Topic 1:

Data-driven Interpretable Fuzzy Systems

Abstract

AI has become a popular research topic in recent years and has shown great success in different applications. However, most AI models function as black boxes and it is hard to explain the inference process of a suggestion made by these models. In this context, explainable AI (XAI) has attracted the attention of many researchers. Fuzzy systems (FSs) that show the advantage of interpretability in their inference fuzzy rules may provide a possible solution to XAI. In this talk, the basic concept of FSs and their interpretability will be introduced. Then, I will introduce our recent research results in data-driven interpretable FSs. Two learning techniques of data-driven interpretable FSs, including fuzzy neural networks (FNNs) and multiobjective evolutionary FSs (EFSs), will be introduced together with their applications. For FNNs, I will start with learning with low-dimensional data and its application to classification and prediction problems. Learning of FNNs with high-dimensional feature maps from a deep learning model and its application to image classification problems will then be given. The technique of multiobjective EFSs aims to find a set of non-dominated FSs that show tradeoffs between different objectives such as system interpretability and model accuracy through multiobjective evolutionary computation algorithms. In this subtopic, I will introduce the Multiobjective EFS we recently proposed and its applications.