Data Complexity in Pattern Recognition [

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Monografía

Machines capable of automatic pattern recognition have many fascinating uses in science and engineering as well as in our daily lives. Algorithms for supervised classification, where one infers a decision boundary from a set of training examples, are at the core of this capability. Tremendous progress has been made in refining such algorithms; yet, automatic learning in many simple tasks in daily life still appears to be far from reach. This book takes a close view of data complexity and its role in shaping the theories and techniques in different disciplines and asks: • What is missing from current classification techniques? • When the automatic classifiers are not perfect, is it a deficiency of the algorithms by design, or is it a difficulty intrinsic to the classification task? • How do we know whether we have exploited to the fullest extent the knowledge embedded in the training data? Data Complexity in Pattern Recognition is unique in its comprehensive coverage and multidisciplinary approach from various methodological and practical perspectives. Researchers and practitioners alike will find this book an insightful reference to learn about the current status of available techniques as well as application areas

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Contenido: Theory and Methodology -- Measures of Geometrical Complexity in Classification Problems -- Object Representation, Sample Size and Dataset Complexity -- Measures of Data and Classifier Complexity and the Training Sample Size -- Linear Separability in Descent Procedures for Linear Classifiers -- Data Complexity, Margin-based Learning and Popper's Philosophy of Inductive Learning -- Data Complexity and Evolutionary Learning -- Data Complexity and Domains of Competence of Classifiers -- Data Complexity Issues in Grammatical Inference -- Applications -- Simple Statistics for Complex Feature Spaces -- Polynomial Time for Complexity Graph Distance Computation for Web Content Mining -- Data Complexity in Clustering Analysis for Gene Microarray Expression Profiles -- Complexity of Magnetic Resonance Spectrum Classification -- Data Complexity in Tropical Cyclone Positioning and Classification -- Human-Computer Interaction for Complex Pattern Recognition Problems -- Complex Image Recognition and Web Security

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