

Preface

This book treats the problem of learning from data streams generated by time-based and evolving nonstationary processes. It presents major and well-known techniques, methods, and tools able to manage, to exploit, and to interpret correctly the increasing amount of data in environments that are continuously changing. The goal is to build a predictor (classifier, learner), about the future system behavior, able to tackle and to govern the high variability of evolving and nonstationary systems. This book addresses the problems of modeling, prediction, classification, data understanding, and processing in nonstationary and unpredictable environments. It presents some major and well-known methods for the design of systems able to learn and to fully adapt their structure and to adjust their parameters according to the changes in their environments. In summary, this book aims at (1) defining the problem of learning from data streams in evolving and nonstationary environments, its interests, its applications, and its challenges, (2) providing a general scheme and principals of methods and techniques treating the problem of learning from data streams in evolving and nonstationary environments, (3) listing the major applications of these methods and techniques in various real-world problems, and (4) comparing these methods and techniques in order to define some new research directions in the area of learning from data streams in evolving and nonstationary environments.

Keywords: Drift monitoring; Self-adaptive learning methods; Data streams; Online learning; Incremental-decremental learning

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