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Redefinition of mutual information in the fuzzy sets framework for computational genomics.

(English) [Zbl 1221.92044](#)

Madani, Kurosh (ed.) et al., Computational intelligence. Revised and selected papers of the 1st international joint conference IJCCI 2009 held in Funchal, Madeira, Portugal, October 5–7, 2009. Berlin: Springer (ISBN 978-3-642-20205-6/hbk; 978-3-642-20206-3/ebook). Studies in Computational Intelligence 343, 73–83 (2011).

Summary: Mutual information is a measure of correlation between two discrete random variables: the aim of this work is to provide a new definition of mutual information using concepts from fuzzy sets theory, to extend it to continuous variables. With this approach, we extended the model on which the well known REVEAL algorithm for reverse engineering of gene regulatory networks is based and we designed a new flexible version of it, called FuzzyReveal, able to avoid the loss of information caused by the binarization of the continuous biological variables. The predictive power of our new version of the algorithm is promising, being both significantly higher than the one of REVEAL and comparable with a state-of-the-art algorithm on a set of simulated problems.

For the entire collection see [\[Zbl 1217.68014\]](#).

MSC:

[92C42](#) Systems biology, networks

[68T05](#) Learning and adaptive systems in artificial intelligence

[62B86](#) Statistical aspects of fuzziness, sufficiency, and information

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