TECHNOLOGY

Machine Learns Alphabet

AN EXPERIMENTAL machine that correctly identifies letters of the alphabet—even letters of a writing style it has never seen before—was demonstrated publicly for the first time in Buffalo, N. Y.

Called the Mark I perceptron, the machine's alphabet recognition represents a breakthrough in data processing. Existing digital computers fundamentally handle numerical data.

Future perceptrons may be used in situations which now require human operators to differentiate between patterns and objects.

The machine was developed by Cornell Aeronautical Laboratory, Inc.

The perceptron can correctly identify letters of a type face it has "seen" before. When another type face is introduced, the machine is still correct 79% of the time.

The machine is taught to recognize letters almost as a child is. The trainer places test patterns in view of the machine's photo cell eye. The trainer leaves the machine alone when it makes a correct identification.

But when the big machine errs, the trainer corrects it, using electrical controls to force the right answer out of the machine.

After only 15 exposures to a letter, the machine can reognize it from then on as long as the letter is written in the same style.

If the machine's trainer accidentally makes occasional mistakes and forces the wrong answer from the machine, the machine can overcome this bad training. It will take longer, but the machine eventually will recognize the test patterns without error.

And as a child eventually learns to read various handwriting styles, the machine can eventually recognize partially obscured or distorted patterns—though not without some error.

In other words, the perceptron can generalize.

The perceptron can be taught to learn other patterns besides those of the alphabet, but its major application would seem to be in alphabet recognition. It might, for instance, be incorporated into translating machines.

The Cornell scientists, however, emphasized the present equipment was for research only.

Dr. Frank Rosenblatt, 31, a research psychologist, originated the perceptron theory and is in charge of the Cornell program.

He said the Mark I system can perform only very simple recognition tasks but is of scientific interest because of its use of new principles. The Office of Naval Research and the Rome Air Development Center both finance the perceptron work.

A representative of the Center said that

"during November of 1958 the Intelligence Laboratory of RADC became strongly convinced that developments in self-organizing systems could represent a significant breakthrough in the field of intelligence data processing."

Dr. Rosenblatt originally conceived of the perceptron as a model of a biological nerve net. He believes the machine to be based on theoretical models consistent with current anatomical and physiological data.

METALLURGY

Metallurgists Develop New Columbium Alloys

DEVELOPMENT of new alloys of columbium that meet space age and nuclear requirements was reported at a symposium on columbium metallurgy in Bolton Landing, N. Y.

Columbium is one of the several relatively uncommon metals, such as beryllium, that have become increasingly important for atomic reactors and high-performance jet and rocket engines because of their peculiar properties at high temperatures. Extensive deposits of columbium ore were recently discovered in Quebec.

Alloys of columbium containing tungsten and titanium were found to resist oxidation at temperatures up to 2,550 degrees Fahrenheit, while maintaining good mechanical properties.

Those containing aluminum and vanadium retain their low neutron cross section but have oxidation rates only a hundredth the rate of pure columbium.

Metallurgists at Union Carbide Metals Company also investigated alloys containing varying amounts of titanium, molybdenum, chromium and zirconium.

MINING

Use of Nuclear Blasts In Mining Sulfur Studied

NUCLEAR EXPLOSIONS may be used to mine sulfur in the Gulf of Mexico, the joint meeting in Mexico City of the American Institute of Chemical Engineers and the Instituto Mexicano de Ingenieros Quimicos was told.

John M. Dales and Roger C. DeHart of the Southwest Research Institute in San Antonio, Texas, said nuclear mining would be cheaper than methods currently in use such as the usual Frasch process.

The sulfur could be melted by heat from a small nuclear device and then forced up a bore-hole by hot water or steam that is forced down a second bore-hole.

The engineers expect new deposits of sulfur will be discovered under the Gulf of Mexico. They say studies are now being made for recovery of the sulfur by nuclear explosions.

Mr. Dale and Mr. DeHart said that, although the explosion would be entirely contained underground and quite safe, the greatest obstacle to its use would be the lack of understanding on the part of the public.

PERCEPTRON—*Mark I perceptron, built by the Cornell Aeronautic Laboratory, Buffalo, N Y., can be 'trained' to recognize automatically the letters of the alphabet. An engineer is adjusting the photo cell 'eye' to recognize the letter C.*