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Nota di contenuto	Spoken, Multilingual and Multimodal Dialogue Systems; Contents; Preface; 1 Introduction to Dialogue Systems; 1.1 Human-Computer Interaction and Speech Processing; 1.2 Spoken Dialogue Systems; 1.2.1 Technological Precedents; 1.3 Multimodal Dialogue Systems; 1.4 Multilingual Dialogue Systems; 1.5 Dialogue Systems Referenced in This Book; 1.6 Area Organisation and Research Directions; 1.7 Overview of the Book; 1.8 Further Reading; 2 Technologies Employed to Set Up Dialogue Systems; 2.1 Input Interface; 2.1.1 Automatic Speech Recognition; 2.1.2 Natural Language Processing 2.1.3 Face Localisation and Tracking2.1.4 Gaze Tracking; 2.1.5 Lip-reading Recognition; 2.1.6 Gesture Recognition; 2.1.7 Handwriting Recognition; 2.2 Multimodal Processing; 2.2.1 Multimodal Data Fusion; 2.2.2 Multimodal Data Storage; 2.2.3 Dialogue Management; 2.2.4 Task Module; 2.2.5 Database Module; 2.2.6 Response Generation; 2.3 Output Interface; 2.3.1 Graphic Generation; 2.3.2 Natural Language

Generation; 2.3.3 Speech Synthesis; 2.3.4 Sound Generation; 2.3.5 Tactile/Haptic Generation; 2.4 Summary; 2.5 Further Reading; 3 Multimodal Dialogue Systems; 3.1 Benefits of Multimodal Interaction 3.1.1 In Terms of System Input 3.1.2 In Terms of System Processing; 3.1.3 In Terms of System Output; 3.2 Development of Multimodal Dialogue Systems; 3.2.1 Development Techniques; 3.2.2 Data Fusion; 3.2.3 Architectures of Multimodal Systems; 3.2.4 Animated Agents; 3.2.5 Research Trends; 3.3 Summary; 3.4 Further Reading; 4 Multilingual Dialogue Systems; 4.1 Implications of Multilinguality in the Architecture of Dialogue Systems; 4.1.1 Consideration of Alternatives in Multilingual Dialogue Systems; 4.1.2 Interlingua Approach; 4.1.3 Semantic Frame Conversion Approach 4.1.4 Dialogue-Control Centred Approach 4.2 Multilingual Dialogue Systems Based on Interlingua; 4.2.1 MIT Voyager System; 4.2.2 MIT Jupiter System; 4.2.3 KIT System; 4.3 Multilingual Dialogue Systems Based on Web Applications; 4.3.1 Requirements for Practical Multilingual Dialogue Systems; 4.3.2 Dialogue Systems Based on Web Applications; 4.3.3 Multilingual Dialogue Systems Based on the MVC Framework; 4.3.4 Implementation of Multilingual Voice Portals; 4.4 Summary; 4.5 Further Reading; 5 Dialogue Annotation, Modelling and Management; 5.1 Dialogue Annotation 5.1.1 Annotation of Spoken Dialogue Corpora 5.1.2 Annotation of Multimodal Dialogue Corpora; 5.2 Dialogue Modelling; 5.2.1 State-Transition Networks; 5.2.2 Plans; 5.3 Dialogue Management; 5.3.1 Interaction Strategies; 5.3.2 Confirmation Strategies; 5.4 Implications of Multimodality in the Dialogue Management; 5.4.1 Interaction Complexity; 5.4.2 Confirmations; 5.4.3 Social and Emotional Dialogue; 5.4.4 Contextual Information; 5.4.5 User References; 5.4.6 Response Generation; 5.5 Implications of Multilinguality in the Dialogue Management 5.5.1 Reference Resolution in Multilingual Dialogue Systems

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## Sommario/riassunto

Dialogue systems are a very appealing technology with an extraordinary future. Spoken, Multilingual and Multimodal Dialogues Systems: Development and Assessment addresses the great demand for information about the development of advanced dialogue systems combining speech with other modalities under a multilingual framework. It aims to give a systematic overview of dialogue systems and recent advances in the practical application of spoken dialogue systems. Spoken Dialogue Systems are computer-based systems developed to provide information and carry out simple tasks using speech as the

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