IV. Path Planning and Localization

Path planning and localization constitute a traditional research field in robotics and a vast number of works have been reported. This field still continues to be so, as demonstrated by the papers in this chapter concerned with a variety of systems, e.g. manipulators, rovers and mobile robot teams.

Conner *et al.* present a realistic industrial application of trajectory planning to automotive spray painting. In particular, analytic deposition models are developed for the widely used electrostatic rotating bell atomizers. Several measures of quality are adopted to evaluate experimental performance.

Howard, Matarić, and Sukhatme describe a method for localizing a team of robots, using only the robots themselves as landmarks. The localization problem is cast as a distributed numerical optimization problem, and the best estimates found are tested on a team of four mobile robots.

Vandapel and Hebert investigate the use of airborne laser altimetry and 3D ground measurements to estimate the position and attitude of a mobile robot. The proposed method is evaluated in terms of terrain parameters and sensors influence. An extensive field experimentation is carried out.

Tusbouchi, Yamaguchi, and Yuta report on the implementation of a sensor-based behaviour decision system for a mobile robot navigating an an unknown indoor environment. One key feature is the free space navigation rather than the wall following. The experiments for a mobile robot equipped with a range scanner are illustrated.

Arras, Tomatis, and Siegwart introduce a mobile robot conceived for autonomous operation in a mass exhibition environment. A global feature-based localization approach is adopted, and robustness with respect to poor odometry, collisions and kidnapping is discussed.