in order to cope with partially unknown and ever changing environment. They must find "what" they want to achieve and not only "how". The development of new goals on the basis of the interaction with the environment is here defined the "what" problem. The development of a collection of goals permits to redefine the concept of Umwelt in what could be considered the teleological Umwelt of an agent. With respect to a given agent there are four different kind of environment: 1) the environment in itself made of all possible physical events in the spatial and temporal neighborhood of the agent; 2) the part of environment which is available to the agent's sensorial apparatus; 3) the part of the environment which the agent is capable of perceiving; 4) the part of the environment which is a goal for the agent. The latter is what we define here as a teleological Umwelt: that is the set of all those events that are used as goals by a given agent.

The objective of this paper is twofold: i) to outline the "what" problem and ii) to describe a robotic architecture capable of addressing it.