

Motion Planning for an Autonomous Mobile Robot using Cell Decomposition Architecture

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Abstract: Autonomous robots have wide reaching applications like military applications, finding humans in wreckage in calamities, home automation etc. Major problems facing designers are power and reliable sensing mechanism and unfamiliar terrain. Human Assistant robots are rapidly coming to lime-light with their wide variety of applications. One major requirement of such a robot is to plan its path of motion in a known environment (Off-Line Planning). Consider a human assistant robot designed to do household tasks. The bot is aware of its environment i.e. the house. It is required to move from one place to another. This paper explores the prospects of providing the robot with the shortest path by dividing the entire environment of the robot into cells. This process is called cell decomposition. Here the work volume or space of the robot is divided in the form of $m \times n$ squares (Cell Decomposition), then identify one such square as the “start” and another as the “goal”.

The decomposition is further enhanced by deploying Negative Selection procedure and flooding algorithm to ensure the shortest part is selected.

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