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THE SKULL CAN TELL US: POSITIONAL RELATIONSHIPS BETWEEN THE SKULL AND THE FACIAL FEATURES; 3.4.1 THE RELATIONSHIP BETWEEN THE ORBIT AND THE EYE; 3.4.2 THE RELATIONSHIP BETWEEN THE BONY NASAL APERTURE AND THE NOSE; 3.4.3 THE RELATIONSHIP BETWEEN THE SKULL, THE TEETH, AND THE MOUTH; 3.4.4 THE RELATIONSHIP BETWEEN THE SKULL AND THE EARS; 3.4.5 SEXUAL DIMORPHISM IN THE FACE

3.5 BUILDING THE FACE FROM THE SKULL 3.5.1 PRELIMINARY COLLECTION OF DATA; 3.5.2 CLEANING AND PREPARATION OF THE SKULL; 3.5.3 REPAIRING THE DAMAGED SKULL; 3.5.4 THE CLAY MODELING PROCEDURE; 3.6 HOW SUCCESSFUL IS FACIAL APPROXIMATION?; 3.7 COMPUTER ENHANCEMENT OF THE APPROXIMATION; 3.8 PUBLICIZING THE RESULTS; 3.9 CASE REPORTS; 3.10 CONCLUSION; REFERENCES; CHAPTER 4 THREE-DIMENSIONAL QUANTIFICATION OF FACIAL SHAPE; 4.1 INTRODUCTION; 4.2 BACKGROUND: WHY MEASURE FACES?; 4.3 BACKGROUND: WHAT IS A FACE?; 4.4 DATA ACQUISITION METHODS; 4.5 SOFTWARE TOOLS FOR DATA EXTRACTION AND ANALYSIS 4.6 QUANTITATIVE DIFFERENCES BETWEEN FACES 4.7 DATA TYPES: POINT CLOUDS; 4.8 DATA TYPES: LANDMARKS; 4.9 DATA TYPES: OUTLINES; 4.10 CALCULATION OF DIFFERENCES BETWEEN FACES; 4.11 CONCLUSION; ACKNOWLEDGEMENTS; REFERENCES; CHAPTER 5 AUTOMATIC 3D FACIAL RECONSTRUCTION BY FEATURE-BASED REGISTRATION OF A REFERENCE HEAD; 5.1 INTRODUCTION; MORPHOMETRY-BASED METHODS; MORPHOLOGY-BASED METHODS; REGISTRATION-BASED METHODS; 5.2 DESCRIPTION OF THE METHOD; 5.2.1 DATA ACQUISITION; THE ACQUISITION PROCESS; THE REFERENCE HEAD; EXPERIMENT 1: UNKNOWN CONTEMPORARY SKULL EXPERIMENT 2: PREHISTORIC SKULL OF THE MAN OF TAUTAVEL 5.2.2 EXTRACTION OF FEATURE POINTS AND LINES; 5.2.3 REGISTRATION OF FEATURE LINES; 5.2.4 GEOMETRICAL NORMALIZATION; 5.2.5 COMPUTING THE 3D TRANSFORMATION; 5.3 RESULTS AND DISCUSSION; 5.3.1 THE PROBLEM OF THE VALIDATION; EXPERIMENT 1; EXPERIMENT 2; 5.3.2 DEFINING A REFERENCE HEAD; 5.3.3 MODELING THE HUMAN VARIABILITY; AGE; ETHNICITY; CORPULENCE; EXPRESSIVITY; 5.3.4 INFERRING ILL-DEFINED FACIAL PARTS OR FEATURES; 5.4 CONCLUSION; ACKNOWLEDGEMENTS; REFERENCES; PART II CONCEPTS AND CREATION OF FACIAL RECONSTRUCTION MODELS CHAPTER 6 TWO-DIMENSIONAL COMPUTER-GENERATED AVERAGE HUMAN FACE MORPHOLOGY AND FACIAL APPROXIMATION

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## Sommario/riassunto

This unique book looks at a cost-efficient, fast and accurate means of facial reconstruction--from segmented, decomposed, or skeletal remains--using computer-graphic and computational means.

Computer-Graphic Facial Reconstruction is designed as a valuable resource for those scientists designing new research projects and protocols, as well as a practical handbook of methods and techniques for medico-legal practitioners who actually identify the faceless victims of crime. It looks at a variety of approaches: artificial intelligence using neural networks, case-based reasoning, Bayesian be

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