

Preface

Face recognition is one of the most important abilities that we use in our daily lives. There are several reasons for the growing interest in automated face recognition, including rising concerns for public security, the need for identity verification for physical and logical access, and the need for face analysis and modeling techniques in multimedia data management and digital entertainment. Research in automatic face recognition started in the 1960s. Recent years have seen significant progress in this area and a number of face recognition and modeling systems have been developed and deployed. However, accurate and robust face recognition still offers a number of challenges to computer vision and pattern recognition researchers, especially under unconstrained environments.

This book is written with two primary motivations. The first is to compile major approaches, algorithms, and technologies available for automated face recognition. The second is to provide a reference book to students, researchers, and practitioners.

The book is intended for anyone who plans to work in face recognition or who wants to become familiar with the state-of-the-art in face recognition. It also provides references for scientists and engineers working in image processing, computer vision, biometrics and security, computer graphics, animation, and the computer game industry. The material contained in the book fits the following categories: advanced tutorial, state-of-the-art survey, and a guide to current technology.

This second edition consists of twenty seven chapters, with additions and updates from the sixteen chapters in the first edition. It covers all the subareas and major components necessary for developing face recognition algorithms, designing operational systems, and addressing related issues in large scale applications. Each chapter focuses on a specific topic or system component, introduces background information, reviews up-to-date techniques, presents results, and points out challenges and future directions.

The twenty seven chapters are divided into four parts according to the main problems addressed. Part I, *Face Image Modeling and Representation*, consists of ten chapters, presenting theories in face image modeling and facial feature representation. Part II, *Face Recognition Techniques*, also consists of ten chapters, presenting techniques for face detection, landmark detection, and face recognition in static face

images, in video, in non-visible spectrum images, and in 3D. Part III, *Performance Evaluation: Machines and Humans*, consists of three chapters, presenting methods and programs for face recognition evaluation and also studies and comparisons with human performance. Part IV, *Face Recognition Applications*, consists of four chapters, presenting various applications of face recognition and related issues.

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Beijing, People's Republic of China
East Lansing, USA

Stan Z. Li
Anil K. Jain

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Li, S.Z.; Jain, A.K. (Eds.)

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