

Preface

This book focuses on the state of the art developments of humanoid robots. It aims to facilitate building robots that resemble the human form and imitate human behaviors. Humanoid robots are developed to use the infrastructures designed for humans, to ease the interactions with humans, and to help the integrations into human societies. The developments of humanoid robots proceed from building individual robots to establishing societies of robots working alongside with humans.

For building individual robots, this book addresses the problems of constructing a humanoid body and mind. On constructing a humanoid body, it describes the designs of foot, knee, waist, arm, head, and face. On constructing a mind, it describes how to generate walk patterns and maintain balance, how to encode and specify humanoid motions, and how to control eye and head movements for focusing attention on moving objects. It provides methods for learning motor skills and for language acquisition. It describes how to generate facial movements for expressing various emotions and provides methods for decision making and planning. Finally, it discusses how to create artificial cognition.

For establishing societies of robots working for humans, this book addresses the problems of interactions between humans and robots. It describes how robots learn from humans and how humanoid robots use various facial expressions as a form of nonverbal communication.

This book accounts for the current leading researches and challenges in building humanoid robots in order to prepare for the near future when human societies will be advanced by using humanoid robots. It serves as a reference source for any researchers interested in humanoid robots and as a supplementary textbook for any courses in robotics.

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