ELECTRONICS

Machine Solves Problems

Electronic machines, the so-called "brains," now being used to bring added speed and accuracy to many processes, are contributing to learning and problem solving.

➤ HOW TO make it easier for machines and human beings to talk to one another was discussed at a conference in San Jose, Calif., on the communication of scientific information.

Machines that can handle non-numerical information have become very important.

Non-numerical problems include recognition of human speech by machine and mechanical translation of language. Machines for such problems must be able to handle information in the same form that human beings use.

Related problems are retrieving information from documents in library storage and the design of self-organizing machines that can be taught to play chess or to prove mathematical theorems.

These latter machines are important because they are able to simulate some important characteristics of human problem solving.

Although special small machines and adaptations of large numerical computing machines have been used for years in non-numerical problems, workers in the field have shown that non-numerical problems do not readily fit on the standard computing machines built for adding and multiplying numbers. (See p. 360.)

Non-numerical problems require machines that may be more complex than ordinary computing machines. To build such machines for non-numerical problems requires better understanding of the principles of human communications.

For example, although a trained mathematician can set down the step-by-step procedures necessary for solving mathematical problems, no trained linguist has yet been able to tell a machine exactly how to set about producing a really good translation from one language to another.

The two-day conference was held in conjunction with the dedication of the new manufacturing and research facilities of the International Business Machines Corporation.

The IBM facilities include a manufacturing plant for the IBM 305 RAMAC, a machine designed for business data processing but which can be adapted to non-numerical usage because of its large memory capacity for 5,000,000 alphabetical or numerical characters.

"Electronic Librarian"

➤ AN "ELECTRONIC librarian" was described by Dr. H. P. Luhn of the International Business Machines Corporation.

The business intelligence system, reported to the conference of communication scientists, would be able to match documents to readers.

Dr. Luhn envisions a centralized service using a large-scale computing machine that would combine information retrieval with a notification service to the users of the information.

In Dr. Luhn's system the potential user would first write a description of his background and work. This would be analyzed by machine to determine a "profile" of the subjects in which the user would be interested.

At the same time, documents fed into the machine would also be analyzed and standard abstracts prepared.

The information analysis of each document would then be matched by the machine with the interest "profile" of each user, Dr. Luhn said.

The user would be given a selected list of titles by the machine, if the machine's matching showed that the user should receive the new information. From these titles the user could then select abstracts and from the abstracts, full papers that he would want to read.

In the final step, the machine would note which documents the user selected and the machine would revise the user's "profile" immediately. In this way the machine would always have an up-to-date picture of interests of each of its users.

Direct requests for information made by the user could also be reflected in his "profile."

Communication Aid

➤ NEW MATHEMATICAL tools are being created to help us understand the systems that generate and process information, whether they are human beings or computing machines.

This is the opinion of Dr. Jerome B. Wiesner, director of the Research Laboratory of Electronics, Massachusetts Institute of Technology, and member of the steering committee of MIT's newly formed Center for Communication Sciences, speaking at the dedication ceremonies.

Dr. Wiesner told how these new tools, now emerging from many branches of mathematics, are essential to the understanding we have of electrical communication, language, computing devices, servomechanisms, and many other of the communication sciences. He looked forward to further developments that will give a better understanding of the complicated problems of communication and control found in living creatures.

The results, he said, could make important contributions to mental health and social relations. In addition, Dr. Wiesner stated, a better understanding of the underlying theory should permit man-made information processing devices, such as computing machines, to be made more versatile, intelligent, and useful.

He stressed that it is possible to know a great deal about the performance of communication without having the generalizations that will account for the details observed. Although we have had electrical communication systems for more than a hundred years, Dr. Wiesner pointed out, the mathematical theory of communication is only about 15 years old.

He cited the work of Prof. Claude E. Shannon of MIT, also a speaker at the dedication meeting, and of Prof. Norbert Wiener of MIT.

SEA COPTER—The new Sikorsky S-62 is believed to be the first amphibious helicopter ever built with a flying boat-type hull, suitable for operating from water, land, ice, snow or swamp. The hull weighs less than a land type hull equipped with inflated pontoons for water landings. Much of the drag associated with pontoon-type flotation, in flight and in the water, is also eliminated.