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Article / Book Information

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著者(和文)	Gomez CaballeroFelipe
Author(English)	Felipe Gomez Caballero
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Doctoral thesis outline

The dissertation “A statistical approach for person authentication using human behavioral patterns” consists of 7 Chapters.

Chapter 1 [Introduction] presents a brief description of previous related approaches, as well as an overview and objectives of the presented research. A brief explanation of biometrics methods using human motion for the purpose of identity recognition is given along with a description of their disadvantages.

Chapter 2 [Behavioral biometrics] provides an overview of the analysis of human motion for person authentication in the field of behavioral biometrics. First, a number of studies in the field of psychology and biomechanics focusing on the perception and analysis of biological motion are described, emphasizing the characteristics, advantages and disadvantages of human motion. Finally, an overview of the behavioral biometrics methods that rely on the characteristics of human motion is provided.

Chapter 3 [Statistical modeling approaches] describes the statistical modeling and adaptation techniques used to robustly model behavioral patterns exhibit in human motion. A review of model adaptation techniques is also presented.

Chapter 4 [Acquisition and analysis of 3D human movements] gives a detailed definition of the human movements that are analyzed on this study. It focuses on individuality of ‘simple movements’ and stability of ‘complex movements’, as well as possible target applications. This Chapter also provides a description of the methods, conditions and apparatus employed for the acquisition of human movements that constitute the data sets used for experimentation.

Chapter 5 [Person recognition using simple upper body movement] describes the method implemented for person recognition by using behavioral patterns from simple movements. First, it provides a description of the algorithm created for the extraction of anthropometric and kinematic features from specific parts of the upper body. Second, it describes the implementation of modeling techniques presented in Chapter 3 for the tasks of person identification and person verification. Third, the results of both identification and verification task are presented, focusing on the discussion and analysis of the performance of the implemented modeling techniques and the effectiveness of the analyzed features. Finally, it provides a summary of the findings.

Chapter 6 [Robustness of complex human movement for person verification] presents the robustness analysis of the subject-preferred movements and the predefined sequence of gestures against forgery attacks by impostors for person verification tasks. First, it provides a description of the anthropometric and kinematic features extracted from specific joints of the human body. Second, it describes the modeling approach used to model the behavioral patterns from complex movements and the conditions in which the forgery attacks by impostors are introduced. Third, results of person verification task are presented. Finally, it provides a summary of the findings.

Finally, In Chapter 7 [Conclusions and future work] the conclusions of this study and future work are described.