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Titolo	Derivative-Free Optimization : Theoretical Foundations, Algorithms, and Applications // by Yang Yu, Hong Qian, Yi-Qi Hu
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Collana	Machine Learning: Foundations, Methodologies, and Applications, , 2730-9916
Altri autori (Persone)	QianHong HuYi-Qi
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Nota di contenuto	Introduction -- Preliminaries -- Framework -- Theoretical Foundation -- Basic Algorithm -- Optimization in Sequential Mode -- Optimization in High-Dimensional Search Space -- Optimization under Noise -- Optimization with Parallel Computing.
Sommario/riassunto	This book offers a pioneering exploration of classification-based derivative-free optimization (DFO), providing researchers and professionals in artificial intelligence, machine learning, AutoML, and optimization with a robust framework for addressing complex, large-scale problems where gradients are unavailable. By bridging theoretical foundations with practical implementations, it fills critical gaps in the field, making it an indispensable resource for both academic and industrial audiences. The book introduces innovative frameworks such as sampling-and-classification (SAC) and sampling-and-learning (SAL), which underpin cutting-edge algorithms like Racos and SRacos. These methods are designed to excel in challenging optimization scenarios, including high-dimensional search spaces, noisy environments, and parallel computing. A dedicated section on the ZOOpt toolbox provides practical tools for implementing these algorithms effectively. The book'

s structure moves from foundational principles and algorithmic development to advanced topics and real-world applications, such as hyperparameter tuning, neural architecture search, and algorithm selection in AutoML. Readers will benefit from a comprehensive yet concise presentation of modern DFO methods, gaining theoretical insights and practical tools to enhance their research and problem-solving capabilities. A foundational understanding of machine learning, probability theory, and algorithms is recommended for readers to fully engage with the material.
