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Nota di contenuto	Machine Learning for H? Emitters Classification -- Stellar Dating Using Chemical Clocks and Bayesian Inference -- Detection of Quasi-Periodic Oscillations in Time Series of a Cataclysmic Variable Using Support Vector Machine -- Dust Extinction from Random Forest Regression of Interstellar Lines -- QSOs Selection in Highly Unbalanced Photometric Datasets: The "Michelangelo" Reverse-Selection Method -- Radio Galaxy Detection Prediction with Ensemble Machine Learning -- A Machine Learning Suite to Halo-Galaxy Connection -- New Applications of Graph Neural Networks in Cosmology -- Detection of Point Sources in Maps of the Temperature Anisotropies of the Cosmic Microwave Background -- Reconstruction and Particle Identification with CYGNO Experiment -- Event Reconstruction for Neutrino Telescopes -- Classification of Evolved Stars with (Unsupervised) Machine Learning

Post Proceedings -- Patterns in the Chaos: An Unsupervised View of Galactic Supernova Remnants -- Clustering of Galaxy Spectra: An Unsupervised Approach with Fisher-EM -- Unsupervised Classification Reveals New Evolutionary Pathways -- In Search of the Peculiar: An Unsupervised Approach to Anomaly Detection in the Transient Universe -- Classifying Gamma-Ray Burst X-Ray Afterglows with a Variational Autoencoder -- Reconstructing Blended Galaxies with Machine Learning -- Time Domain Astroinformatics -- A Convolutional Neural Network to Characterise the Internal Structure of Stars -- Finding Stellar Flares with Recurrent Deep Neural Networks -- Planetary Markers in Stellar Spectra: Jupiter-Host Star Classification -- Using Convolutional Neural Networks to Detect and Confirm Exoplanets -- Machine Learning Applied to X-Ray Spectra: Separating Stars from Active Galactic Nuclei -- Classification of System Variability Using A CNN -- Deep Learning Processing and Analysis of Mock Astrophysical Observations -- Deep Neural Networks for Source Detection in Radio Astronomical Maps -- Radio Image Segmentation with Autoencoders -- Citizen Science and Machine Learning: Towards a Robust Large-Scale Automatic Classification in Astronomy -- Background Estimation in Fermi Gamma-Ray Burst Monitor Lightcurves Through a Neural Network -- Machine Learning Investigations for LSST: Strong Lens Mass Modeling and Photometric Redshift Estimation -- Multi-Band Photometry and Photometric Redshifts from Astronomical Images -- Inference of Galaxy Clusters Mass Radial Profiles from Compton-? Maps with Deep Learning Technique -- Deep Learning 21cm Lightcones in 3D -- ConvNets for Enhanced Background Discrimination in the Diffuse Supernova Neutrino-Background (DSNB) Search -- Deep Neural Networks for Single-Line Event Direction Reconstruction in ANTARES -- Cats Vs Dogs, Photons Vs Hadrons -- Events Classification in MAGIC Through Convolutional Neural Network Trained with Images of Observed Gamma-Ray Events -- Federated Learning Meets HPC and Cloud -- Integration and Deployment of Model Serving Framework at Production Scale -- Predictive Maintenance for Array of Cherenkov Telescopes.

Sommario/riassunto

This book reviews the state of the art in the exploitation of machine learning techniques for the astrophysics community and gives the reader a complete overview of the field. The contributed chapters allow the reader to easily digest the material through balanced theoretical and numerical methods and tools with applications in different fields of theoretical and observational astronomy. The book helps the reader to really understand and quantify both the opportunities and limitations of using machine learning in several fields of astrophysics.