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Sommario/riassunto

This book introduces human reconstruction technologies in smart homes leveraging mmWave signals. It begins by presenting the overview of human reconstruction and the development of mmWave sensing technology. The authors introduce a mmWave sensing-based human posture reconstruction approach, which exploits mmWave signals to sense and track multiple users' postures as they move, walk or sit. It also presents a facial expression reconstruction system that reconstructs 3D human faces and continuously exhibits facial expressions using mmWave. The authors describe a hand gesture reconstruction system that utilizes mmWave signals to generate 3D hand skeletons and reconstruct hand meshes. A thorough investigation of state-of-art research work is further presented covering human reconstruction, mmWave sensing and mmWave-based human reconstruction. Finally, conclusions and the direction of future research are highlighted for this book. Human and the cyberworld are moving towards high synchronization as more IoT devices are integrated in smart homes. By reconstructing human postures, facial expressions, and hand gestures in the cyberworld, a virtual human avatar can map the state of human into the physical world and deeply integrate reality and virtuality. The process strongly energizes emerging applications such as virtual reality, augmented reality, meta-universe, immersive games, etc. This book targets graduate-level students majoring in the computer science and engineering, and electrical engineering. Professionals working in wireless signal-based human sensing will also find this book a valuable resource.