

Why Real-World Planning is Difficult: A Tale of Two Applications

Steve Chien, Randall Hill, Jr., XueMei Wang, Tara Estlin,
Kristina Fayyad, and Helen Mortenson
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA 91109-8099

Abstract. In this paper we describe a number of obstacles hampering the application of planning technology to real-world problems, as encountered in two real-world planning projects at JPL: MVP - a planning system for automated generation of image processing procedures; and LMCOA - an intelligent system for assistance in antenna operations. First, we describe how existing planning representation must be enhanced to represent and reason about aspects of plans besides goal achievement - resource usage, quality, execution time, flexibility, and generality. Second, planning systems must be able to fit into a wide range of operational contexts - most planning tasks cannot be completely automated, therefore at a minimum the plans produced must be easily understandable and modifiable by the users. In some cases the user must be intimately involved in the plan construction process itself. Third, planning systems must be able to compare favorably in terms of software lifecycle costs to other means of automation such as scripts or rule-based expert systems. This means that development of intelligent tools and environments to facilitate knowledge acquisition, validation, and maintenance are of prime importance. We hope that our description and elucidation of these issues will lead to increased work in these areas.

1 Introduction

Why have so few actual planning applications been fielded? In this paper we describe three types of issues hindering such efforts - lessons learned from two fielded planning applications: an automated image processing system (called MVP - for Multimission VICAR Planner) and a decision support system for antenna operations (called LMCOA - for Link Monitor and Control Operator Assistant). We hope that our description of these issues will encourage research in these areas of great importance to fielding real-world planning systems. We categorize these planning issues into three general classes. The first set of issues relates to expressiveness of representations for planning knowledge (such as more expressive action and temporal representations). Within this issue, we

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