- Introduction to a Systemic Theory of Meaning - March 2020 (1/4)

Short paper- Christophe Menant - Bordeaux France -

1) Introduction

a) Information and meanings are present everywhere (humans, animals, artificial agents).
b) Different perspectives have been used to assess links between information and meaning:
- Linguistic, Semiotic, Biosemiotic, Psychology, Psychiatry.
- Philosophy, Biology, Neurology, Cognition, Artificial Intelligence...
c) No general coverage is available for the notion of meaning.
d) We propose a system approach to meaning generation in an evolutionary background.

2) Information and Meaning in Evolution. Matter, Life, Human Mind [II]

a) Information and meaning came up with life in the evolution of our universe [IX].
b) Life is a far from thermodynamic equilibrium event submitted to a local "maintain status" constraint.
c) Management of local constraint introduces information and meaning.
d) Evolution has led the animal "stay alive" constraint up to human constraints.
e) Humans create artificial (derived) constraints for artificial agents.

3) Elementary Information and Meaning. The Meaning Generator System [I]

a) The word "meaning" is most of the time associated to human performances.
b) The unknown nature of human mind makes human meaning a complex subject.
c) We propose to analyse "meaning" for elementary life and formulate the results in a system approach. This should bring up a system perspective on meaning generation (Fig.1).
d) Definitions and properties of "meaning" and of a "Meaning Generator System" (MGS):

A meaning *is meaningful information that is generated by a system submitted to a constraint when it receives an external information that has a connection with the constraint.*

The meaning is formed of the connection existing between the received information and the constraint of the system.

The function of the meaning is to participate to the determination of an action that will be implemented in order to satisfy the constraint of the system.

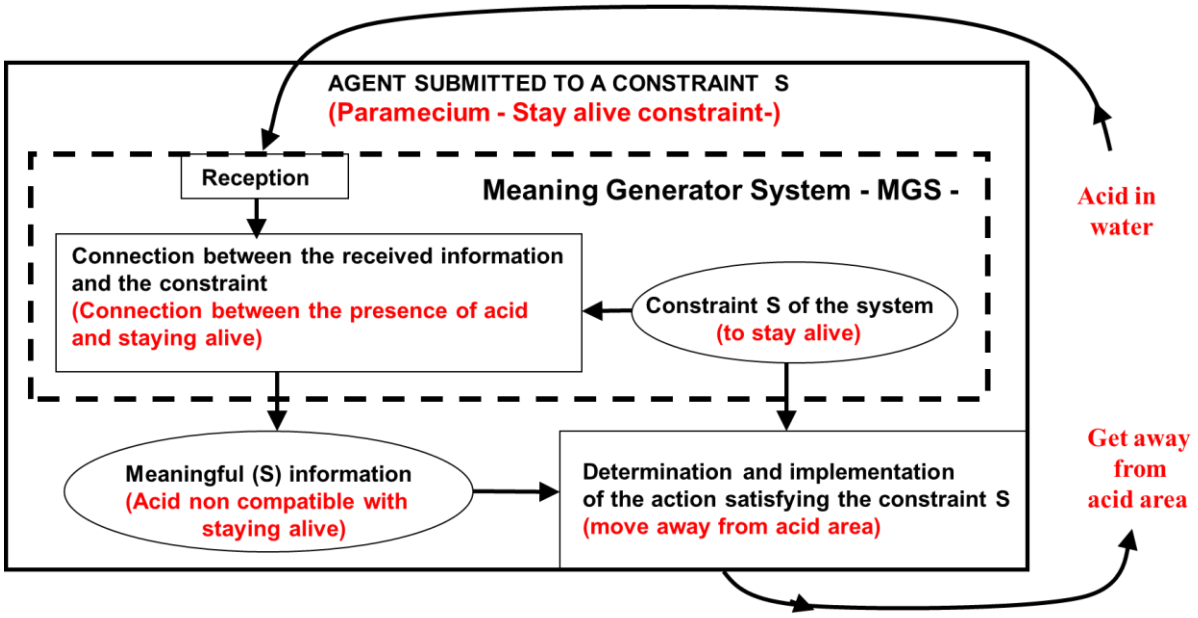

Fig 1. Meaning generation for elementary life

- Introduction to a Systemic Theory of Meaning - March 2020 (2/4)

4) MGS Characteristics [II]

a) Tells what a meaning is and what it is for. Is part of a higher-level system (agent).
b) Is constraint satisfaction oriented.
c) Is compatible with Von Uexkull's Umwelt and with the Peircean Interpreter. Highlights constructivist aspects of meaning generation [X].
d) Is a basic contributor to cognition [IV]. Is close to Enactive sense making [VI].
e) Shows, when used with the Turing Test, why today computers cannot think like humans do [V].
f) Makes available a framework for an evolutionary approach to intentionality [III].

5) Transmission of Meaning [I]

a) A generated meaning can be transmitted to other agents and survive to the MGS.
b) Introduction of an "Efficiency of a Meaning" and of a "Domain of Efficiency of a Meaning".
c) The information received by the MGS can be already meaningful.

6) MGS and higher- level Systems (Agents) [II]

a) The MGS is a building block for higher-level systems (agents):
- Biological agents (plants, animals, humans) are submitted to natural (intrinsic) constraints.
- Artificial agents are submitted to artificial (derived) constraints implemented by humans.
- Generated meanings are correspondingly natural or artificial.
- Evolutions of constraints allow to differentiate biological agents from artificial ones [IX].

b) Agents contain functions like memory, scenarios simulation/optimisation, action implementation, other receivers, other constraints and MGSs.
c) Meanings do not exist by themselves. Meanings are created and used by agents submitted to constraints.
d) The MGS is the source of interactive relations that link agents to their environments, allowing agents to maintain and adapt their natures.
e) Actions implementations can be of different types (physical, biological, mental, conscious, unconscious, data processing, ..). Actions can be external or internal to the agent and can lead to modifications of functions or constraints of the agent.
f) The MGS approach leads to the definition of an agent as an entity submitted to constraints and capable of actions for the satisfaction of the constraints. Consequently, an autonomous agent can be defined as an agent that can satisfy its constraints by its own [X].

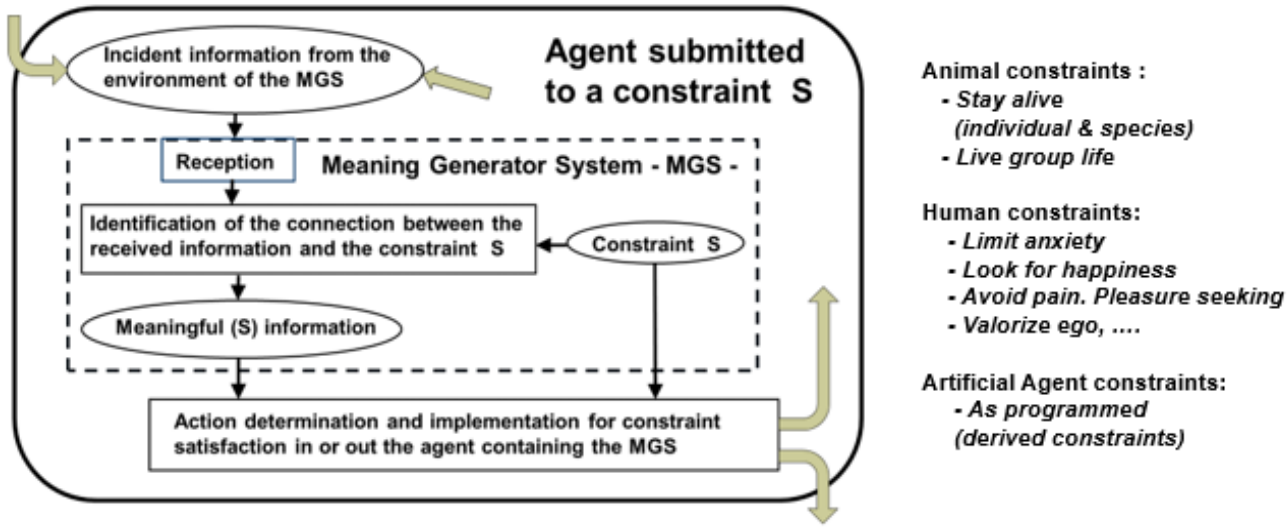

Fig 2. MGS as a building block in agent

- Introduction to a Systemic Theory of Meaning - March 2020 (3/4)

7) From Meaningful Information to Meaningful Representation [II] [VI]

a) Different meanings generated by an agent about an entity create a network of meanings relative to that entity. Such network is a meaningful representation of the entity for the agent.
b) Meaningful representations are constraints satisfactions oriented and can be used in an evolutionary scenario from animals to humans.

8) Meaningful Representations and Human Evolution [VII]

a) An evolutionary scenario using meaningful representations leads to an "ancestral self-consciousness" characterized by a subject representing his own entities as existing in the environment, like conspecifics are represented.
b) The scenario evidences identifications with suffering conspecifics as source of a specific human anxiety, not considered so far and tightly linked to the nature of self-consciousness.
c) The scenario positions anxiety limitation as a key human constraint. Anxiety management processes, mostly unconscious, then become significant contributors to our mental states and mental health, perhaps up to wicked behaviours [VIII].
d) The implementation of anxiety limitation processes by our ancestors has created an evolutionary engine that has accelerated the evolution of the homo genus up to today humans. That engine may still be active today.

9) Conclusion and Continuation

a) Basic elements for a systemic theory of meaning have been presented: meaning, constraint, meaning generation (MGS), meaning transmission, meaningful representation, relations with higher level systems (biological and artificial agents), evolution of meaning generation with the evolution of constraints.
b) It has been highlighted that the MGS and corresponding meaningful representations:
- make possible some evolutionary scenarios for cognition and intentionality.
- make possible an evolutionary scenario for self-consciousness with anxiety limitation as a key human constraint.
- allow to address some limits of today AI by introducing meaning generation in the Turing Test.
c) Continuations:
- Use the existing evolutionary scenario for self-consciousness to challenge the postulate status of pre-reflective self-consciousness.
- Apply the evolutionary approach on local constraints to our pre-biotic universe.
- Investigate the evolutionary build-up of anxiety limitation processes for a better understanding of human mind.
- Consider refined modes of anxiety management to improve our human mental health.

References

[I] Menant, C. (2003) " Information and Meaning". *Entropy 2003, 5, 193-204* http://philpapers.org/rec/MENIAM-2
[II] Menant, C. (2011) "Computation on Information, Meaning and Representations. An Evolutionary Approach". *Book chapter of "Information and Computation"* (World Scientific 2011) http://philpapers.org/rec/MENCOI
[III] Menant, C. (2015) "Biosemiotics, Aboutness, Meaning and Bio-intentionality. Proposal for an Evolutionary Approach" *Biosemiotics Gatherings 2015* https://philpapers.org/rec/MENBAM-2
[IV] Menant. C. (2011) "Cognition as management of meaningful information. Proposal for an evolutionary approach". *IACAP 2011 presentation*: https://philpapers.org/rec/MENCAM-6

- Introduction to a Systemic Theory of Meaning - March 2020 (4/4)

References (Cont')

[V] Menant, C. (2013) "Turing Test, Chinese Room Argument, Symbol Grounding Problem. Meanings in Artificial Agents" *APA Newsletter*: http://philpapers.org/rec/MENTTC-2
[VI] Menant, C. (2008) "From meaningful information to representations, Enaction and cognition" *E-CAP 08 presentation* http://philpapers.org/rec/MENFMI-2
[VII] Menant, C. (2018) "Proposal for an evolutionary nature of self-consciousness linked to a human specific anxiety". *(Neurex 2018 poster).* https://philpapers.org/rec/MENPFA-4
[VIII] Menant, C. (2018) "Self-consciousness and human evil. Proposal for an evolutionary approach" *(ASSC 22, poster)* https://philpapers.org/rec/MENSAH
[IX] Menant, C. (2017) "Information, Constraint and Meaning. From the pre-biotic world to a possible post human one. An evolutionary approach" *(IS4SI 2017 presentation).* https://philpapers.org/rec/MENICA-2
[X] Menant, C. (2019) "Constraint satisfaction, agency and meaning generation as an evolutionary framework for a constructive biosemiotics" https://philpapers.org/rec/MENCSA-2