SRM ACM Student Chapter, India, - Invited Lecture

Cognitive Heuristics for Commonsense Thinking and Reasoning in the next generation Artificial Intelligence

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Date: Saturday, 30th March 2021

Commonsense reasoning is one of the main open problems in the field of Artificial Intelligence (AI) while, on the other hand, seems to be a very intuitive and default reasoning mode in humans and other animals. In this talk, we discuss the different paradigms that have been developed in AI and Computational Cognitive Science to deal with this problem (ranging from logic-based methods, to diagrammatic-based ones). In particular, we discuss - via two different case studies concerning commonsense categorization and knowledge invention tasks - how cognitively inspired heuristics can help (both in terms of efficiency and efficacy) in the realization of intelligent artificial systems able to reason in a human-like fashion, with results comparable to human-level performances.

References

Lieto, A., & Pozzato, G. L. (2020). A description logic framework for commonsense conceptual combination integrating typicality, probabilities and cognitive heuristics. *Journal of Experimental & Theoretical Artificial Intelligence*, 32(5), 769-804.

Chiodino, E., Di Luccio, D., Lieto, A., Messina, A., Pozzato, G. L., & Rubinetti, D. (2020). A knowledge-based system for the dynamic generation and classification of novel contents in multimedia broadcasting. *Proceedings of ECAI* 2020, 680 - 687.

Lieto, A., Perrone, F., Pozzato, G. L., & Chiodino, E. (2019). Beyond subgoaling: A dynamic knowledge generation framework for creative problem solving in cognitive architectures. *Cognitive Systems Research*, 58, 305-316.

Lieto, A., Pozzato, G. L., Perrone, F., & Chiodino, E. (2019). Knowledge capturing via conceptual reframing: A goal-oriented framework for knowledge invention. In K-CAP 2019, *Proceedings of the 10th International Conference on Knowledge Capture* (pp. 109-114).

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Lieto, A., & Pozzato, G. L. (2018, October). A description logic of typicality for conceptual combination. In *International Symposium on Methodologies for Intelligent Systems* (pp. 189-199). Springer, Cham.

Chiodino, E., Lieto, A., Perrone, F., & Pozzato, G. L. (2020). A goal-oriented framework for knowledge invention and creative problem solving in cognitive architectures. *Proceedings of ECAI 2020*, 2893-2894.