

Preface

This book provides an introduction into the emerging field of planning and decision making of aerial robots. An aerial robot is the ultimate of Unmanned Aerial Vehicles, an aircraft endowed with built-in intelligence, no direct human control, and able to perform a specific task. It must be able to fly within a partially structured environment, to react and adapt to changing environmental conditions, and to accommodate the uncertainty that exists in the physical world. An aerial robot can be termed as a physical agent that exists and flies in the real 3D world, can sense its environment, and act on it to achieve some goals. So throughout this book, an aerial robot will also be termed as an agent.

Fundamental problems in aerial robotics are the tasks of moving through space, sensing about space, and reasoning about space. Reasoning in the case of a complex environment represents a difficult problem. The issues specific to reasoning about space are planning and decision making. Planning deals with the trajectory algorithmic development based on the available information. Decision making determines the most important requirements and evaluates possible environment uncertainties.

The issues specific to planning and decision making of aerial robots in their environment are examined in this book, leading to the contents of this book: Motion planning, Deterministic decision making, Decision making under uncertainty, and finally Multi-robot planning. A variety of techniques are presented in this book, and some case studies are developed. The topics considered in this book are multidisciplinary and lie at the intersection of Robotics, Control Theory, Operational Research, and Artificial Intelligence.

Paris, France

Yasmina Bestaoui Sebbane

Planning and Decision Making for Aerial Robots

Bestaoui Sebbane, Y.

2014, XX, 406 p. 17 illus., 14 illus. in color., Hardcover

ISBN: 978-3-319-03706-6