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Computational Techniques for Human Smile Analysis

Springer

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ISSN 2191-5768 ISSN 2191-5776 (electronic)
SpringerBriefs in Computer Science
ISBN 978-3-030-15380-9 ISBN 978-3-030-15381-6 (eBook)
https://doi.org/10.1007/978-3-030-15381-6

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This Springer imprint is published by the registered company Springer Nature Switzerland AG
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To all those who smile.

Preface

It is often said that the face is a window to the soul. Bearing a metaphor of this nature in mind, one might find it intriguing to understand, if any, how the physical, behavioural as well as emotional characteristics of a person could be decoded from the face itself. With the increasing deductive power of machine learning techniques, it is becoming plausible to address such questions through the development of appropriate computational frameworks. Though there are as many as over twenty-five categories of emotions one could express, regardless of the ethnicity, gender or social class, across humanity, there exist six common emotions namely happiness, sadness, surprise, fear, anger and disgust—all of which can be inferred from facial expressions. Of these facial expressions, the smile is the most prominent in social interactions.

The smile bears important ramifications with beliefs such as it makes one more attractive, less stressful in upsetting situations and employers tending to promote people who smile often. Even pockets of scientific research appear to be forthcoming to validate such beliefs and claims, e.g. the smile intensity observed in photographs positively correlates with longevity, the ability to win a fight and whether a couple would stay married. Thus, it appears that many important personality traits are encoded in the smile itself. Therefore, the deployment of computer based algorithms for studying the human smiles in greater detail is a plausible avenue for which we have dedicated the discussions in this book.

In this book, we discuss the recent developments in computational techniques for automated non-invasive facial emotion detection and analysis with particular focus on the smile. By way of application, we discuss how genuine and non-genuine smiles can be inferred, how gender is encoded in a smile and how it is possible to use the dynamics of a smile itself as a biometric feature.

Bradford, UK
February 2019

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Acknowledgements

This book is a result of years of research into the topic of computer based human facial analysis by the authors. To this end, we are grateful for the research support and funding we have received from a variety of sources. Notably, we would like to acknowledge the doctoral scholarship provided for Ahmad Al-dahoud by Al-Zaytoonah University of Jordan. We gratefully acknowledge funding we have received from the European Union's Horizon 2020 Programme H2020-MSCA-RISE-2017, under the project PDE-GIR with grant number 778035 and also funding from the University of Bradford's Higher Education and Innovation Fund. Undoubtedly, it takes a fair amount of dedication and continuous effort to put together a book—usually work on a book falls outside the regular lines of the day to day academic tasks. As a result, a support base outside the immediate academic environment is essential to complete a book of this nature. We feel blessed to have received such support from our dear family members, our friends, our colleagues and our collaborators. Without their support and continued encouragement, this book would not have seen the light of the day. Our heartfelt thanks, therefore, goes to all of them. Thank you!

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Acronyms

AAM	Active Appearance Model
ASM	Active Shape Model
AU	Action Unit
EMFACS	Emotional Facial Action Coding System
EMG	Electromyography
FNP	Facial Normalisation Parameter
GUI	Graphical User Interface
k-NN	k-Nearest Neighbour
LBP	Local Binary Patterns
SIFT	Scale Invariant Feature Transform
SVM	Support Vector Machine