Record Nr.	UNINA9910818616003321
Autore	Schuller Bjorn
Titolo	Computational paralinguistics : emotion, affect and personality in speech and language processing / / Bjorn W. Schuller, Anton M. Batliner
Pubbl/distr/stampa	Hoboken, New Jersey : , : John Wiley & Sons, , [2014] ©2014
ISBN	1-118-70662-5 1-118-70666-8
	1-118-70663-3
Edizione	[First edition.]
Descrizione fisica	1 online resource (xxi, 321 pages) : illustrations
Altri autori (Persone)	BatlinerAnton
Disciplina	401/.90285
Soggetti	Computational linguistics
	Emotive (Linguistics)
	Human-computer interaction
	Language and emotions
	Paralinguistics
	Psycholinguistics - Data processing
	Speech processing systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	 Preface xiii Acknowledgements xv List of Abbreviations xvii Part I Foundations 1 Introduction 3 1.1 What is Computational Paralinguistics? A First Approximation 3 1.2 History and Subject Area 7 1.3 Form versus Function 10 1.4 Further Aspects 12 1.4.1 The Synthesis of Emotion and Personality 12 1.4.2 Multimodality: Analysis and Generation 13 1.4.3 Applications, Usability and Ethics 15 1.5 Summary and Structure of the Book 17 References 18 2 Taxonomies 21 2.1 Traits versus States 21 2.2 Acted versus Spontaneous 25 2.3 Complex versus Simple 30 2.4 Measured versus Assessed 31 2.5 Categorical versus Continuous 33 2.6 Felt versus Perceived 35 2.7 Intentional versus Instinctual 37 2.8 Consistent versus Discrepant 38 2.9 Private versus Social 39 2.10 Prototypical versus Peripheral 40 2.11

1.

Universal versus Culture-Specific 41 2.12 Unimodal versus Multimodal 43 2.13 All These Taxonomies - So What? 44 2.13.1 Emotion Data: The FAU AEC 45 2.13.2 Non-native Data: The C-AuDiT corpus 47 References 48 3 Aspects of Modelling 53 3.1 Theories and Models of Personality 53 3.2 Theories and Models of Emotion and Affect 55 3.3 Type and Segmentation of Units 58 3.4 Typical versus Atypical Speech 60 3.5 Context 61 3.6 Lab versus Life, or Through the Looking Glass 62 3.7 Sheep and Goats, or Single Instance Decision versus Cumulative Evidence and Overall Performance 64 3.8 The Few and the Many, or How to Analyse a Hamburger 65 3.9 Reifications, and What You are Looking for is What You Get 67 3.10 Magical Numbers versus Sound Reasoning 68 References 74 4 Formal Aspects 79 4.1 The Linguistic Code and Beyond 79 4.2 The Non-Distinctive Use of Phonetic Elements 81 4.2.1 Segmental Level: The Case of /r/ Variants 81 4.2.2 Suprasegmental Level: The Case of Pitch and Fundamental Frequency - and of Other Prosodic Parameters 82 4.2.3 In Between: The Case of Other Voice Qualities, Especially Laryngealisation 86 4.3 The Non-Distinctive Use of Linguistics Elements 91 4.3.1 Words and Word Classes 91 4.3.2 Phrase Level: The Case of Filler Phrases and Hedges 94 4.4 Disfluencies 96 4.5 Non-Verbal, Vocal Events 98 4.6 Common Traits of Formal Aspects 100 References 101 5 Functional Aspects 107 5.1 Biological Trait Primitives 109 5.1.1 Speaker Characteristics 111 5.2 Cultural Trait Primitives 112 5.2.1 Speech Characteristics 114 5.3 Personality 115 5.4 Emotion and Affect 119 5.5 Subjectivity and Sentiment Analysis 123 5.6 Deviant Speech 124 5.6.1 Pathological Speech 125 5.6.2 Temporarily Deviant Speech 129 5.6.3 Non-native Speech 130 5.7 Social Signals 131 5.8 Discrepant Communication 135 5.8.1 Indirect Speech, Irony, and Sarcasm 136 5.8.2 Deceptive Speech 138 5.8.3 Off-Talk 139 5.9 Common Traits of Functional Aspects 140 References 141 6 Corpus Engineering 159 6.1 Annotation 160 6.1.1 Assessment of Annotations 161 6.1.2 New Trends 164 6.2 Corpora and Benchmarks: Some Examples 164 6.2.1 FAU Aibo Emotion Corpus 165 6.2.2 aGender Corpus 165 6.2.3 TUM AVIC Corpus 166 6.2.4 Alcohol Language Corpus 168 6.2.5 Sleepy Language Corpus 168 6.2.6 Speaker Personality Corpus 169 6.2.7 Speaker Likability Database 170 6.2.8 NKI CCRT Speech Corpus 171 6.2.9 TIMIT Database 171 6.2.10 Final Remarks on Databases 172 References 173 Part II Modelling 7 Computational Modelling of Paralinguistics: Overview 179 References 183 8 Acoustic Features 185 8.1 Digital Signal Representation 185 8.2 Short Time Analysis 187 8.3 Acoustic Segmentation 190 8.4 Continuous Descriptors 190 8.4.1 Intensity 190 8.4.2 Zero Crossings 191 8.4.3 Autocorrelation 192 8.4.4 Spectrum and Cepstrum 194 8.4.5 Linear Prediction 198 8.4.6 Line Spectral Pairs 202 8.4.7 Perceptual Linear Prediction 203 8.4.8 Formants 205 8.4.9 Fundamental Frequency and Voicing Probability 207 8.4.10 Jitter and Shimmer 212 8.4.11 Derived Low-Level Descriptors 214 References 214 9 Linguistic Features 217 9.1 Textual Descriptors 217 9.2 Preprocessing 218 9.3 Reduction 218 9.3.1 Stopping 218 9.3.2 Stemming 219 9.3.3 Tagging 219 9.4 Modelling 220 9.4.1 Vector Space Modelling 220 9.4.2 On-line Knowledge 222 References 227 10 Supra-segmental Features 230 10.1 Functionals 231 10.2 Feature Brute-Forcing 232 10.3 Feature Stacking 233 References 234 11 Machine-Based Modelling 235 11.1 Feature Relevance Analysis 235 11.2 Machine Learning 238 11.2.1 Static Classification 238 11.2.2 Dynamic Classification: Hidden Markov Models 256 11.2.3 Regression 262 11.3 Testing Protocols 264 11.3.1 Partitioning 264 11.3.2 Balancing 266 11.3.3 Performance Measures 267 11.3.4 Result Interpretation 272 References 277 12 System Integration and Application 281 12.1 Distributed Processing 281 12.2

	Autonomous and Collaborative Learning 284 12.3 Confidence Measures 286 References 287 13 'Hands-On': Existing Toolkits and Practical Tutorial 289 13.1 Related Toolkits 289 13.2 openSMILE 290 13.2.1 Available Feature Extractors 293 13.3 Practical Computational Paralinguistics How-to 294 13.3.1 Obtaining and Installing openSMILE 295 13.3.2 Extracting Features 295 13.3.3 Classification and Regression 302 References 303 14 Epilogue 304 Appendix 307 A.1 openSMILE Feature Sets Used at Interspeech Challenges 307 A.2 Feature Encoding Scheme 310 References 314 Index 315
Sommario/riassunto	"This book is a guide through the contemporary field of automatically detecting speaker states/traits in speech via acoustic and linguistic properties. The authors will first introduce the general topic covering definitions, usability and application, and then discuss the psychological underpinnings of emotions, affect and personality and how they are expressed and categorized in speech. Reflecting the multidisciplinary character of the field, the authors switch to aspects of human speech and language containing speech production and perception, and linguistic and paralinguistic aspects. The authors will also focus on the signal processing and machine learning aspects of the actual computational modelling of emotion and personality and will explain the detection process from corpus collection through feature extraction and model testing to system integration. After a general introduction into computational modelling of emotion and personality including pre-processing, feature extraction and machine learning algorithms, acoustic and linguistic analyses will each be handled in separate chapters. Once emotion and personality have been recognised by a technical system, the question arises how to best integrate this information in a system context, in particular dealing with uncertainty - an aspect often handled with lower attention, neglecting its high importance. The authors will cover this providing an extra chapter on aspects in this context as standards for emotion and personality, dealing with error-prone prediction results, real-time issues, application design, and real-life evaluation of systems. The book will end with a tutorial enabling the reader to build an emotion detection model on an existing corpus. This hands-on approach by integrating actual data sets, software, and open-source utilities will make the book invaluable as a teaching tool and similarly useful for those professionals already in the field"