

Rule Based Fuzzy Classification Using Squashing Functions

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Abstract – In this paper we are dealing with the construction of a fuzzy rule based classifier. A three-step method is proposed based on Łukasiewicz logic for the description of the rules and the fuzzy memberships to construct concise and highly comprehensible fuzzy rules. In our method, a genetic algorithm is applied to evolve the structure of the rules and then a gradient based optimization to fine tune the fuzzy membership functions. The introduced squashing function allows us not only to handle the approximation of the operators and the memberships in the same way, but also to efficiently calculate the derivatives of the membership functions. We also show applications of the model on the UCI machine learning database.

Index terms – Łukasiewicz logic, squashing function, rule based classifier