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Facial Kinship Verification

A Machine Learning Approach

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Foreword

Any parent knows that people are always interested in whether their own child bears some resemblance to any of them, mother or father. Human interest in family ties and connections, in common ancestry and lineage, is as natural to life as life itself.

Biometrics has made enormous advances over the last 30 years. When I wrote my first paper on automated face recognition (in 1985) I could count the active researchers in the area on the fingers of my hand. Now my fingers do not suffice even to count the countries in which automatic face recognition is being developed, my fingers suffice only to count the continents. Surprisingly, even with all the enormous volume of research in automated face recognition and in face biometrics, there has not as yet been much work on kinship analysis in biometrics and computer vision despite the natural interest. And it does seem a rather obvious tack to take. The work has actually concerned conference papers and journal papers, and now it is a book. Those are prudent routes to take in the development of any approach and technology.

There are many potential applications here. In the context of forensic systems, the police now use familial DNA to trace offenders, particularly for cold crimes (those from a long time ago). As we reach systems where automated search will become routine, one can countenance systems that look for kinship. It could even putatively help to estimate appearance with age, given a missing subject. There are many other possible applications too, especially as advertising has noted the potent abilities of biometric systems.

For now those topics are a long way ahead. First facial kinship analysis needs exposure and development in terms of science. It needs data and it needs technique. I am pleased to see that is what is being considered in this new text on Facial Kinship Verification: A Machine Learning Approach. This will be part of our future. Enjoy!

Southampton, UK   Mark Nixon
February 2017   IAPR Fellow

Preface

Facial images convey many important human characteristics, such as identity, gender, expression, age, and ethnicity. Over the past two decades, a large number of face analysis problems have been investigated in the computer vision and pattern recognition community. Representative examples include face recognition, facial expression recognition, facial age estimation, gender classification and ethnicity recognition. Compared with these face analysis tasks, facial kinship verification is a relatively new research topic in face analysis and only some attempts have been made over the past few years. However, this new research topic has several potential applications such as family album organization, image annotation, social media analysis, and missing children/parents search. Hence, it is desirable to write a book to summarize the state-of-the-arts of research findings in this direction and provide some useful suggestions to researchers who are working in this field.

This book is specialized in facial kinship verification, covering from the classical feature representation, metric learning methods to the state-of-the-art facial kinship verification methods with feature learning and metric learning techniques. It mainly comprises three parts. The first part focuses on the feature learning methods, which are recently developed for facial kinship verification. The second part presents several metric learning methods for facial kinship verification, including both conventional methods and some recently proposed methods. The third part discusses some recent studies on video-based facial kinship verification. As feature learning and metric learning methods presented in this book can also be easily applied to other face analysis tasks, e.g., face recognition, facial expression recognition, facial age estimation, and gender classification, it will be beneficial for researchers and practitioners who are searching for solutions for their specific face analysis applications or even pattern recognition problems. The book is also suitable for graduates, researchers, and practitioners interested in computer vision and machine learning both as a learning text and as a reference book.

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