The Environment of Turing's Child-Machine

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In order to bridge the gap in the development of a thinking machine, Turing proposed, in his 1950 paper titled "Computing Machinery and Intelligence", to first construct a replication of a child's mind instead of that of an adult. It would then be possible for such a machine to undergo a form of learning that would follow the trajectory and lifetime of a child's education, resulting in a machine that would perform similar to a developed, adult mind. To build on Turing's notion of raising such a 'child-machine', Dr. S. G. Sterrett of the Department of Philosophy at Carnegie-Mellon University takes a deep dive into the many principles related to this development. This paired with Turing's research makes it possible to better understand the underlying factors necessary to construct the optimal teaching environment for such a machine.

The primary consideration that both authors take into account is the difference between "disciplined", "random", and "intelligent" behavior (Sterrett 2). This distinction is critical in understanding the methods necessary to teach a child-machine. Most traditional computers are built to function with disciplined knowledge, often relying on a set of ingrained guidelines and instructions. Therefore, those who attempt to teach such a machine face the challenge of complete predictability. Random behavior, on the other hand, is a construct that lies on the opposite end of the spectrum, often resulting in spontaneous behavior that a teacher may not recognize. The balance of these two is found through intelligent behavior which "escapes the predictability of completely disciplined machine behavior without veering off into random behavior" (Sterrett 2) with a teacher being able "to some extent predict his pupil's behavior" (Turing 458). The real benefit of intelligent behavior arises in its ability to be in continuous change, facing a wide variety of inputs that dynamically change and reflect the stimulus.

Initiative is a critical component that must be factored into the lesson plan of a child-machine. Initiative drives the mind to engage in activities beyond the basic structure and output of their instruction. A traditional machine, however, is designed to just respond to an input. Without an incoming instruction or command, most machines in this category remain idle (Turing 456). This is a critical component in articulating both the programming design and physical environment of a child-machine's education. Another critical component of designing the environment of a child-machine is the concept of accidental interference, one that is touched by both Turing and Sterrett, but leaves room for further research and development. The mind of a child, which greatly impacted by its educational period, is also subjected to subliminal teachings throughout its lifetime. These subliminal teachings can, at times, have unintended consequences upon the mind of a child, causing results that a teacher may struggle to predict. While in a broad sense these subtle interferences may be considered educational, those outside of the system will notice that often times such interferences have neither educational intent nor expectations. A common example of this phenomenon could be when a child accidently sees something. It is not the intention of the teacher to have the child witness this, nor is there a direct lesson involved. Nonetheless, the interference engages the mind of the child causing changes that may emerge in other facets of their behavior. Both initiative and interference are imperative, yet still debated, parts of many research studies. Turing's closest solution to alleviate these concerns was to implement an intended dose of randomness in the machine, giving the leeway to simulate these characteristics without descending into the chaos of a completely random machine.

The final, and often most overlooked, part of a child-machine's environment is the teacher itself. A common form of teaching is "education by community", a principle in which the child-machine is subjected to multiple perspectives. While in his other works Turing describes the potential need for multiple teachers, allowing for a variety of influences upon the machine, there are a few issues that may arise that are necessary to mitigate to build a constructive environment. The first issue is that of community contradictions. For principles that are not strictly governed by a definite right answer, it is important for the study to reflect so or for the community perspective to be normalized. A secondary issue arises in the potential implications of culture within a community, the influences of which must also be monitored (Sterrett 7).

The phenomenon of Turing's child-machine is a truly impressive ideology in the design of a thinking machine. While the research for such a mechanism is vast, it becomes important that equal importance be given to both the design (program and hardware) and educational environment of the machine.

Citations

Sterrett, S. G., Dr. (2012, April). *Bringing up Turing's 'Child-Machine'* [Scholarly paper]. Retrieved January 21, 2021, from http://philsci-archive.pitt.edu/9085/1 /SterrettBringingUpTuringsChild-Machine6April2012ForPSAArchive.pdf

Turing, A. M., Dr. (1950, October). *Computing Machinery and Intelligence* [Scholarly paper]. Retrieved January 21, 2021.