Automaton plays with blocks

By Bob Lefkowitz

A year or two of high-level research at Project MAC has culminated in the development of a robot that matches the ability of a two-year-old child to play with blocks.

At a Tuesday afternoon seminar, Professor Patrick Winston described recent Artificial Intelligence work at Project MAC that tackles fundamental problems of pattern recognition and communication in English.

He explained that AI research is moving out of an "Era of Exlibris" that involved specific programs to "show off" the aptitude of computers. Having convinced people that computers are capable of handling complicated problems, researchers have been able to approach tasks requiring much more versatility from the computer.

"Playing with blocks"—"playing with blocks" marks a sample of the research done in the important area of pattern recognition. Such abilities, though well-developed in very young children, are difficult to discern and feed into a computer.

The Project MAC robot is equipped with an "eye," an arm, and two "fingers." A structure is constructed from several blocks, the robot distinguishes between them, and constructs a line drawing, lines appearing wherever there are any significant change in the amount of reflected light.

In the second stage, but in reality a complete sequence of steps. The first is to draw the structure. The robot does so with its "eye," and constructs a line drawing, lines appearing wherever there is any significant change in the amount of reflected light.

This line drawing is then processed by the "bookkeeper." This subroutine accounts for the lines and "complains" when unwanted ones appear, or needed ones are missing. This is checked by the verifier, and finally, an accurate two-dimensional line drawing is obtained.

Then the body finder is called, to pick out which of the two-dimensional figures are edges of members of the same blocks. And to complete the first phase, the Z-determiner sets up a coordinate for all the bodies.

Final steps

This completes the first phase, because until now, no action has been taken to either take apart or rebuild a similar structure. The approach the robot takes to building a similar structure is to analyze how it would take apart the existing one, and then reverse the process. The final steps are much easier than the first few, and simply consist in deciding which blocks to move first, and then doing so.

The robot so far deals only with blocks that are rectangular parallelopipeds. However, a week or so of study should introduce triangular prisms and other shapes.

Professor Patrick Winston details Project MAC's pattern-recognition program.

Photo by Dave Yogler

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- IMPORTANT - There will be class officer elections concurrent with the IUP election scheduled for March 3. Petitions should be picked up in W20-401 and returned by Friday, February 26th.

- Harvard University Professor C.C. Lambert-Karovsky will give a lecture on the recent discovery of a 5000 year old site in southern Iran. This lecture is sponsored by the Iranian Students Association of MIT at 7:30 pm, Thursday, February 25, in the Student Center mezzanine lounge.

- An exhibit of photographs and slides of IUP being planned as part of the Main Corridor Project. A member who has material might be interested should get in touch with Joanne Miller in the News Office, Room 5-415, x2101.

- Alpha Phi Omega, National Service Fraternity, is working on a project to eliminate architectural barriers to the handicapped from the MIT campus. The first part of this project is a survey of handicapped members of the MIT community. If you have any kind of physical handicap, please call APO at x3788 or Dorm Line 9695.

- The Tech Catholic Community and the United Christian Fellowship announce an open seminar: Who Needs a Church? A discussion of the role of organized religion with Rev. Stanley F. MacNeil and Rev. John Crocker. Tuesday, February 23rd at 7:30 pm in the McCormick Brown Room. All faithful, believers, atheists, prophets, heretics, dissidents, agnostics, etc. of all religions are welcome. Please come and help discuss student attitudes. Refreshments will be provided.

- The Work of William Reich is to be the topic of a talk by Mycon Sharaf. Assistant Area Director, Boston State Hospital, Tuesday evening, February 23rd in room 7-345; 6 pm for communal supper, presentation and discussion at 8 pm. Sponsored by the Open Forum on Human Ecology.

- People interested in building a revolutionary socialist organization on campus are urged to attend a meeting of the Rosa Luxemburg Committee at 7:30 pm, Tuesday, February 23, in the Student Center (the room number will be posted). Discussion will focus on anti-war activity at MIT and related issues affecting the MIT community.

* Just this week's Thursday Noontime Concert will be a solo clarinet recital by Ray Jackendoff. The program, to begin at 12:10 in the MIT Chapel, includes Violin Sonata by Bach and Three Poets by Straussky.

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