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CIDMA
CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

SEMINAR

Grupo de Análise Funcional e Aplicações
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Generalization of the Belief Propagation Algorithm

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Abstract

The Belief Propagation (BP) Algorithm is an inference algorithm with applications to any system that can be represented as a factor graph. Meanwhile, algorithms such the forward/backward algorithm, the Viterbi algorithm, the iterative "turbo" decoding algorithm, the Kalman filter and certain fast Fourier transform algorithms are also specific instances of the BP algorithm.
In this seminar it will be presented a generalization of the BP Algorithm so it can be applied to broader variety of inference problems. For that we define a 'L-set theory', based on a fuzzy logic and the concept of membership functions, as well as a 'S-measurable space', based on the concept of measurable spaces and aggregation functions. A 'generalised' factor graph will then be defined from a pair of aggregations functions (which satisfy certain conditions but that can be different to the sum and product functions of the standard factor graph). Such a factor graph can be more particularly called a 'measurable factor graph' if defined on a S-measurable space (in the standard case, on a probability space).

Room Sousa Pinto
June 12, 2024 - 14:30

This seminar is supported in part by the Portuguese Foundation for Science and Technology (FCT - Fundação para a Ciência e a Tecnologia), through CIDMA - Center for Research and Development in Mathematics and Applications, within project UIDB/04106/2020 (https://doi.org/10.54499/UIDB/04106/2020).

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