

Autonomous path planning through application of rotated two-parameter overrelaxation 9-point Laplacian iteration technique

ABSTRACT

Autonomous path navigation is one of the important studies in robotics since a robot's ability to navigate through an environment brings about many advancements with it. This paper suggests the iteration technique called half-sweep two-parameter overrelaxation 9-point laplacian (HSTOR-9P) to be applied on autonomous path navigation and aims to investigate its effectiveness in performing computation for path planning in an indoor static environment. This iteration technique is a harmonic function that solves the Laplace's equation where the modelling of the environment is based on. The harmonic functions are an appropriate method to be used on autonomous path planning because it satisfies the min-max principle, therefore avoiding the occurrence of local minima which traps robot's movements, and that it offers complete path planning algorithm. Its performance is tested against its predecessor iteration technique. Results shown that HSTOR-9P iteration technique enables path construction in a lower number of iterations, thus, performs better than its predecessors.