

A Review on Comparative Analysis of Path Planning and Collision Avoidance Algorithms

Authors : Divya Agarwal, Pushpendra S. Bharti

Abstract : Autonomous mobile robots (AMR) are expected as smart tools for operations in every automation industry. Path planning and obstacle avoidance is the backbone of AMR as robots have to reach their goal location avoiding obstacles while traversing through optimized path defined according to some criteria such as distance, time or energy. Path planning can be classified into global and local path planning where environmental information is known and unknown/partially known, respectively. A number of sensors are used for data collection. A number of algorithms such as artificial potential field (APF), rapidly exploring random trees (RRT), bidirectional RRT, Fuzzy approach, Purepursuit, A* algorithm, vector field histogram (VFH) and modified local path planning algorithm, etc. have been used in the last three decades for path planning and obstacle avoidance for AMR. This paper makes an attempt to review some of the path planning and obstacle avoidance algorithms used in the field of AMR. The review includes comparative analysis of simulation and mathematical computations of path planning and obstacle avoidance algorithms using MATLAB 2018a. From the review, it could be concluded that different algorithms may complete the same task (i.e. with a different set of instructions) in less or more time, space, effort, etc.

Keywords : path planning, obstacle avoidance, autonomous mobile robots, algorithms

Conference Title : ICAIM 2018 : International Conference on Automation and Intelligent Manufacturing

Conference Location : Vienna, Austria

Conference Dates : June 14-15, 2018