

Automatic navigation of mobile robots in unknown environments

ABSTRACT

Online navigation with known target and unknown obstacles is an interesting problem in mobile robotics. This article presents a technique based on utilization of neural networks and reinforcement learning to enable a mobile robot to learn constructed environments on its own. The robot learns to generate efficient navigation rules automatically without initial settings of rules by experts. This is regarded as the main contribution of this work compared to traditional fuzzy models based on notion of artificial potential fields. The ability for generalization of rules has also been examined. The initial results qualitatively confirmed the efficiency of the model. More experiments showed at least 32 % of improvement in path planning from the first till the third path planning trial in a sample environment. Analysis of the results, limitations, and recommendations is included for future work.

Keyword: Local navigation; Reinforcement learning; Associative memory