3. FUZZY SETS
AN ABSTRACT MECHANISM FOR HANDLING UNCERTAINTY

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ABSTRACT
Fill is an AI language incorporating a powerful mechanism for handling uncertainty in knowledge-based applications. It is implemented as a compiler producing code for an abstract machine. In this paper, we outline the features of the abstract machine used to handle uncertainty and illustrate their operation by reference to a simple example.


1. INTRODUCTION

Many AI applications have used Prolog, partly because it is suited to symbolic processing, partly because it can be executed as efficiently as conventional (procedural) languages, and partly because of its underlying theoretical foundations. However it lacks any representation of uncertainty, which is a major consideration in most current knowledge-based systems. Support logic programming\[1\] extends the logic programming approach to handle generalised probabilities in a clean and consistent way, yielding an AI language in which the management of uncertainty has a central role. Fril\[2\] is a practical implementation of support logic programming, which has been used for a wide variety of applications. It is a compiled language, based on an underlying abstract machine, described in more detailed in \[3\]. In this paper we outline the mechanism used to handle uncertainty. Owing to the brevity of this paper, we assume a familiarity with Fril and the Warren Abstract Machine (WAM) \[4\], a von-Neumann oriented instruction set reflecting the features particularly associated with Prolog programs. This has been used in most successful Prolog compilers.

2. SUPPORT LOGIC PROGRAMMING

In support logic programming, uncertainty can appear in the value of a parameter, in the relation between objects, and in drawing a conclusion from a set of conditions. Fril models the first form by allowing pos-