

ABSTRACT

ALMEIDA, Cesar Eduardo Ferreira de. *FTP-CGP: synthesis of fuzzy pattern trees for regression by cartesian genetic programming*. 2017. 80f. Dissertação (Mestrado em Engenharia Eletrônica) – Faculdade de Engenharia, Universidade do Estado do Rio de Janeiro, Rio de Janeiro, 2017.

This work explores an alternative model uses fuzzy set theory to solve regression problems. Instead of the traditional fuzzy rule based system, a hierarchical structure called Fuzzy Pattern Trees for Regression, which represents knowledge in a more compact way and presents a compromise between security and interpretability, has been used. This structure in the form of a tree is composed of leaves that are fuzzy terms associated with the attributes. The outputs are approximations of the real values of functions that are synthesized to solve the regression problem. The algorithm for synthesis was replaced by Cartesian Genetic Programming, which can efficiently explore large search spaces. In this work two models were created that exploit a synergy of APFs and PGC. The experimental part performed through available data sets in the UCI and KEEL repositories sought to find a better overall configuration for the trees and compare models created here with the k nearest neighbors, Linear Regression, Regression Trees, Support Vector Machines and Multilayer Perceptrons. In addition, a comparison was made with the original method of APFs. Results were competitive in terms of accuracy and interpretability.

Keywords: Fuzzy Pattern Trees; Cartesian Genetic Programming; Regression; Interpretability.