Multi-Level Pattern Interpretation

Rule-Based Understanding of Signals

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SU/X and SU/P are knowledge-based programs which employ pattern-invoked inference methods. Both tasks are concerned with the interpretation of large quantities of digitized signal data. The task of SU/X is to understand "continuous signals", that is, signals which persist over time. The task of SU/P is to interpret protein x-ray crystallographic data. Some features of the design are: (1) incremental interpretation of data employing many different pattern-invoked sources of knowledge, (2) production rule representation of knowledge, including high level strategy knowledge, (3) "opportunistic" hypothesis formation using both data-driven and model-driven techniques within a general hypothesize-and-test paradigm; and (4) multilevel representation of the solution hypothesis.

A Production System for Speech Understanding

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A production system was developed for syntactic and semantic processing within the Hearsay-II speech understanding system. The major properties of the system are discussed, including (1) conversion of static language descriptions into productions, (2) compilation and data-directed execution of productions, (3) dynamically modifiable thresholds on goodness of pattern matches, (4) partial matching, and (5) representation and integration of bottom-up, top-down and horizontal searches. Several weaknesses of the production system paradigm in this application appeared during the course of this research. These arose from (1) the arbitrariness of canonical decompositions of patterns into subpatterns, (2) insufficient use of contextually confirming evidence for individual hypotheses due to the narrowness (literality) of monitored conditions, and (3) difficulty in evaluating the varying import of the same generic action in different contexts. Thus, while the uniformity and lack of explicit organization of production systems are touted as their most desirable features, attendant difficulties of dynamically organizing and controlling coherent problem solutions must be seriously considered in problem domains requiring careful allocation of computational resources.

Pattern Recognition and Pattern-Directed Inference in a Program for Playing Go

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Skilled human go play presumes the ability to recognize and make inferences from many different kinds of complex patterns. The go playing program described here deals with these various pattern recognition activities in terms of a small set of basic scanning and recognition mechanisms. All of the program's inference processes are defined with respect to these mechanisms.

The treatment of pattern similarity is conservative. Novel configurations are broken down into subpatterns, and subsequent inferences regarding such configurations are based upon the properties of the subpatterns and the relations among them. The basic functions carried out by the recognition and inference system include: establishing appropriate multilevel pattern organizations; maintaining and updating pattern interrelations as the board situation changes; recognizing configurational identities and similarities; monitoring and filtering situational changes with respect to their implications for higher-level planning and problem solving functions; and providing predictively useful pattern information for planning.

Although still very weak by human standards, the program is demonstrably stronger than previous go programs. In particular, tests of its performance resulted in the first reported win by a program against a non-novice human player.

OFFICERS' MESSAGES

Outgoing Chairman

So, the transition to the new regime is in its final stages and it is time to write a farewell message. The only thing that I want to do in this message is say thank you to all the SIGART officers and committee members who worked with me during the last year.

I especially want to thank Lee Erman and Mike Rychener for doing an excellent job with the Newsletter during their terms as editors. Producing the Newsletter is by far the most difficult and energy-consuming task associated with SIGART, and Lee and Mike have consistently produced a responsive and high quality Newsletter and have been a pleasure to work with.

I also want especially to thank Don Waterman for taking care of the rather large quantity of financial and budgetary matters during the last year. He succeeded in interfacing with the formidable ACM bureaucracy, relieving me of the necessity of learning about SIGART's financial mechanics, and keeping watch over our financial condition.

I have enjoyed being your Chairman, and I am looking forward to reading someone else's Chairman's Messages.

R.E.F.

Incoming Chairman

First, I would like to thank Rich Fikes who has given me a good deal of information and advice to help me get started. Lee Erman will be ending his Newsletter editorship with this issue, and deserves special thanks for his long and excellent service -- I know he feels relieved! Ira Goldstein will take over as Newsletter editor beginning with the issue after next; the next issue (August) will be a joint issue with SIGPLAN devoted entirely to the August Rochester conference on AI and programming languages. Jim Low will serve as editor.

In my nomination statement I suggested organizing conferences or workshops to fill in the gap between IJCAIs. Planning for such events must begin soon, and I would like some idea about what types of meetings SIGART members feel would be most valuable and who would be willing to organize the meetings. I personally favor the idea of having one or more small workshops on relatively specific aspects of AI, as opposed to a single joint conference; Bob Simmons has already proposed another TINLAP conference, and this seems a good idea to me. However, it would be nice to get feedback from you about what formats you prefer, what topics would serve as good focus points for workshops, and especially about who would be willing to handle local organizing and arrangements for meetings. This is a golden opportunity to put yourself on the map!

D. W.

Outgoing Newsletter Editor

On this last issue of my editorship, I would like especially to thank Mike Rychener, who has done yeoman work as associate editor, and Bev Howell, who has done so much of the typing and paste-up. We're all going to miss those long, late afternoon sessions of finally putting the Newsletter to bed.

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