

Autonomy as Management of Meaningful Information for Constraints Satisfaction. Proposal for an Evolutionary Approach.

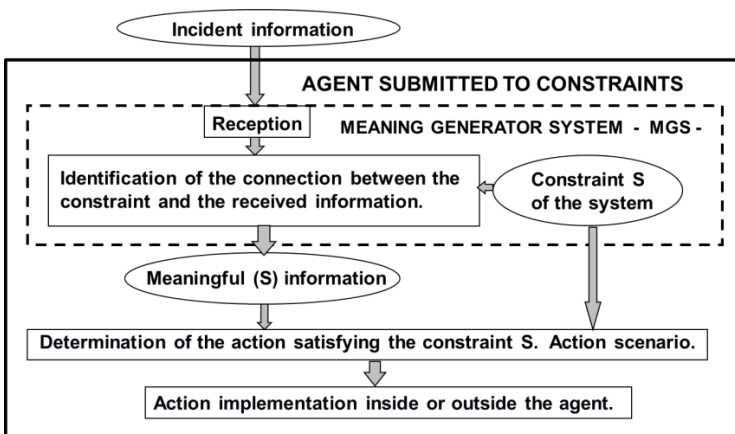
(From fifth EuCogII Member Conference Meeting - Groningen Oct 2011 -)

C. Menant - Bordeaux- France -

A) Frame of analysis: Autonomy as management of meaningful information for constraint satisfaction

	MATTER	LIFE	HUMANS	ROBOTS
Autonomous Agency	No	Yes	Yes	Yes
Laws and constraints	Physico-chemical laws. Ubiquist laws. Efficient causes.	Local & intrinsic constraints. Stay alive (individual & species). Final causes.	Local & intrinsic constraints. (look for happiness, anxiety limitation,...). Conscious and unconscious constraints. Final causes.	Local & extrinsic/derived constraints as designed or programmed (avoid obstacle, ...). Final/efficient causes ?
Meaningful relations with environment	NA.	Intrinsic meanings via constraints satisfaction processes (embed agent in environment).	Intrinsic meanings via constraints satisfaction processes (embed agent in environment).	Extrinsic/derived meanings via constraints satisfaction processes (embed agent in environment).
Related concerns	Far from equilibrium systems (catalytic closure, autopoiesis).	Unknown nature of life. Animal/organic self ?	Unknown nature of human mind. Consciousness. Free will. Self-conscious self.	Derived nature of constraints, meanings and autonomy. Artificial self ? Final/efficient causes ?

B) Constraint satisfaction . Agent level (<http://cogprints.org/6279/>)



- * Meanings do not exist by themselves. Are from systems submitted to constraints.
- * Meaning generation => Action implementation => Constraint satisfaction.
- * Meaning generation embeds agent in its environment.

D) Human autonomy as evolution of animal autonomy (Intrinsic Constraints, Meanings &Autonomy)

- * **Constraints** (in addition to animal ones):
 - Unknown self-consciousness/free will => constraints difficult to address.
 - Maslow pyramid of needs.
 - Look for happiness, limit anxiety, (evolutionary approach) [1].
- * **Management of meanings for constraints satisfaction:**
 - Conscious/unconscious constraints & emotions (decide & rationalize).
 - Human constraint satisfaction can conflict with animal ones.
 - Free will as key player.
- * **Open questions**
 - Unknown human mind. Possible specific constraints and tools.
 - Evolution of representations toward conscious self-representation [1].
 - Need for a self-conscious self (as animal self + self-consciousness).
 - Consider free will as animal autonomy with self-consciousness.

[1] <http://cogprints.org/4957/> <http://cogprints.org/6831/>

C) Animal autonomy as starting point (Intrinsic Constraints, Meanings &Autonomy)

- * **Constraints:** - stay alive (individual/species).
- group life constraints (hierarchy, synergy, ...).
- * **Management of meanings for constraints satisfaction:**
 - Determine actions (physical, mental, ..) for constraints satisfaction.
 - Use innate action programs. Improvement by experiences.
 - Simulate outcomes and choose the best (anticipation).
 - Build new action programs (random inputs on existing ones).
 - Imitation => new action programs.
 - Usage of meaningful representations (network of meanings).
- * **Open questions**
 - Unknown nature of life (is more than the characteristics of life).
 - Management of constraint satisfaction may use unknown processes.
 - Need for an animal/organic self as a tool (=> "identity" of agent ?).

E) Robot autonomy [2] (Extrinsic/Derived Constraints, Meanings & Autonomy)

- * **Robot constraints:** as built in or programmed.
 - Extrinsic/derived constraints (=> extrinsic/derived autonomy).
- * **Management of meanings for constraints satisfaction:**
 - Determine action that will lead to constraints satisfaction.
 - Use action programs. Simulation, optimization, anticipation.
 - Programs improvement by experiences and performances increase.
- * **Open questions:**
 - Nature of extrinsic/derived constraints versus intrinsic ones.
 - Possible robotic self/identity based on constraint satisfaction.
 - Grounding of intrinsic symbols without intrinsic constraints .
 - Possibility of organisms in robots for benefit of life specificities.
 - "Meat in the computer" as option for local intrinsic constraints.

[2] <http://cogprints.org/7676/>