AGH University of Technology
Krakow, 30 January 2019

Ethics by Design of Large-Scale Multi-Agent Systems

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Abstract

To fit with the fast-growing number of autonomous agents and the need of an increased focus on end users, engineering complex multi-agent systems have to evolve towards more scalable and ethical systems, in the respect of the users these systems are designed to serve. Based on VOWELS modelling, we propose an iterative method of constructing such scalable and ethical systems, which is divided into six stages, each of them being independently verified, and the whole system being empirically validated. We firstly focus on the two first stages of the method. The first models the end-users in terms of preferences, capabilities, activities and expectations, and the environment in which they operate. The second deals with personal data protection mechanisms to ensure privacy. We then investigate how to determine, at design time, the right balance between legal aspects and moral aspects of concerned agents. We show how this balance depends on the problem to solve, of the application domain, and how it should evolve over time. We illustrate the design of such large-scale agent-based systems and the balance between legal and moral issues about three application domains: personal assistants, autonomous transports, and health informatics. We detail issues related with unmanned aerial vehicles. We finally discuss how legal and moral aspects differ from one country to another. We believe the methodology of designing large-scale agent-based systems we propose can be adopted internationally to enable the acceptance of large-scale systems by a wider public.

References

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Curriculum Vitae

Yves Demazeau received his PhD in Computer Science at INP Grenoble Institute in 1986. He has been distinguished ECCAI Fellow in 2010 and Doctor Honoris Causa at University of Southern Denmark Odense in 2017. He is Director of Research at CNRS since 1988, and Invited Professor at USD since 2002. Yves Demazeau is one of the founders of the Multi-Agent Systems (MAS) area. He has edited 39 books or proceedings, has authored or co-authored 190 papers and has been invited for 54 lectures, 22 tutorials, and 196 seminars. He has (co-)advised 57 MSc students and 29 PhD students and served in 278 conference program committees. He is conducting the PAAMS series since 2009 and the National AI Platform PFIA since 2013. He is Editor-in-Chief of the French AI Journal (RIA) since 2010 and President of the French Association for Artificial Intelligence (AFIA) since 2011.