Fuzzy Rule-Based Classifier Design: Tradeoff between Accuracy and Interpretability

This talk starts with explanations about basic concepts in fuzzy logics such as fuzzy sets, membership functions and fuzzy rules. Next, a brief historical review on fuzzy rule-based system design is given. Then simple heuristic methods for fuzzy rule generation and accuracy improvement attempts are explained. It is shown that there is a clear tradeoff relation between accuracy improvement and interpretability improvement in the design of fuzzy rule-based systems. Finally fuzzy rule-based classifier design is formulated as multi-objective optimization problem to which evolutionary algorithms are applied. Some research directions towards explainable fuzzy system designs are also discussed.