Robot Motion Planning: The Springer International in Engineering and Computer

Robots are becoming increasingly prevalent in our lives, performing a wide range of tasks from manufacturing to healthcare. One of the key challenges in robotics is motion planning: how to move a robot from one point to another while avoiding obstacles and adhering to constraints.

Robot Motion Planning (The Springer International Series in Engineering and Computer Science Book 124)

by Jean-Claude Latombe

★★★★★ 4.6 out of 5

Language	: English
File size	: 9901 KB
Text-to-Speech	: Enabled
Print length	: 651 pages
Screen Reader	: Supported

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Robot Motion Planning provides a comprehensive to this challenging field, covering both the fundamentals and the most advanced techniques. Written by leading experts in the field, this book is an essential resource for researchers and practitioners alike.

What is Robot Motion Planning?

Robot motion planning is the task of finding a path for a robot to move from one point to another while avoiding obstacles and adhering to constraints.

This can be a complex task, especially in environments with many obstacles or when the robot has complex dynamics.

There are a wide range of different motion planning algorithms, each with its own strengths and weaknesses. Some of the most common algorithms include:

* **PRM (Probabilistic Roadmap Method):** PRM builds a roadmap of the environment and then uses a probabilistic approach to search for a path through the roadmap. * **RRT (Rapidly Exploring Random Tree):** RRT grows a tree of paths from the start to the goal, while randomly exploring the environment. * **D* Lite:** D* Lite is a real-time motion planning algorithm that can be used for dynamic environments.

Applications of Robot Motion Planning

Robot motion planning has a wide range of applications in robotics, including:
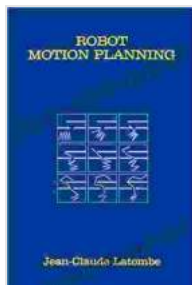
* **Manufacturing:** Robot motion planning is used to plan the paths of robots in manufacturing environments, such as assembly lines and welding stations. * **Healthcare:** Robot motion planning is used to plan the paths of robots in healthcare settings, such as surgical robots and rehabilitation robots. * **Self-driving cars:** Robot motion planning is used to plan the paths of self-driving cars, which must navigate through complex environments while avoiding obstacles and adhering to traffic laws.

Benefits of Robot Motion Planning

Robot motion planning provides a number of benefits, including:

* **Increased efficiency:** Robot motion planning can help to increase the efficiency of robots by planning paths that minimize travel time and energy consumption. * **Improved safety:** Robot motion planning can help to improve the safety of robots by planning paths that avoid obstacles and minimize the risk of collisions. * **Reduced development time:** Robot motion planning can help to reduce the development time of robotic systems by providing tools and algorithms that can automate the path planning process.

Robot motion planning is a challenging but essential field in robotics. This book provides a comprehensive to this field, covering both the fundamentals and the most advanced techniques. Written by leading experts in the field, this book is an essential resource for researchers and practitioners alike.

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