

Modeling Dynamical Systems with Data Stream Mining

Aljaž Osojnik¹, Sašo Džeroski¹,

^a*Jožef Stefan Institute, Jamova 39, Ljubljana, Slovenia*

Abstract

We address the task of modeling dynamical systems in discrete time using regression trees, model trees and option trees for on-line regression. Some challenges that modeling dynamical systems pose to data mining approaches are described: these motivate the use of methods for mining data streams. The algorithm FIMT-DD for mining data streams with regression or model trees is described, as well as the FIMT-DD based algorithm ORTO, which learns option trees for regression. These methods are then compared on several case studies, i.e., tasks of learning models of dynamical systems from observed data. The experimental setup, including the datasets, and the experimental results are presented in detail. These demonstrate that option trees for regression work best among the considered approaches for learning models of dynamical systems from streaming data.

Email addresses: aljaz.osojnik@ijs.si (Aljaž Osojnik), saso.dzeroski@ijs.si (Sašo Džeroski)