

عنوان مقاله:

Rule-based joint fuzzy and probabilistic networks

محل انتشار:

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خلاصه مقاله:

One of the important challenges in Graphical models is the problem of dealing with the uncertainties in the problem. Among graphical networks, fuzzy cognitive map is only capable of modeling fuzzy uncertainty and the Bayesian network is only capable of modeling probabilistic uncertainty. In many real issues, we are faced with both fuzzy and probabilistic uncertainties. In these cases, the proposed method of this paper can take into account both types of uncertainty with a new and different approach. In this method, we avoid fuzzy transformations to probabilities and vice versa, and fuzzy uncertainties and probabilities are considered jointly. For this purpose, in the original graphical model, first, the type of uncertainty of each node is identified, and accordingly two separate fuzzy and probabilistic networks are constructed. In these networks, relations between nodes are expressed in terms of a set of rules. In each network, fuzzy and probabilistic inference is individually constructed and ultimately the values obtained from each network are combined. This method has been tested on a real problem of localization in wireless sensor networks. In this case, a sensor with uncertain location should be able to predict its location from the received power of its adjacent sensors. In the given scenario, 60 sensors with uncertain locations and 11 sensors with a specific location are considered. Meanwhile, the average location error of sensors has been used to evaluate the methods. The simulation results show the efficiency of the proposed method well.

کلمات کلیدی:

Graphical models, fuzzy cognitive map, Bayesian network, fuzzy and probabilistic uncertainty, rules, Wireless sensor network

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