Abstract

One of the most important areas of research on mobile robots is that of their moving from one point in a space to the other and that too keeping aloof from the different objects in their path i.e. real time obstacle detection. This is the basic problem of path planning through a continuous domain. For this a large number of algorithms have been proposed of which only a few are really good as far as local and global path planning are concerned as to some extent a trade of has to be made between the efficiency of the algorithm and its accuracy. In this project an integrated approach for both local as well as global path planning of a robot has been proposed. The primary algorithm that has been used for path planning is the artificial Potential field approach [1] and a* search algorithm has been used for finding the most optimum path for the robot. Obstacle detection for collision avoidance (a high level planning problem) can be effectively done by doing complex robot operations in real time and distributing the whole problem between different control levels. This project proposes the artificial potential field algorithm not only for static but also for moving obstacles using real time potential field values by creating sub-goals which eventually lead to the main goal of the most optimal complete path found by the A* search algorithm. Apart from these scan line and convex hull techniques have been used to improve the robustness of the algorithm. To some extent the shape and size of a robot has also been taken into consideration. The effectiveness of these algorithms has been
verified with a series of simulations.

References

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Index Terms

Computer Science
Automation

Keywords
Obstacle search hit point leave point path approaches