

Preface

The automotive industry is experiencing a significant technological shift, driven by electrification, connectivity, intelligence, sharing, and the trend towards “software-defined cars.” With this transformation, the traditional car cabin is evolving into a digital, intelligent, and mobile smart terminal that prioritizes passenger-centric design and data fusion. The design of in-car interaction has become essential in creating engaging, emotional, and humanized user experiences. Future success for traditional car manufacturers lies in developing effective communication methods and context for the intelligent car cabin while addressing relevant issues. However, research into the cognitive mechanisms underlying human-machine interaction behavior in intelligent cars extends beyond driving behavior. Theoretical research on quantitative problems associated with human-machine interaction behavior, such as cabin situational cognitive models, visual cognitive models, and brain cognitive quantification models, requires further investigation. This book focuses on extensive theoretical model development, method research, and experimental studies based on user interaction behavior, visual and brain cognitive mechanisms, and human-machine interaction design in intelligent cars. It holds significant theoretical and engineering application value for the research and development of intelligent car cabins.