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HUMAN IDENTIFICATION BASED ON GAIT

by

Mark S. Nixon
University of Southampton, UK

Tieniu Tan
Chinese Academy of Sciences, Beijing, P. R. China

Rama Chellappa
University of Maryland, USA

Springer
Contents

Preface .......................................................................................................................... vii

1 Introduction ................................................................................................................. 1
  1.1 Biometrics and Gait ............................................................................................... 1
  1.2 Contexts ................................................................................................................ 2
    1.2.1 Immigration and Homeland Security ............................................................ 2
    1.2.2 Surveillance ..................................................................................................... 2
    1.2.3 Human ID at a Distance (HiD) Program ....................................................... 3
  1.3 Book Structure ...................................................................................................... 3

2 Subjects Allied to Gait ............................................................................................... 5
  2.1 Overview ................................................................................................................ 5
  2.2 Literature ............................................................................................................... 5
  2.3 Medicine and Biomechanics ............................................................................... 6
    2.3.1 Basic Gait Analysis ....................................................................................... 6
    2.3.2 Variation in Gait Covariate Factors ............................................................... 10
  2.4 Psychology ............................................................................................................ 12
  2.5 Computer Vision-Based Human Motion Analysis ............................................. 13
  2.6 Other Subjects Allied to Gait ............................................................................. 15

3 Gait Databases .......................................................................................................... 17
  3.1 Early Databases ................................................................................................... 17
    3.1.1 UCSD Gait Data .......................................................................................... 17
    3.1.2 Early Soton Gait Data .................................................................................. 18
  3.2 Current Databases ............................................................................................... 20
    3.2.1 Overall Design Considerations .................................................................. 20
    3.2.2 NIST/USF Database .................................................................................... 21
    3.2.3 Soton Database ............................................................................................ 22
      Overview .............................................................................................................. 22
      Laboratory Layout ............................................................................................... 24
      Outdoor Data Design Issues ............................................................................ 27
      Acquisition Set-up Procedure ......................................................................... 29
      Filming Issues ................................................................................................... 29
      Recording Procedure .......................................................................................... 30
      Ancillary Data .................................................................................................... 31
    3.2.4 CASIA Database ......................................................................................... 32
    3.2.5 UMD Database ............................................................................................ 33

4 Early Recognition Approaches ............................................................................... 35
  4.1 Initial Objectives and Constraints ....................................................................... 35
  4.2 Silhouette Based .................................................................................................. 35
  4.3 Model Based ......................................................................................................... 39
5 Silhouette-Based Approaches .........................................................45
5.1 Overview .............................................................................45
5.2 Extending Shape Description to Moving Shapes ..................48
  5.2.1 Area Masks ..................................................................49
  5.2.2 Gait Symmetry .............................................................51
  5.2.3 Velocity Moments .........................................................53
  5.2.4 Results .................................................................54
    Recognition by Area Masks ...............................................55
    Recognition by Symmetry ...............................................58
    Recognition by Velocity Moments .....................................61
  5.2.5 Potency of Measurements of Silhouette .........................63
5.3 Procrustes and Spatiotemporal Silhouette Analysis ..........65
  5.3.1 Automatic Gait Recognition Based on Procrustes Shape Analysis 65
  5.3.2 Silhouette Detection and Representation for Procrustes Analysis 66
    Silhouette Extraction ......................................................66
    Representation of Silhouette Shapes ..................................68
  5.3.3 Procrustes Gait Feature Extraction and Classification ....69
    Procrustes Shape Analysis ..............................................69
    Gait Signature Extraction ..............................................69
    Similarity Measure and Classifier ....................................70
  5.3.4 Spatiotemporal Silhouette Analysis Based Gait Recognition 70
    Spatiotemporal Feature Extraction ...................................72
    Feature Extraction and Classification ...............................73
  5.3.5 Experimental Results and Analysis ..............................77
    Procrustes Shape Analysis ..............................................77
    Spatiotemporal Silhouette Analysis ..................................82
5.4 Modeling, Matching, Shape and Kinematics ...................89
  5.4.1 HMM Based Gait Recognition .......................................89
    Gait Recognition Framework ..........................................90
    Direct Approach ..........................................................91
    Indirect Approach .......................................................93
  5.4.2 DTW Based Gait Recognition .......................................94
    Gait Recognition Framework ..........................................96
  5.4.3 Shape and Kinematics ...............................................97
    Shape Analysis ..........................................................97
    Dynamical Models ......................................................98
  5.4.4 Results ..............................................................100
    HMM Based Gait Recognition ........................................100
    DTW Based Gait Recognition ..........................................102
    Shape and Kinematics ................................................104
6 Model-Based Approaches ..........................................................107
6.1 Overview .......................................................................107
6.2 Planar Human Modeling ....................................................109
  6.2.1 Modeling Walking and Running ....................................109
  6.2.2 Model-Based Extraction and Description ......................111
6.3 Kinematics-based People Tracking and Recognition in 3D Space ...114
  6.3.1 Model-based People Tracking using Condensation ..........114
    Human Body Model .....................................................115
Learning Motion Model and Motion Constraints ..................... 117
Experiments and Discussions ........................................... 125
6.4 Other Approaches ..................................................... 131
  6.4.1 Structure by Body Parameters .................................. 132
  6.4.2 Structural Model-based Recognition ......................... 132

7 Further Gait Developments ............................................. 135
  7.1 View Invariant Gait Recognition .................................. 135
    7.1.1 Overview of the Algorithm .................................. 136
    7.1.2 Optical flow based SfM approach ............................ 137
    7.1.3 Homography based approach ................................. 138
    7.1.4 Experimental Results ........................................ 138
  7.2 Gait Biometric Fusion ............................................. 141
  7.3 Fusion of Static and Dynamic Body Biometrics for Gait Recognition ... 144
    7.3.1 Overview of Approach ....................................... 144
    7.3.2 Classifiers and Fusion Rules ............................... 145
    7.3.3 Experimental Results and Analysis ....................... 146

8 Future Challenges .......................................................... 151

References ............................................................................. 157
  Literature ........................................................................ 157
  Medicine and Biomechanics .............................................. 157
  Covariate factors .......................................................... 158
  Psychology ...................................................................... 159
  Computer Vision-Based Analysis of Human Motion .................. 160
  Databases ....................................................................... 161
  Early work ...................................................................... 162
  Current approaches ........................................................ 163
  Further Analysis ............................................................ 166
  Other Related Work ....................................................... 169
  General .......................................................................... 169

9 Appendices .......................................................................... 171
  Appendix 9.1 Southampton Data Acquisition Forms ................. 171
    Appendix 9.1.1 Laboratory Set-up Forms .......................... 171
    Appendix 9.1.2 Camera Set-up Forms ............................... 175
    Appendix 9.1.3 Session Coordinator’s Instructions ............... 180
    Appendix 9.1.4 Subject Information Form ......................... 182

Index ...................................................................................... 185
Preface

It is a great honor to be associated with subjects at their inception. It is certainly early in the cycle for gait – as it is for biometrics. It is then a great honor to be part of the first ever series on biometrics, as it is to be amongst the first researchers in gait as a biometric. It has been great fun too – a challenge indeed since gait concerns not just recognizing objects, but moving objects at that, so we have had to develop new techniques before we saw the first results that people can indeed be recognized by the way they walk.

In terms of setting the scene, and the context of this book with others in the same series, it has been fascinating to see the rise in prominence of biometrics, from what was originally an academic interest, to one that is on the lips of leading politicians. This is because biometrics has the capability to solve current problems of international concern. These essentially center on verification of identity at speed and with assured performance and biometrics has a unique capability here since we carry our own identity. As can be found elsewhere in the series, the earliest biometrics were palm prints – these suited computational facilities available in the 1970’s. Then, there has been interest in the more popular biometrics: the fingerprint given its long forensic use; the face given that it is non-invasive and can be captured without a subject’s knowledge or interaction; and the iris. Iris recognition has proved quite an inspiration in biometrics, providing some of the largest biometric deployments and with some excellent performance. The fingerprint is now used in products such as mobile phones, computers and access control. Face recognition has a more checkered history, but it is the biometric favored by many in view of its practical advantages. These of course make face recognition more difficult to deploy, as can be found in other volumes in the International Series on Biometrics. Visitors to the US now routinely find their fingerprints and faces recorded at portals of entry. Our context here is to set the scene, not to contrast merit and advantage – that comes later. One of the main reasons for the late entry of gait onto the biometrics stage was not just idea, but also technology. Recognition by gait requires processing sequences of images and this imposes a large computational burden and only the recent advances in speed and memory made gait practicable as a biometric.

Rather than coordinate an edited book, we chose to author this text. We provide a snapshot of all the biometric work in human identification by gait and all major centers for research are indicated in the text. To complete the picture, we have added studies from medicine, psychology and other areas wherein we will find not only justification for the use of gait as a biometric, but also pointers to techniques and to analysis. We have collocated the references at the end of the book, itemized by the area covered and cross referenced to the text. There are of course many other references we could have included since gait is innate to human movement so we have aimed here to provide a set of references which serve as a complete picture of current research in gait for identification, and as pointers to the richer literature to be found in this topic.

As academics, we know well that this book would not have been possible without the contributions of colleagues and students who have conducted research
in this new and fascinating biometric, especially those at the University of Southampton, the CAS Institute of Automation (CASIA) and the University of Maryland. We are very grateful to all whose work appears here. As ever, assembling any book is a difficult task and not eased by current systems. Notwithstanding that, any errors that may have occurred in translating material to this text are our responsibility alone.

Finally, we are grateful to the series editors, Anil Jain and David Zhang for putting the International Series on Biometrics together, and to the staff at Springer who kept us on track. We ourselves have enjoyed working in biometrics and gait very much and we hope that the readers of this text find it not only a useful (and useable!) source of reference, but that it also inspires further interest, development and advances in this fascinating biometric.

Mark S. Nixon
University of Southampton

Tieniu Tan
Institute of Automation, Chinese Academy of Sciences

Rama Chellappa
University of Maryland

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