



## Lecture Series 2024 - IEEE SMC Italy Chapter

### Weighted Commonsense Knowledge Graphs: Construction and Utilization

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On line: [LINK](#)

#### Abstract:

The talk presents an approach for constructing weighted commonsense knowledge graphs, which encapsulate general information through frequency-based weights on nodes and relations. The procedure for automatically building these graphs using deep learning models to process images is described. An initially constructed visual-data-generated commonsense knowledge graph is further expanded. The process leverages pre-trained language models to learn the context of the initial graph with minimal bias. The chain-of-thought prompting method enriches the graphs with new concepts and assigns fuzzy linguistic terms to the generated information.

This two-step process—vision mining followed by prompting language models—facilitates the auto-generation of a commonsense knowledge graph, abundant in physical commonsense knowledge. Additionally, it is shown how these graphs support possibilistic-based commonsense reasoning.



**Bio:** Marek Reformat received his M.Sc. degree (with honors) from the Technical University of Poznan, Poland, and his Ph.D. from the University of Manitoba, Canada. He is a Full Professor in the Department of Electrical and Computer Engineering at the University of Alberta.

His research activities aim to develop methods and techniques for intelligent data modeling and analysis that lead to the translation of data into knowledge and to design systems that can imitate different aspects of human behavior. In this context, he recognizes the concepts of Computational Intelligence – with fuzzy computing and possibility theory in particular – as crucial elements for capturing relationships between data and knowledge and mimicking human reasoning about opinions and facts.

He is an Associate Editor of several international journals. In addition, he has been a general and program chair and a member of program committees of numerous international conferences related to Computational Intelligence and Software Engineering.

He is a past president of the North American Fuzzy Information Processing Society (NAFIPS) and the International Fuzzy Systems Association (IFSA).