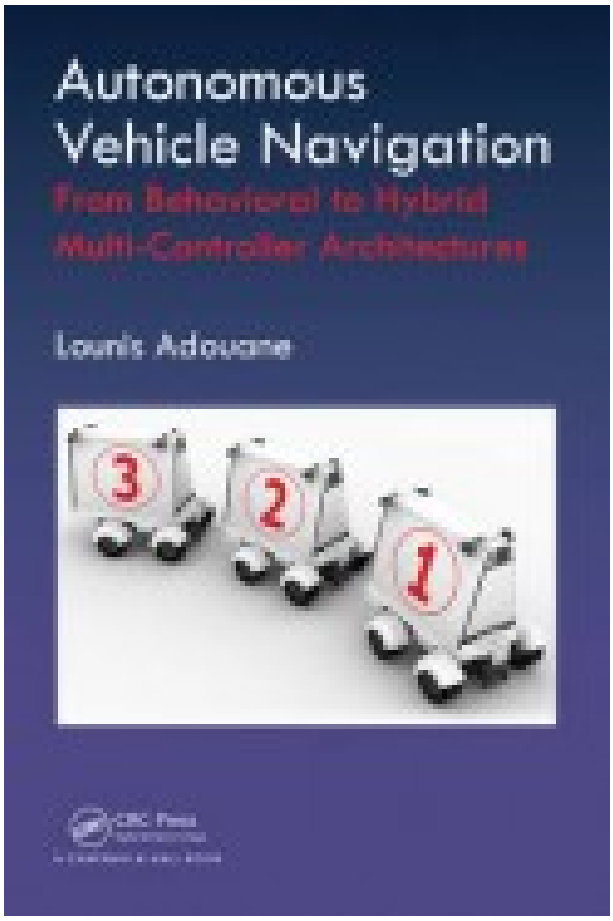
Autonomous Vehicle Navigation



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Improve the Safety, Flexibility, and Reliability of Autonomous Navigation in Complex Environments
Autonomous Vehicle Navigation: From Behavioral to Hybrid Multi-Controller Architectures explores the use of multi-controller architectures in fully autonomous robot navigation-even in highly dynamic and cluttered environments. Accessible to researchers and graduate students involved in mobile robotics and fully autonomous vehicle navigation, the book presents novel techniques and concepts that address different complex mobile robot tasks. The author examines the development of reliable elementary controllers and proposes mechanisms to manage the interaction of these multi-controller architectures while addressing different constraints and enhancing metrics/criteria linked to the safety, flexibility, and reliability of the proposed control architectures. He covers the modeling of subtasks, reliable obstacle avoidance, appropriate stable control laws for target reaching/tracking, short- and long-term trajectory/waypoint planning, navigation through sequential waypoints, and the cooperative control and interaction of a group of mobile robots.
The author's website provides MATLAB(R) and Simulink(R) source code of the main procedures related to the task modeling, planning, and control of mobile robots. It also includes videos showing the main simulations and experiments given in the text. In addition to flexible and bottom-up construction, multi-controller architectures can be formally analyzed to achieve reliable navigation in complex environments. This book reveals innovative control architectures that can lead to fully autonomous vehicle

navigation in these challenging situations.

Joachim Fjeld 02.02.

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