1. Record Nr. UNINA9910255014703321

Titolo	Algorithmic advances in Riemannian geometry and applications : for machine learning, computer vision, statistics, and optimization / / edited by Hà Quang Minh, Vittorio Murino
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2016
Edizione	[1st ed. 2016.]
Descrizione fisica	1 online resource (XIV, 208 p. 55 illus., 51 illus. in color.)
Collana	Advances in Computer Vision and Pattern Recognition, , 2191-6586
Disciplina	516.373
Soggetti	Pattern recognition Computational intelligence Statistics Computer science—Mathematics Computer mathematics Artificial intelligence Mathematical statistics Pattern Recognition Computational Intelligence Statistics and Computing/Statistics Programs Mathematical Applications in Computer Science Artificial Intelligence Probability and Statistics in Computer Science
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Introduction -- Bayesian Statistical Shape Analysis on the Manifold of Diffeomorphisms -- Sampling Constrained Probability Distributions using Spherical Augmentation -- Geometric Optimization in Machine Learning -- Positive Definite Matrices: Data Representation and Applications to Computer Vision -- From Covariance Matrices to Covariance Operators: Data Representation from Finite to Infinite-Dimensional Settings -- Dictionary Learning on Grassmann Manifolds

-- Regression on Lie Groups and its Application to Affine Motion Tracking -- An Elastic Riemannian Framework for Shape Analysis of Curves and Tree-Like Structures.

Sommario/riassunto

This book presents a selection of the most recent algorithmic advances in Riemannian geometry in the context of machine learning, statistics, optimization, computer vision, and related fields. The unifying theme of the different chapters in the book is the exploitation of the geometry of data using the mathematical machinery of Riemannian geometry. As demonstrated by all the chapters in the book, when the data is intrinsically non-Euclidean, the utilization of this geometrical information can lead to better algorithms that can capture more accurately the structures inherent in the data, leading ultimately to better empirical performance. This book is not intended to be an encyclopedic compilation of the applications of Riemannian geometry. Instead, it focuses on several important research directions that are currently actively pursued by researchers in the field. These include statistical modeling and analysis on manifolds,optimization on manifolds, Riemannian manifolds and kernel methods, and dictionary learning and sparse coding on manifolds. Examples of applications include novel algorithms for Monte Carlo sampling and Gaussian Mixture Model fitting, 3D brain image analysis,image classification, action recognition, and motion tracking.