Autonomy as Management of Meaningful Information for Constraints Satisfaction.
Proposal for an Evolutionary Approach.
(From fifth EuCogII Member Conference Meeting - Groningen Oct 2011 -)

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

<table>
<thead>
<tr>
<th>Autonomy Agency</th>
<th>MATTER</th>
<th>LIFE</th>
<th>HUMANS</th>
<th>ROBOTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>constraints</td>
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<td>relations with</td>
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<td>environment</td>
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</tbody>
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B) Constraint satisfaction - Agent level

http://cogprints.org/6279/

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 ?).

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.


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.