A first step with the theory of automata

With the conception of an analytical framework for the study of automata we need to examine iteration as differentiated from alternative mathematical concepts. We must examine the automaton. First, it must iterate in order to reflect the cycling of the machinery of digital information.

By condensing commonality from the differentiation of hard and soft automata, the automaton inherited iteration as intrinsic and implicit. Iteration is the process by which the object of study, the automaton, performs work. Practical automata convert electrical power to informational results by iteration.

This is important as the central feature of any automaton, and in distinction to the remainder of the universe of mathematical logic. Assuming that the universe of mathematical logic is rational, as would be prescribed by Russell and Whitehead, the universe of computation has an equivalent rationality that is founded on discrete objects of information and steps of iteration. The universe of mathematical logic has emerged from thought and mind as a collection of tools for the management of a particular class of

thought. The universe of computational machinery is a tool for the management of information. The distinction concerns media, mind and machine. The mental medium is vastly more powerful than the mechanical medium, as in the comparison of internet and computer. Thought ranges over information with care, or carelessly. One may give little thought to the sights and sounds that bring no new information. Any mechanical proportion would represent a surplus of computational capacity over the examination of every sight and sound. The constraints on the features and devices of automata are severe and unusual, among the objects of the familiar world of information.

Rather than perform in the mind of the experience of performance, with the faculty of training and the facility of expression, the automaton performs in the unfamiliar sterility of its features and devices. The first of these are iteration and object.

With iteration and object we can describe the degenerate automaton that scans an object sequence by iteration, to no effect. With iteration, object, and subject, we can describe the stateless automaton that scans an object sequence to produce a result to a subject.

$$S_i \leftarrow_\alpha O_i$$

This automaton may be conceived in software or hardware, it represents any number of extremely simple devices. It performs a simple task at a particular frequency. The typical conception is a function from input to output, from a digital domain to a digital range.

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