

PROGRAMme systems workshop, June 8 2021

Titles and Abstracts

Maarten Bullynck (Université de Paris 8), Tomas Petricek (University of Kent) and Julian Rohrhuber (Robert schumann Hochschule)

Title: The system is dead! Long live the system!

Abstract: The term system typically refers to a technical notion of "operating system". However, to understand systems, we need to consider them from a wider perspective. Any human interaction with computer and programs involves systems of many different kinds: systems occupy an intermediate zone where resources must be handled, translations provided and access maintained. It is no surprise that the structure of technical systems often reflect social structures and that the boundaries between programmed work and programming work are ambiguous, the roles of programmer and user often shifting.

We start out with RUNCOM, a precursor to modern shell scripting tools, which exposes systems to users in unprecedented way and forced the developers of the Compatible Time Sharing System (CTSS) view it in a broader social context. The attempt to manage the social and technical context leads to a quest for logical closure that allows maintaining logical consistency inside a system. However, now we need to build bridges between the inside and the outside - both in the technical sense (to support networking and I/O operations) and in the social sense (to allow contributions and extensions to the system). To shed light on the environment in which programs exists, we present systems as stabilized situations in this continuous struggles between the technical and the social, the inside and the outside, the closed and the opened.

Jean-Gabriel Ganascia (LIP6, Sorbonne University)

Title: From Moral Artificial Agents to Computational Ethics

Abstract: With the development of Machine Learning techniques trained with Big Data, Artificial Intelligent systems while being more and more efficient, may sometimes become unpredictable. This could cause problem when these systems equip autonomous artificial agents, as autonomous cars or chatbots, of which behaviors infringe moral laws. To avoid such situations, it appears necessary to make these artificial agents moral, i.e. to ensure that they act in accordance to duty, i.e. to moral laws, which doesn't mean by reference to Kantian ethics, that they act from duty. We shall present our current attempts to design such moral artificial agents that act in conformity to moral laws by designing and implementing computational models of ethical systems.

Géza Kulcsar (InQuery Labs)

Title: Clouded Systems: Systems Engineering under the Rule of the Unknown

Abstract: The origins of the word 'system' indicate that the general notion of a system involves not only a compound wholeness or modularity and organization, but also an inherently dynamic principle of something emergent, something arising in the actuation process. In turn, in a technical context, this actuation or realization process is typically brought about by engineering, i.e., the practical work of furnishing an entity (here, a system) with its essential distinguishing qualities. In short, to engineer is to invent - typically, to create a machine instructed to perform a given task. Thus, the systems engineering process has at its root an implied finiteness and definiteness, which seems to contradict or at least not completely match the emergence aspect. This discrepancy is magnified in nowadays engineering scenarios, often explicitly aiming at designing reactive, autonomous systems with a high uncertainty about the environment, as seen in the recent hype around notions like the Internet of Things, cloud computing and Systems of Systems. But how can an autonomous, networked system be instructed? Is it still a system? Can it be engineered? In the talk, we explore those questions on a wide range, from their fundamental ontologic aspects to recent systems engineering problems.

Teresa Numerico (Roma Tre University)

Title: The late victory of the cybernetical systemic approach in machine intelligence

Abstract: The idea of human machine integration of Cybernetics was not similar to the first projects of artificial intelligence in terms of technical aims and tools (Galison, 1994), though they proceed hand in hand during the Fifties, the Sixties. The failure of the project of AI as a substitution of human intelligence as in the strong AI programs, which happened during the Eighties (Franchi, Güzeldere 2005) was the anticipation of the victory of the cybernetical systemic approach (Wiener 1948, 1954).

The system that was at the center of Cybernetics implied two different layers. The first was the communication/control integration between the machine and the humans who were managing and orienting it. The second layer was related to the social perception which was a crucial element of attribution of intelligence to the technical system.

Since 1948, Turing himself, who is wrongly considered the champion of the computational intelligence approach to AI, suggested that the attribution of intelligence to the machine depended on a social definition: "The extent to which we regard something as behaving in an intelligent manner is determined as much by our own state of mind and training as by the properties of the object under consideration" (Turing 1948/2004, p. 431).

This attitude was not pursued in the first season of artificial intelligence, but it is very well understood now. When machine learning systems became data driven and the pattern recognition capabilities had to do with the learning bias imposed by the programmers as well as with the work of the taggers to train the neural network for the recognition purposes plus the activities of the unaware users, it is clear that only a systemic view could

attribute intelligence to the sociotechnical complex device for predicting and prescribing the future (Rouvroy Berns 2013).

The new data driven science on which the new generation of successful AI tools are based is clearly founded on a systemic complex view of intelligence which is captured from human beings and embodied in the machine. Such embodiment is not only understandable from the rational perspective, but also from the perception/emotion/imagination circuit of socio-technical environment in which we are all embedded.

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