Unorganized machine

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An **unorganized machine** is a concept mentioned in a far-sighted 1948 report in which Alan Turing suggested that the infant human cortex was what he called an "unorganised machine".[1][2] Turing defined the class of unorganized machines as largely random in their initial construction, but capable of being trained to perform particular tasks. Turing's unorganized machines were in fact very early examples of randomly connected, binary neural networks, and Turing claimed that these were the simplest possible model of the nervous system.

Turing had been interested in the possibility of simulating neural systems for at least the previous two years. In correspondence with William Ross Ashby in 1946 he writes:

> I am more interested in the possibility of producing models of the action of the brain than in the applications to practical computing...although the brain may in fact operate by changing its neuron circuits by the growth of axons and dendrites, we could nevertheless make a model, within the ACE, in which this possibility was allowed for, but in which the actual construction of the ACE did not alter, but only the remembered data

In his 1948 paper Turing defined two examples of his unorganized machines. The first were *A-type machines* — these being essentially randomly connected networks of NAND logic gates. The second were called *B-type machines*, which could be created by taking an A-type machine and replacing every inter-node connection with a structure called a *connection modifier* — which itself is made from A-type nodes. The purpose of the connection modifiers were to allow the B-type machine to undergo "appropriate interference, mimicking education" in order to organize the behaviour of the network to perform useful work. Before the term *genetic algorithm* was coined, Turing even proposed the use of what he called a *genetical search* to configure his unorganized machines.[3] Turing claimed that the behaviour of B-type machines could be very complex when the number of nodes in the network was large, and stated that the "picture of the cortex as an unorganized machine is very satisfactory from the point of view of evolution and genetics".

Notes

1. ^ Turing's 1948 paper has been re-printed as **Turing AM.** Intelligent Machinery. In: Ince DC, editor. *Collected works of AM Turing — Mechanical Intelligence.* Elsevier Science Publishers, 1992.
2. ^ **Webster CS.** Alan Turing's unorganized machines and artificial neural networks: his remarkable early work and future possibilities. *Evolutionary Intelligence* 2012: 5; 35-43.
3. ^ Compucology.net Technology and biology "Unorganized machines and the brain" (http://home.clear.net.nz/pages/cw/unorganized.htm)

External links

- Turing's correspondence regarding simulation of neural systems (http://www.rossashby.info/letters/turing.html)

Categories: Alan Turing