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ABOUT

Abstract

The undesired effects of data gathered from real world can be produced by the noise in the process, the bias of the sensors and the presence of hysteresis, among other uncertainty sources. In previous works the learning models using the so-called Low Quality Data (LQD) has been studied in order to analyze the way to represent the uncertainty. It makes use of genetic programming and the multiobjective simulated annealing heuristic, which has been hybridized with genetic operators. The role of the tree generation methods when learning LQD was studied in that paper. The present work deals with the analysis of the generation methods relevance in depth and provides with statistical studies on the obtained results.

Keywords Genetic Programming - Genetic Algorithm and Programming - Low Quality Data - Multiobjective Simulated Annealing

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An Study of the Tree Generation Algorithms in Equation Based Model Learning with Low Quality Data

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Abstract. The undesired effects of data gathered from real world can be produced by the noise in the process, the bias of the sensors and the presence of hysteresis, among other uncertainty sources. In previous works the learning models using the so-called Low Quality Data (LQD) has been studied in order to analyze the way to represent the uncertainty. It makes use of genetic programming and the multiobjective simulated annealing heuristic, which has been hybridized with genetic operators. The role of the tree generation methods when learning LQD was studied in that paper. The present work deals with the analysis of the generation methods relevance in depth and provides with statistical studies on the obtained results.

Keywords: Genetic Programming, Genetic Algorithm and Programming, Low Quality Data, Multiobjective Simulated Annealing.

1 Introduction

With the scarce energy sources and the worsening environmental pollution, how to use the existing energy is becoming a very important challenge in various fields of modern engineering [8,6,16]. For example, notorious efforts have been made within the area of lighting control systems, whose aim is to control the electrical power consumption for the ballast in the installation so the luminance complies with the regulations. In [13,15] a lighting control system was considered to show the relevance of the uncertainty for an efficient energy use. The typical control loop includes a light sensor, the light ballasts and a light controller. The sensors measure the amount of light in a room, but they have some drawbacks: they operate with hysteresis and saturation [6] and their measurements depend on the light sensor unit. In the studied literature, when obtaining models for simulation, only crisp values are regarded as the measurements from light sensors. Obviously, the inputs and outputs of the light sensor models obtained

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