

Abstract

This study proposes model of the optimal motion planner and controller for multi mobile robots. The proposed controller is responsible for avoiding the collision among multi robots after generating the optimal trajectory in term of multi objective for each robot. This work includes two stages: the first is to generate multi objective optimal path and trajectory for each robot independently from the start to the goal position using the modified genetic algorithm (MGA) with A* search algorithm (A*). The second one is to establish a movement strategy to let the robots navigate with avoiding collision risk with each other by introducing Sugeno first order fuzzy controller. Five objective functions have been proposed in this study for minimizing travelling length, time, smoothness, security and trajectory and reducing the energy consumption for each mobile robot by using Cubic Spline interpolation curve fitting for optimal planned path. The simulation results show that the multi mobile robots navigate successfully with avoiding static obstacles as well as avoiding the collision between each other.