

Abstract

In this paper, a Neuro-fuzzy and fuzzy probabilistic coordination and path planning for multiple mobile robots are presented. The coordination relies on a leader-followers conception which means related to the leader position, the followers will behave. The method consists of two fuzzy level controllers architecture based on a fuzzy probabilistic control and an Adaptive Neuro-Fuzzy Inference System (ANFIS). Each robot has low level probabilistic fuzzy controller to eliminate the stochastic uncertainties as well as to make the multi-robots team navigates from the start point to the target point without any dangerous collision. The first order Sugeno fuzzy inference system is utilized to model the leader robot system and create the high level controller. The approach starts by generating the input/output data. Then, the subtractive clustering algorithm along with least square estimation (LSE) generates the fuzzy rules that describe the relationship between input/output data. A learning algorithm based on neural network is developed to tune parameters of membership function and the fuzzy rules are tuned by ANFIS. The feasibility and effectiveness of the proposed approach is verified by simulation. The simulation results demonstrate the effectiveness of the proposed system. In addition, some parts of the proposed approach verified by experiments on real robot.