

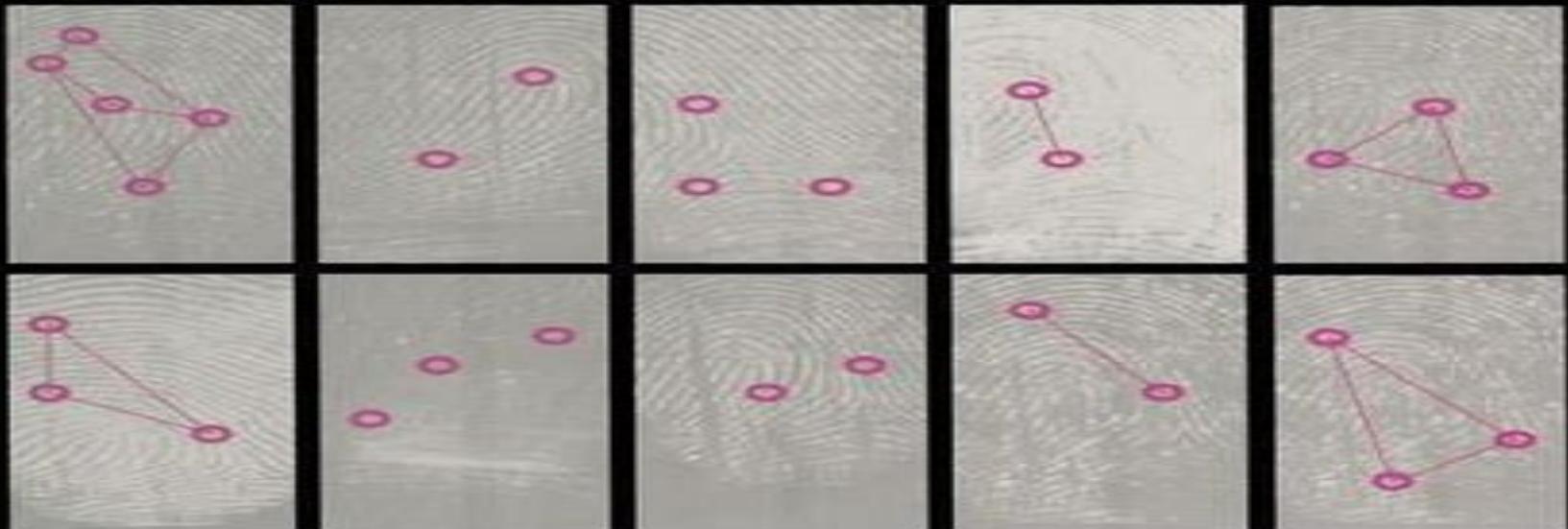
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# Computational Algorithms for Fingerprint Recognition

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Bir Bhanu

Xuejun Tan



- Feature Extraction
- Matching
- Performance Prediction

- Indexing
- Classification
- Identification

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# Computational Algorithms For Fingerprint Recognition

**Bir Bhanu, Xuejun Tan**



## **Computational Algorithms For Fingerprint Recognition:**

**Computational Algorithms for Fingerprint Recognition** Bir Bhanu, Xuejun Tan, 2012-12-06 Biometrics such as fingerprint face gait iris voice and signature recognizes one's identity using his/her physiological or behavioral characteristics Among these biometric signs fingerprint has been researched the longest period of time and shows the most promising future in real world applications However because of the complex distortions among the different impressions of the same finger fingerprint recognition is still a challenging problem *Computational Algorithms for Fingerprint Recognition* presents an entire range of novel computational algorithms for fingerprint recognition These include feature extraction indexing matching classification and performance prediction validation methods which have been compared with state of art algorithms and found to be effective and efficient on real world data All the algorithms have been evaluated on NIST 4 database from National Institute of Standards and Technology NIST Specific algorithms addressed include Learned template based minutiae extraction algorithm Triplets of minutiae based fingerprint indexing algorithm Genetic algorithm based fingerprint matching algorithm Genetic programming based feature learning algorithm for fingerprint classification Comparison of classification and indexing based approaches for identification Fundamental fingerprint matching performance prediction analysis and its validation *Computational Algorithms for Fingerprint Recognition* is designed for a professional audience composed of researchers and practitioners in industry This book is also suitable as a secondary text for graduate level students in computer science and engineering [Handbook of Fingerprint Recognition](#) Davide Maltoni, Dario Maio, Anil K. Jain, Salil Prabhakar, 2009-04-21 A major new professional reference work on fingerprint security systems and technology from leading international researchers in the field Handbook provides authoritative and comprehensive coverage of all major topics concepts and methods for fingerprint security systems This unique reference work is an absolutely essential resource for all biometric security professionals researchers and systems administrators [Computer Applications for Handling Legal Evidence, Police Investigation and Case Argumentation](#) Ephraim Nissan, 2012-06-15 This book provides an overview of computer techniques and tools especially from artificial intelligence AI for handling legal evidence police intelligence crime analysis or detection and forensic testing with a sustained discussion of methods for the modelling of reasoning and forming an opinion about the evidence methods for the modelling of argumentation and computational approaches to dealing with legal or any narratives By the 2000s the modelling of reasoning on legal evidence has emerged as a significant area within the well established field of AI Law An overview such as this one has never been attempted before It offers a panoramic view of topics techniques and tools It is more than a survey as topic after topic the reader can get a closer view of approaches and techniques One aim is to introduce practitioners of AI to the modelling legal evidence Another aim is to introduce legal professionals as well as the more technically oriented among law enforcement professionals or researchers in police science to information technology resources from which their own respective field stands to benefit Computer

scientists must not blunder into design choices resulting in tools objectionable for legal professionals so it is important to be aware of ongoing controversies A survey is provided of argumentation tools or methods for reasoning about the evidence Another class of tools considered here is intended to assist in organisational aspects of managing of the evidence Moreover tools appropriate for crime detection intelligence and investigation include tools based on link analysis and data mining Concepts and techniques are introduced along with case studies So are areas in the forensic sciences Special chapters are devoted to VIRTopsy a procedure for legal medicine and FLINTS a tool for the police This is both an introductory book possibly a textbook and a reference for specialists from various quarters

**Performance Prediction for Biometrics Recognition Systems** Rong Wang,2007 *Automatic Fingerprint Recognition Systems* Nalini Ratha,Ruud Bolle,2003-10-09

An authoritative survey of intelligent fingerprint recognition concepts technology and systems is given Editors and contributors are the leading researchers and applied R D developers of this personal identification biometric security topic and technology Biometrics and pattern recognition researchers and professionals will find the book an indispensable resource for current knowledge and technology in the field

**Image Matching and Analysis** Society of Photo-optical Instrumentation Engineers,Hua zhong gong xue yuan,Guo jia zi ran ke xue ji jin wei yuan hui,2001

**Seventh International Conference on Pattern Recognition** ,1984 **Biometric Technology for Human Identification** ,2007

**Computational Science and Its Applications** ,2004 **Empirical Evaluation Techniques in Computer Vision**

Kevin W. Bowyer,P. Jonathon Phillips,1998-07-11 Empirical Evaluation Techniques in Computer Vision presents methods that allow comparative assessment of algorithms and the accompanying benefits places computer vision on solid experimental and scientific grounds assists the development of engineering solutions to practical problems allows accurate assessments of computer vision research provides convincing evidence that computer vision research results in practical solutions The chapters in this volume cover the three main paradigms for evaluating computer vision algorithms The paradigms are 1 evaluations that are independently administered 2 evaluation of a set of algorithms by one research group and 3 evaluation methods that feature ground truthing procedures as a major component

Computer Vision Algorithms on Reconfigurable Logic Arrays Nalini Kanta Ratha,1996 Algorithms and Complexity ,2003 **Sci-tech News** ,2004 **Audio- and**

**Video-based Biometric Person Authentication** ,2003 The Biometric Computing Karm Veer Arya,Robin Singh

Bhadoria,2019-11-05 The Biometric Computing Recognition Registration presents introduction of biometrics along with detailed analysis for identification and recognition methods This book forms the required platform for understanding biometric computing and its implementation for securing target system It also provides the comprehensive analysis on algorithms architectures and interdisciplinary connection of biometric computing along with detailed case studies for newborns and resolution spaces The strength of this book is its unique approach starting with how biometric computing works to research paradigms and gradually moves towards its advancement This book is divided into three parts that

comprises basic fundamentals and definitions algorithms and methodologies and futuristic research and case studies  
Features A clear view to the fundamentals of Biometric Computing Identification and recognition approach for different human characteristics Different methodologies and algorithms for human identification using biometrics traits such as face Iris fingerprint palm print voiceprint etc Interdisciplinary connection of biometric computing with the fields like deep neural network artificial intelligence Internet of Biometric Things low resolution face recognition etc This book is an edited volume by prominent invited researchers and practitioners around the globe in the field of biometrics describes the fundamental and recent advancement in biometric recognition and registration This book is a perfect research handbook for young practitioners who are intending to carry out their research in the field of Biometric Computing and will be used by industry professionals graduate and researcher students in the field of computer science and engineering

**Signal Processing, Sensor Fusion, and Target Recognition** ,1998     *Documentation Abstracts* ,1991     **Computer Analysis of Images and Patterns** ,1995     **Neural Computation** ,1996 Covers neural computation which encompasses psychology physics computer science neuroscience and artificial intelligence among others It highlights common problems and techniques in modeling the brain and the design and construction of neurally inspired information processing systems

**Smart Systems Engineering** Cihan H. Dagli,2006 Proceedings Annie Conference November 2006 St Louis Missouri The newest volume in this series presents refereed papers in the following categories and their applications in the engineering domain Neural Networks Complex Networks Evolutionary Programming Data Mining Fuzzy Logic Adaptive Control Pattern Recognition Smart Engineering System Design These papers are intended to provide a forum for researchers in the field to exchange ideas on smart engineering system design

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