Abstract

This paper presents preliminary results of the application of two-Kinect cameras system on a two-wheeled indoor mobile robot for off-line optimal path planning and execution. In our approach, the robot makes use of depth information delivered by the vision system to accurately model its surrounding environment through image processing techniques. In addition, a *Genetic Algorithm* is implemented to generate a collision-free optimal path linking an initial configuration of the mobile robot (*Source*) to a final configuration (*Target*). After that, *Piecewise Cubic Hermite Interpolating Polynomial* is used to smooth the generated optimal path. Finally, an *Adaptive Fuzzy-Logic* controller is designed to keep track of a mobile robot on the desired smoothed path (by transmitting the appropriate right and left velocities using wireless communication). In parallel, sensor fusion (odometry sensors and Kinect sensors) is used to estimate the current position and orientation of the robot using *Kalman filter*. The validation of the proposed solution is carried out using the differentially-driven mobile robot, *RobuTER*, to successfully achieve safe motion (without colliding with obstacles) in an indoor environment.