A review on path planning and obstacle avoidance algorithms for autonomous mobile robots

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ABSTRACT
Mobile robots have been widely used in various sectors in the last decade. A mobile robot could autonomously navigate in any environment, both static and dynamic. As a result, researchers in the robotics field have offered a variety of techniques. This paper reviews the mobile robot navigation approaches and obstacle avoidance used so far in various environmental conditions to recognize the improvement of path planning strategists. Taking into consideration commonly used classical approaches such as Dijkstra algorithm (DA), artificial potential field (APF), probabilistic road map (PRM), cell decomposition (CD), and meta-heuristic techniques such as fuzzy logic (FL), neutral network (NN), particle swarm optimization (PSO), genetic algorithm (GA), cuckoo search algorithm (CSO), and artificial bee colony (ABC). Classical approaches have limitations of trapping in local minima, failure to handle uncertainty, and many more. On the other hand, it is observed that heuristic approaches can solve most real-world problems and perform well after some modification and hybridization with classical techniques. As a result, many methods have been established worldwide for the path planning strategy for mobile robots. The most often utilized approaches, on the other hand, are offered below for further study.

KEYWORDS
Collision avoidance; Fuzzy logic; Genetic algorithms; Heuristic methods; Mobile robots; Navigation; Particle swarm optimization (PSO); Robot programming

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