Contents

Contributing authors ---- IX

Preface --- XI

Shane McLaughlin

1 Agile Data Analysis —— 1

Abhijit Sarkar, Sparsh Jain, Jeremy Sudweeks, and Miguel Perez

2 Driver Attention Modeling Through Evidence Accumulation and Gaze Fixation —— 13

Peng Ping, Weiping Ding, Quan Shi, Yongkang Liu, Chiyomi Miyajima, and Kazuya Takeda

3 Driver Distraction Processive Recognition by Fusing Causal Reasoning with Deep Learning —— 29

Takahiro Tanaka

4 Robotic Human–Machine Interface Towards Driving Behavior Improvement for Elderly Drivers —— 47

Zhitong He, Linda Capito, Keith Redmill, Füsun Özgüner, and Ümit Özgüner

5 Risk Analysis for Vehicle-Pedestrian Interaction with Extended Sensing —— 65

Chia-Ming Chang and Takeo Igarashi

6 Exploration of Effective Car-to-Pedestrian Interaction for Autonomous Vehicles —— 81

Ziran Wang, Yongkang Liu, and John H.L. Hansen

7 Enhancing Driver Visual Guidance Through Mobility Digital Twin —— 95

Bin Guo, Yongkang Liu, and John H.L. Hansen

8 Enhancing Mobile-UTDrive Capacity for Onboard Driver Assessment —— 105

Yoshio Ishiquro

9 In-Vehicle Infotainment and UX Improvement —— 119



Marco Gimm, Frederik Kühne, and Gerhard Schmidt

10 A Multichannel Spatial Hands-Free Application for In-Car Communication Systems —— 129

Tobias Hübschen and Gerhard Schmidt

11 Spatial Telephony: Spatial Fidelity and Quality of Experience —— 141

Anton Namenas and Gerhard Schmidt

12 A Recording Setup for Clean Lombard Speech Based on Acoustic Ambiance Simulation and Noise Suppression —— 153

Simon Graf, Tobias Herbig, and Markus Buck

13 Voice Activity Detection for In-Car Communication Systems —— 163

Mohammed Krini and Nilesh Madhu

14 Generalized Theory of Spectral Refinement and Application to Speech Enhancement for In-Car Communication Systems —— 175

Xishun Liao, Ziran Wang, Kyungtae Han, Xuanpeng Zhao, Matthew Barth, and Guoyuan Wu

15 Driver Behavior-Aware Cooperative Ramp Merging for Intelligent Vehicles —— 193

Naren Bao, Alexander Carballo, and Kazuya Takeda

16 Personalized Lane Changes Using Subjective Risk-Sensitive Framework —— 211

Ekim Yurtsever, Daiki Hayashi, and Shunya Seiya

17 Human-Interpretable Learning-Based Automated Driving Systems —— 223

Clément Courcelle, Dominic Baril, François Pomerleau, and Johann Laconte

18 On the Importance of Quantifying Visibility for Autonomous Vehicles Under Extreme Precipitation —— 239

About the editors --- 251

Index ---- 253