1. Record Nr. UNINA9910337639903321

Titolo	Machine Learning in VLSI Computer-Aided Design / / edited by Ibrahim (Abe) M. Elfadel, Duane S. Boning, Xin Li
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2019
ISBN	3-030-04666-4
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (697 pages)
Disciplina	621.395
Soggetti	Electronic circuits Microprocessors Logic design Circuits and Systems Processor Architectures Logic Design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter1: A Preliminary Taxonomy for Machine Learning in VLSI CAD -- Chapter2: Machine Learning for Compact Lithographic Process Models -- Chapter3: Machine Learning for Mask Synthesis -- Chapter4: Machine Learning in Physical Verification, Mask Synthesis, and Physical Design -- Chapter5: Gaussian Process-Based Wafer-Level Correlation Modeling and its Applications -- Chapter6: Machine Learning Approaches for IC Manufacturing Yield Enhancement -- Chapter7: Efficient Process Variation Characterization by Virtual Probe -- Chapter8: Machine learning for VLSI chip testing and semiconductor manufacturing process monitoring and improvement -- Chapter9: Machine Learning based Aging Analysis -- Chapter10: Extreme Statistics in Memories -- Chapter11: Fast Statistical Analysis Using Machine Learning -- Chapter12: Fast Statistical Analysis of Rare Circuit Failure Events -- Chapter13: Learning from Limited Data in VLSI CAD -- Chapter14: Large-Scale Circuit Performance Modeling by Bayesian Model Fusion -- Chapter15: Sparse Relevance Kernel Machine Based Performance Dependency Analysis of Analog and Mixed-Signal Circuits

-- Chapter16: SiLVR: Projection Pursuit for Response Surface Modeling -- Chapter17: Machine Learning based System Optimization and Uncertainty Quantification of Integrated Systems -- Chapter18: SynTunSys: A Synthesis Parameter Autotuning System for Optimizing High-Performance Processors -- Chapter19: Multicore Power and Thermal Proxies Using Least-Angle -- Chapter20: A Comparative Study of Assertion Mining Algorithms in GoldMine -- Chapter21: Energy-Efficient Design of Advanced Machine Learning Hardware.

Sommario/riassunto

This book provides readers with an up-to-date account of the use of machine learning frameworks, methodologies, algorithms and techniques in the context of computer-aided design (CAD) for very-large-scale integrated circuits (VLSI). Coverage includes the various machine learning methods used in lithography, physical design, yield prediction, post-silicon performance analysis, reliability and failure analysis, power and thermal analysis, analog design, logic synthesis, verification, and neuromorphic design. Provides up-to-date information on machine learning in VLSI CAD for device modeling, layout verifications, yield prediction, post-silicon validation, and reliability; Discusses the use of machine learning techniques in the context of analog and digital synthesis; Demonstrates how to formulate VLSI CAD objectives as machine learning problems and provides a comprehensive treatment of their efficient solutions; Discusses the tradeoff between the cost of collecting data and prediction accuracy and provides a methodology for using prior data to reduce cost of data collection in the design, testing and validation of both analog and digital VLSI designs. From the Foreword As the semiconductor industry embraces the rising swell of cognitive systems and edge intelligence, this book could serve as a harbinger and example of the osmosis that will exist between our cognitive structures and methods, on the one hand, and the hardware architectures and technologies that will support them, on the other….As we transition from the computing era to the cognitive one, it behooves us to remember the success story of VLSI CAD and to earnestly seek the help of the invisible hand so that our future cognitive systems are used to design more powerful cognitive systems. This book is very much aligned with this on-going transition from computing to cognition, and it is with deep pleasure that I recommend it to all those who are actively engaged in this exciting transformation. Dr. Ruchir Puri, IBM Fellow, IBM Watson CTO & Chief Architect, IBM T. J. Watson Research Center.