

2020. 08. 21

# Artificial intelligence in editing, writing, and reviewing manuscripts

Kihong Kim (KCSE, Ajou University)

# Applications of AI

- Healthcare: diagnosis, determining the accurate dosage of drugs, AI assistant of doctors, robot-assisted surgery, etc
- Material design
- Self-driving cars
- Finance: fraud prevention, audit, etc
- Cybersecurity
- Strategic games, video games
- Military simulation
- Advertising, marketing
- Natural language processing, translation, etc
- Speech recognition, pattern recognition
- Virtual reality
- Robotics
- Numerous other areas

# Short history of AI

- AI: machines that can **learn** and **solve problems** as humans do
- **Turing test**: a test of whether a machine can be said to **think** [Turing 1950]
- AI was established as a research field in 1950s.
- Key concepts: machine learning, deep learning (~1970), artificial neural networks (~1950)
- Reasons of recent success: faster computers, improved algorithm, big data
- Currently, a huge global competition is going on.

# AlphaGo beat Lee Sedol in 2016



# AI and publishing

- Language processing is an important part of human intelligence
- AI and natural language processing are being widely used in news media and publishing of books and journals
- AI can be used in all stages of journal publishing: peer review, editing, production
- Many publishers such as Taylor & Francis, Elsevier and Springer Nature are involved with developing various AI tools for publishing, in collaboration with software companies.

# The age of AI peer reviews

*Automated software can help review papers, but the decision-making stays with humans.*

BY DOUGLAS HEAVEN

Most researchers have good reason to grumble about peer review: it is time-consuming and error-prone, and the workload is unevenly spread, with just 20% of scientists taking on most reviews.

Now peer review by artificial intelligence (AI) is promising to improve the process, boost the quality of published papers — and save reviewers time. A handful of academic publishers are piloting AI tools to do anything from selecting reviewers to checking statistics and summarizing a paper's findings.

In June, software called StatReviewer, which checks that statistics and methods in manuscripts are sound, was adopted by Aries Systems, a peer-review management system owned by Amsterdam-based publishing giant Elsevier. And ScholarOne, a peer-review platform used by many journals, is teaming up with UNSILO of Aarhus, Denmark, which uses natural language processing and machine learning to analyse manuscripts.

UNSILO uses semantic analysis of the manuscript text to extract what it identifies as the main statements. This gives a better overview of a paper than the keywords typically submitted by authors, says Neil Christensen, sales director at UNSILO. “We find the important

phrases in what they have actually written,” he says, “instead of just taking what they’ve come up with five minutes before submission.”

UNSILO identifies which of these key phrases are most likely to be claims or findings, giving editors an at-a-glance summary of the results. It also highlights whether the claims are similar to those from previous papers, which could be used to detect plagiarism or simply to place the manuscript in context with related work in the wider literature. “The tool’s not making a decision,” says Christensen. “It’s just saying: ‘Here are some things that stand out when comparing this manuscript with everything that’s been published before. You be the judge.’”

“It doesn’t replace editorial judgement but, by God, it makes it easier,” says David Worlock, a UK-based publishing consultant who saw the UNSILO demonstration at the Frankfurt Book Fair in Germany last month.

Worlock notes that there are several similar tools emerging. He is on the board of Wizdom.ai in London, a start-up owned by publishers Taylor & Francis, which is developing software that can mine paper databases and extract connections between different disciplines and

concepts. He says that this kind of tool will be useful beyond peer review, for tasks such as writing grant applications or literature reviews.

Many platforms, including ScholarOne, already have automatic plagiarism checkers. And services including Penelope.ai examine whether the references and the structure of a manuscript meet a journal’s requirements. Some can flag up issues with the quality of a study, too. The tool statcheck, developed by Michèle Nuijten, a methodologist at Tilburg University in the Netherlands, and her colleagues, assesses the consistency of authors’ statistics reporting, focusing on *P* values. The journal *Psychological Science* runs all its papers through the tool, and Nuijten says that other publishers are keen to integrate it into their review processes.

When Nuijten’s team analysed papers published in psychology journals, they found that roughly 50% contained at least one statistical inconsistency (M. B. Nuijten *et al. Behav. Res. Meth.* **48**, 1205–1226; 2016). In one in eight papers, the error was serious enough that it could have changed the statistical significance of a published result. “That’s worrisome,” she says. She’s not surprised that reviewers miss such mistakes, however. “Not everyone has time to go over all the numbers. You focus on the main findings or the general story.”

For now, statcheck is limited to analysing ►

**“It doesn’t replace editorial judgement but, by God, it makes it easier.”**

# AI and editing

- Using AI tools, efficient and reliable automation of various tasks is possible:
  - technical readiness checks
  - plagiarism detection
  - detecting fabricated data and images
  - verification of statistical data
  - validation of references
  - summarizing the key ideas and new results of manuscripts
  - holistic review of manuscripts
  - selection of appropriate peer reviewers
  - scope matching and journal recommendation to authors
  - copy-edit level recommendation
  - automated copy-editing
- Better, faster, cheaper editing and production

# The Rise of the Robot Reporter

- New York Times, Feb. 5, 2019  
<https://www.nytimes.com/2019/02/05/business/media/artificial-intelligence-journalism-robots.html>
- Numerous companies including A.P., Bloomberg, Reuters, BBC, Washington Post, New York Times, and Guardian have developed AI tools for various purposes such as automated reporting and content moderation in the comment section

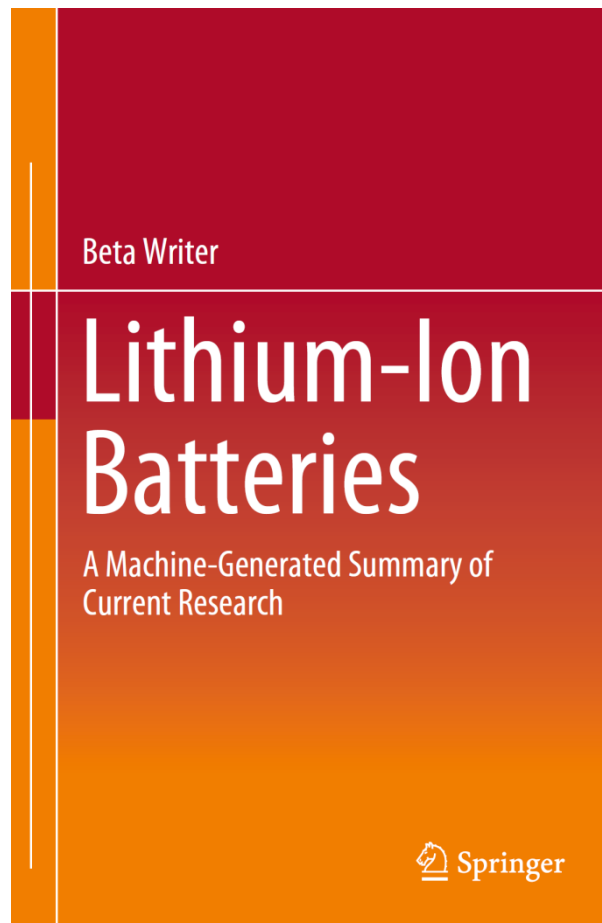




# First research book written by AI

- Springer, 2019, 247 pages

<https://link.springer.com/book/10.1007/978-3-030-16800-1>



# UNSILO

- **UNSILO Manuscript Evaluation**
- Manuscript analysis tool based on AI and natural language processing
- It provides main statements, overview, and summary of manuscripts
- A holistic comparison of the content with those of a large number of other papers is made
- Detection of plagiarism and internal conflicts
- This kind of tools can be useful to researchers and authors as well as to editors and publishers
- Collaboration with Wiley

# Cenveo

- **Smart Suite 2.0**
- Smart Edit, Smart Compose, Smart Proof, Smart Track
- Automatic conversion of a submitted manuscript to an appropriate XML file
- Automation of manuscript editing and production

# Enago

- AuthorOne
- Manuscript screening
- Journal recommender
- Scope intelligence
- Concept intelligence
- Copy-edit level recommender
- AI copy-editing

# Aries Systems

- Elsevier
- **Editorial Manager**: manuscript submission and peer-review tracking system



# Penelope.ai

- **Editorial Manager**
- Automated checks of ethics, declarations, title page, abstract, figures and tables, referencing, statistics, meta data
- Pricing

Annual Submissions	< 500	501 - 1000	1001 - 2500	2501 - 5000	5000 +
Price for full suite of checks (Annual, excl VAT)	£750	£1,200	£2,500	£4,000	Custom
Cost per submission	£1.50	£1.20	£1.00	£0.80	£0.80

# Wizdom.ai

- Taylor & Francis
- Development of a software that can deduce the relationships among various fields and concepts through a mining of the database of papers
- Visualize emerging research trends from full text analysis of submitted articles
- It can be used in writing proposals and review papers

# Statcheck

- Verification of statistical data
- <http://statcheck.io/index.php>

statcheck // web **Home** Documentation About/FAQ Contact

# statcheck

statcheck on the web

To check a PDF, DOCX or HTML file for errors in statistical reporting, upload it below.  
More information on this program is available [here](#).

(Currently in beta - please [tell Sean](#) about any errors!)

---

**Upload files (pdf, html, or docx):**

Try to identify and correct for one-tailed tests?



# AI research advisor, evaluator?

AI tools can

- deduce the relevance of a paper through an extensive comparison with other papers
- find suitable and relevant references
- suggest new directions of research
- complement the current way of evaluating journals and researchers based mainly on the number of citations

They need to be trained using unbiased data

# Conclusion

- The application of AI technology to editing and publishing of scholarly journals will be expanded to a great degree at a rapid pace.
- It is expected that AI technology will completely change the ways scientists do research and write papers and publishers produce journals in a not very far future.
- Everybody including those in small publishers needs to be alert to AI technology.