Machines Who Write and Edit

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The mathematician and his computer

Doron Zeilberger is a mathematician who co-authors papers with his computer, which he has named Shalosh Ekhad. He's even created a website for Ekhad (`http://www.math.rutgers.edu/~zeilberg/ekhad.html`), where the computer describes itself as Zeilberger's "servant" and gloats about the times when journalists have mistaken it for a human, called it a professor, and quoted extensively from it as if it were an ordinary author on Zeilberger's papers. Though Zeilberger presents this collaboration as a joke on Ekhad's site, the mathematician is deeply serious about the idea that he could not be doing his work without the aid of a computer, and therefore the machine deserves credit as an author. The machine is listed as first author on several of Zeilberger's papers.

The filmmaker and the neural network

Sunspring (https://vimeo.com/165547246) is a short movie, created for the Sci-Fi London film festival in 2016, whose script was written entirely by an LSTM recurrent neural network designed to learn from bodies of text and generate new texts based on them. Directed by Oscar Sharp, who named his machine collaborator "Benjamin", *Sunspring* was written after the filmmaker fed Benjamin the full scripts from dozens of science fiction films (and, inexplicably, *Silver Linings Playbook*). The filmmaker and colleagues edited the script for length but not content, noting wryly that the editorial treatment they gave it is much more generous than what most human writers get in Hollywood. Perhaps predictably, Benjamin's script is nonsensical but weirdly evocative, full of bizarre assertions and impossible stage directions.

Benjamin the neural network is credited as an author, but also as a tool. Currently the filmmakers are showing Benjamin off at conventions, allowing it to meet people and interact with them. Like Ekhad the mathematician, Benjamin the scriptwriter is both a joke and a serious exploration of what will happen when we begin to collaborate with machines on creative projects.

The publisher and the "bestseller algorithm"

Inkitt is a platform where aspiring novelists can share their creations, but the company aspires to be a lot more. It has developed a set of algorithms that it believes can analyze novels to "predict future bestsellers" by analyzing reader patterns to determine which stories are "highly-addictive." (`http://www.digitalbookworld.com/2016/data-driven-publisher-inkitt-signs-first-predicted-bestseller-with-tor-books/`). The company recently signed a deal with science fiction publisher Tor, which will publish a novel that Inkitt's algorithms chose. *Sky Riders*, by first-time author Erin Swan, will come out from Tor in 2017. In a release, the company said, "InkittâĂŹs goal is to remove the middle person so that a blockbuster book is never rejected by a publishing house again.âĂİ

There is nothing humorous or fanciful about Inkitt's use of algorithms instead of an acquisitions editor. This machine was used to determine what book would be bought, and which human author would earn money on her writing. Soon, Inkitt promises, publishers will never have to worry about blowing cash on a book that's doomed to be unpopular.

Collaboration without equality

When humans involve machines in the publishing process, the results inspire laughter and dread. It's interesting to consider the range of ways these humans portray their machine collaborators, from math "servant" and babbler of unhinged sci-fi dialogue, to omniscient predictor of bestselling novels. The machine is a slave, a child, or a god. It is never imagined as an equal.

This is not a reflection of some fundamental reality about machines. It is a reflection of how we manage collaboration between humans. Most scholarly papers have ranked authorship, where there is a "first author" who gets the lion's share of the credit and citations. Sometimes human co-authors are listed on a paper purely because their names will be recognized by journal editors; they may have contributed little more than a short conversation about the paper with the lead author. At the same time, many humans who contribute to a paper will never be acknowledged as authors, including the techs who build and calibrate scientific equipment, and the students who conduct research.

There is no question that writers and publishers will be working with machines in the future, because they already are today. But how will we work with them? If these three examples are any guide, we will treat them the way we treat each other–unfairly, whimsically, and with very little understanding of how valuable (or valueless) their

contributions actually are to a finished piece of work.