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"Representing Uncertainty through Many-Valued Logics"

INVITED TALK FEATURING

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Monday, November 18th - 10:30 AM – 11:30 AM
BYENG 210

Abstract:

The aim of this talk is to offer a concise overview of some of the main properties of many-valued logics and their use in the representation of uncertainty. One of the main features of many-valued logics with real-valued semantics is the fact that the valuation of each formula corresponds to a function over the reals. For instance, Lukasiewicz infinite-valued logic is the logic of continuous piecewise linear polynomial functions over the unit cube $[0, 1]^n$. The fact that certain operations are encoded in the syntax makes it possible to use formulas to represent functional relations at the symbolic level. This has been exploited in order to represent measures such as probability, possibility and necessity, and belief functions. In fact, in several works, many-valued logics have been expanded with the addition of a modality whose intended meaning is the degree of uncertainty of a certain proposition. The basic properties of a class of uncertainty measures can then be encoded through formulas depending on the operations that characterize the class. This approach is also being used to represent expected utility and strategic interaction between players in non-cooperative games with discrete polynomial functions.

In this talk, we shall discuss these formal representations from a general point of view and focus on both their logical and computational properties.

BIO:

Enrico Marchioni is a Marie Curie Postdoctoral Research Fellow in Engineering and Information Sciences at the Institut de Recherché en Informatique de Toulouse (IRIT), Paul Sabatier University, France.

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