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Nota di contenuto	3D FACE MODELING, ANALYSIS AND RECOGNITION; Contents; Preface; List of Contributors; 1 3D Face Modeling; 1.1 Challenges and Taxonomy of Techniques; 1.2 Background; 1.2.1 Depth from Triangulation; 1.2.2 Shape from Shading; 1.2.3 Depth from Time of Flight (ToF); 1.3 Static 3D Face Modeling; 1.3.1 Laser-stripe Scanning; 1.3.2 Time-coded Structured Light; 1.3.3 Multiview Static Reconstruction; 1.4 Dynamic 3D Face Reconstruction; 1.4.1 Multiview Dynamic Reconstruction; 1.4.2 Photometric Stereo; 1.4.3 Structured Light; 1.4.4 Spacetime Faces; 1.4.5 Template-based Post-processing 1.5 Summary and ConclusionsExercises; References; 2 3D Face Surface Analysis and Recognition Based on Facial Surface Features; 2.1 Geometry of 3D Facial Surface; 2.1.1 Primary 3D Surface Representations; 2.1.2 Rigid 3D Transformations; 2.1.3 Decimation of 3D Surfaces; 2.1.4 Geometric and Topological Aspects of the Human Face; 2.2 Curvatures Extraction from 3D Face Surface; 2.2.1 Theoretical Concepts on 3D Curvatures; 2.2.2 Practical Curvature Extraction Methods; 2.3 3D Face Segmentation; 2.3.1 Curvature-based 3D Face

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	Segmentation; 2.3.2 Bilateral Profile-based 3D Face Segmentation 2.4 3D Face Surface Feature Extraction and Matching2.4.1 Holistic 3D Facial Features; 2.4.2 Regional 3D Facial Features; 2.4.3 Point 3D Facial Features; 2.5 Deformation Modeling of 3D Face Surface; Exercises; References; 3 3D Face Surface Analysis and Recognition Based on Facial Curves; 3.1 Introduction; 3.2 Facial Surface Modeling; 3.3 Parametric Representation of Curves; 3.4 Facial Shape Representation Using Radial Curves; 3.5 Shape Space of Open Curves; 3.5.1 Shape Representation; 3.5.2 Geometry of Preshape Space; 3.5.3 Reparametrization Estimation by Using Dynamic Programming 3.5.4 Extension to Facial Surfaces Shape Analysis3.6 The Dense Scalar Field (DSF); 3.7 Statistical Shape Analysis; 3.7.1 Statistics on Manifolds: Karcher Mean; 3.7.2 Learning Statistical Models in Shape Space; 3.8 Applications of Statistical Shape Analysis; 3.8.1 3D Face Restoration; 3.8.2 Hierarchical Organization of Facial Shapes; 3.9 The Iso-geodesic Stripes; 3.9.1 Extraction of Facial Stripes; 3.9.2 Computing Relationships between Facial Stripes; 3.9.3 Face Representation and Matching Using Iso-geodesic Stripes; Exercises; Glossary; References 4 3D Morphable Models for Face Surface Analysis and Recognition4.1 Introduction; 4.2 Data Sets; 4.3 Face Model Fitting; 4.3.1 Distance Measure; 4.3.2 Iterative Face Fitting; 4.3.3 Coarse Fitting; 4.3.4 Fine Fitting; 4.3.5 Multiple Components; 4.3.6 Results; 4.4 Dynamic Model Expansion; 4.4.1 Bootstrapping Algorithm; 4.4.2 Results; 4.5 Face Matching; 4.5.1 Comparison; 4.5.2 Results; 4.6 Concluding Remarks; Exercises; References; 5 Applications; 5.1 Introduction; 5.2 3D Face Databases; 5.3 3D Face Recognition; 5.3.1 Challenges of 3D Face Recognition; 5.3.2 3D Face Recognition; State of the Art 5.3.3 Partial Face Matching
Sommario/riassunto	3D Face Modeling, Analysis and Recognition presents methodologies for analyzing shapes of facial surfaces, develops computational tools for analyzing 3D face data, and illustrates them using state-of-the-art applications. The methodologies chosen are based on efficient representations, metrics, comparisons, and classifications of features that are especially relevant in the context of 3D measurements of human faces. These frameworks have a long-term utility in face analysis, taking into account the anticipated improvements in data collection, data storage, processing speeds, and appl