Natural Computing/Unconventional Computing and its Philosophical Significance

# Turing Test, Chinese Room Argument, Symbol Grounding Problem. Meanings in Artificial Agents.

Christophe Menant - Bordeaux France

## A) Turing Test, Chinese Room Argument, Symbol Grounding Problem (1/2)

* Designed to address the question “can machines answer questions as well as humans do?”
* Are also about “can AAs generate human-like meanings?” - Meaning generation can be modeled -

## B) Meaning Generation for Constraint Satisfaction: Animals, Humans, AAs. The MGS (1/2)

* Model of Meaning Generation for constraint satisfaction (MGS).
* AAs need to carry human constraint for human-like meaning generation.

## C) Problematic transfer of human constraints into AAs (1/1)

* Stay alive, look for happiness, limit anxiety tightly linked to life and consciousness.
* Natures of life and consciousness unknown to today science and philosophy.
* Human constraints cannot today be transferred to AAs.

## D) AAs cannot today generate human-like meanings nor think like humans (1/1)

* AAs cannot today pass the TT. The CRA is right. The SGP cannot today have a solution.

## E) Extend life constraint to AAs: a tentative starting point (1/2)

* Evolutionary approach. Extend “stay alive” constraint to AAs. (Life within the computer).

## F) Ethical concerns (1/1)

* AAs satisfying human constraints may not satisfy human values.

## G) Continuations & References (1/3)

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## A) Turing Test, Chinese Room Argument, Symbol Grounding Problem (2/2)

* **Turing Test addressing the question "can machines think"** thru questions answering indistinguishable from human answering.
  - Understand question: **grasp the meaning** from asked question.
  - Answer question: **build up a meaning** for the answer.
  - Is about **human-like meaning generation**.

* **Chinese Room Argument challenging the TT:**
  Computer or non-Chinese speaking operator cannot **access the meaning** of the manipulated Chinese symbols.
  - Is about **human-like meaning attached to the symbols**.

* **Symbol Grounding Problem:**
  How could an AA computing with meaningless symbols **produce a meaning** intrinsic to the AA?
  - Is about **human-like meaning generation**

* **"Can machines answer questions as well as humans do?"** becomes **"Can AAs generate human-like meanings?"**

* **Human-like meaning generation can be addressed with a tool: the Meaning Generator System.**

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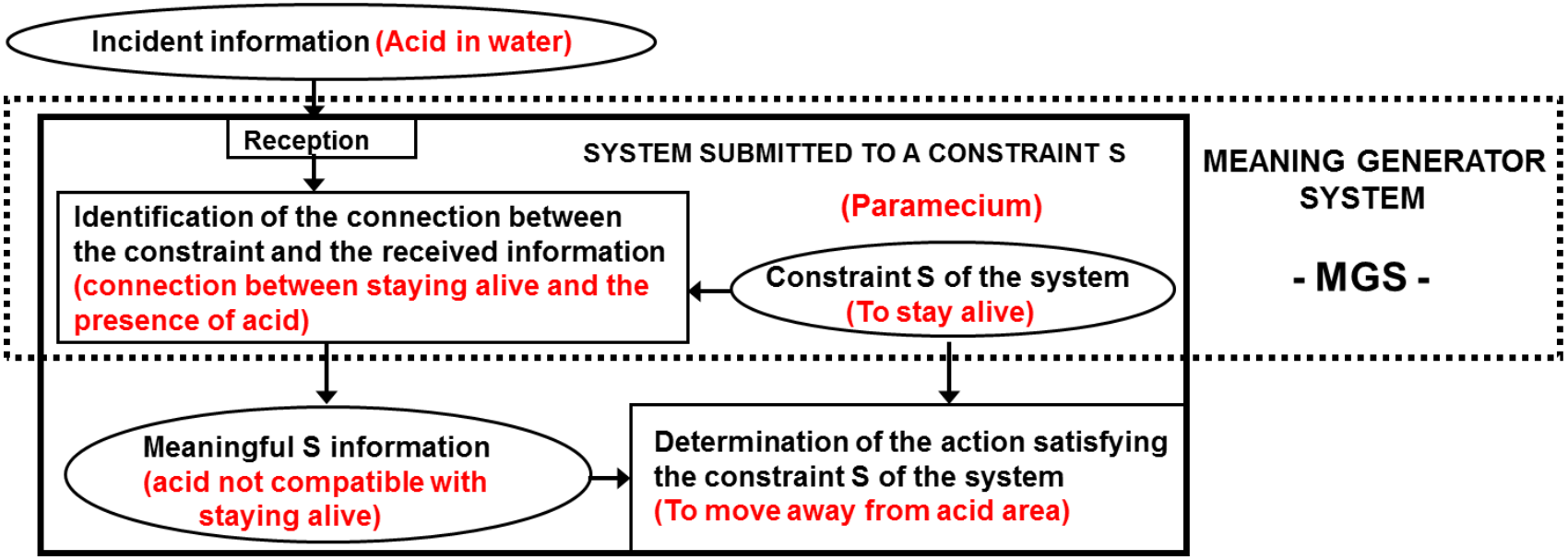
## B) Meaning Generation for Constraint Satisfaction: Animals, Humans, AAs: The MGS (2/2) [5, 6]

*A system submitted to a constraint generates a meaning when it receives information that has a connection with the constraint. The meaning is the connection existing between the constraint and the received information. It will be used to implement an action that will satisfy the constraint.*




*** Constraint satisfaction is key for meaning generation in animals humans and robots:**

- **Animal constraints** (original): stay alive, make sense, live group life.
- **Human constraints**( “”): animal constraints plus look for happiness, limit anxiety, …
- **AA constraint** (derived): as programmed (avoid obstacle, ..).

*** AAs need to carry human constraint for human-like meaning generation.**

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## E) Extend life constraint to AAs: a tentative starting point (2/2)

*** Evolutionary approach. Extend "stay alive" constraint to AAs.**

*** Different from trying to get neurons obeying computer logic [10]**

*** Different from adding AA on living entity (insect-machine hybrids [11]).**

*** Life within AA by biological extension of living entity within AA.**

- Unconventional computing.
- Extension of constraint/meaning from living entity to AA.
- Biological computer controlling physical sensori-motor interfaces.
- Vegetal more linked with matter than animal (rooting in soil).
- Evolutionary approach: start with life.

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## G) Continuations & References (2/3)

### Continuations

* Evolutionary approach to constraints and to meaning generation.

* Better understanding of animal constraints and nature of life.

* Better understanding of human constraints and nature of human mind.

* Extension of “stay alive” constrains to AAs (unconventional computing)

* Relations between human constraints and human values (ethical concerns).

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## G) Continuations & References (3/3)

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