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Titolo	Machine Learning in Radiation Oncology : Theory and Applications / / edited by Issam El Naqa, Ruijiang Li, Martin J. Murphy
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Soggetti	Radiotherapy Medical physics Radiation Medical and Radiation Physics
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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction: What is Machine Learning -- Computational Learning Theory -- Overview of Supervised Learning Methods -- Overview of Unsupervised Learning Methods -- Performance Evaluation -- Variety of Applications in Radiation Oncology -- Machine Learning for Quality Assurance: Quality Assurance as a Learning Problem -- Detection of Radiotherapy Errors Using Unsupervised Learning -- Prediction of Radiotherapy Errors Using Supervised Learning -- Machine Learning for Computer-Aided Detection: Detection of Cancer Lesions from Imaging -- Classification of Malignant and Benign Tumours -- Machine Learning for Treatment Planning and Delivery -- Image-guided Radiotherapy with Machine Learning: IMRT Optimization Using Machine Learning -- Treatment Assessment Tools -- Machine Learning for Motion Management: Prediction of Respiratory Motion -- Motion-Correction Using Learning Methods -- Machine Learning Application in 4D-CT -- Machine Learning Application in Dynamic Delivery -- Machine Learning for Outcomes Modeling: Bioinformatics of Treatment Response -- Modelling of Norma Tissue Complication Probabilities

(NTCP) -- Modelling of Tumour Control Probability (TCP).

Sommario/riassunto

This book provides a complete overview of the role of machine learning in radiation oncology and medical physics, covering basic theory, methods, and a variety of applications in medical physics and radiotherapy. An introductory section explains machine learning, reviews supervised and unsupervised learning methods, discusses performance evaluation, and summarizes potential applications in radiation oncology. Detailed individual sections are then devoted to the use of machine learning in quality assurance; computer-aided detection, including treatment planning and contouring; image-guided radiotherapy; respiratory motion management; and treatment response modeling and outcome prediction. The book will be invaluable for students and residents in medical physics and radiation oncology and will also appeal to more experienced practitioners and researchers and members of applied machine learning communities.