Case-Based Path Planning: Router

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Abstract

The origin of cases is a central issue in cognitive models of case-based reasoning. Some recent work proposes the use of weak methods for generating solutions when a relevant case is not available, and chunking the solutions into cases for potential reuse. Our theory of case-based spatial planning and navigation suggests a different approach in which mental models of the world provide a way for solving new problems and acquiring cases. These mental models also provide a scheme for organizing the case memory, adapting old cases, and verifying new plans. The use of multiple methods, such as case-based and model-based reasoning, raises another important issue in problem solving, namely, how to opportunistically select and dynamically integrate the various methods. Our theory suggests the use of simple meta-reasoning to recursively select an appropriate method as the problem is decomposed into subproblems. This leads to the dynamic integration of different methods while performing a task, where one method is used for one subproblem and a different method for another subproblem. We have instantiated our theory in the Router system, a high-level robotic path planner.

References

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