SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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A LUNAR ROVER PATH SEARCHING ALGORITHM BASED ON TOPOLOGY

Abstract

As the precondition for lunar rover's patrol and exploration, path searching effects lunar rover's safe-guiding as well as the efficiency of tele-operation and autonomous operation. Thus research on lunar rover path searching algorithm is crucial obviously in both theory and practice. In consideration of global path planning of wheel lunar rover, a path searching algorithm based on topology is presented to solve the problems in traditional path searching which is aw with much broken lines, frequently turning points and difficulties in implementation. This algorithm computes the central topology points of every topology graph which is decomposed from the lunar circumstance graph. Passing possibility from the current topology point the adjacent points is derived by using sample path searching strategy combined with rover moving and steering ability. If the passing is capable, smooth path can be generated as well as the moving costs and courses of both the starting and stopping points; thus the nest adjacent topology point can be determined by comparing the moving costs with A star algorithm. The same searching strategy is carried out until the target point is reached. With full consideration of rover's moving and steering ability in the path searching among the topology points, this algorithm can reduce turning points and obtain a relatively optimized smooth path from the starting point to the stopping point.