

XVI. ARTIFICIAL INTELLIGENCE*

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RESEARCH OBJECTIVES

The purpose of our work is to investigate ways of making machines solve problems that are usually considered to require intelligence. Our procedure is to attack the problems by programming a computer to deal directly with the necessary abstractions rather than by simulating hypothetical physiological structures. When a method for solving a problem is not known, searches over spaces of potential solutions of the problem or of parts of the problem are necessary. The space of potential solutions of interesting problems is ordinarily so enormous that it is necessary to devise heuristic methods (1) to replace the searching of this space by a hierarchy of searches over simpler spaces. The major difficulty at present is the excessive length of time required for building machinery or even for writing programs to test heuristic procedures. For this reason, the major part of our effort is going into the development of ways of communicating with a computer more effectively than is now possible. This work has two aspects: a system for instructing the computer in declarative as well as imperative sentences, called the advice taker (2), and a programming language (3) for manipulating symbolic expressions that will be used for programming the advice-taker system and will also be of more general use.

Abrahams, Kleinrock, McCarthy, and Shannon are working on a chess program. The legal move routines are complete and working, and some of the tactical routines have been written.

Bobrow, Minsky, and Shannon are working on the design of a mechanical hand as a computer input-output device. The goal includes devising a way of representing abstraction of physical actions in the computer.

Rochester is working on the application of the programming language to certain routine problems in mathematics and engineering in which the answer is to be furnished by the machine as a formula rather than as a table of numbers.

Some other members of the group are undertaking programs to carry out the operations of elementary calculus and to generate descriptions of the objects in pictures.

J. McCarthy, M. L. Minsky

References

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2. J. McCarthy, Programs with common sense, paper presented at the Symposium on the Mechanization of Thought Processes, National Physical Laboratory, Teddington, England, Nov. 24-27, 1958.
3. J. McCarthy, An algebraic language for the manipulation of symbolic expressions, Internal Memoranda, Artificial Intelligence Project, M.I.T., Sept.-Nov. 1958.

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