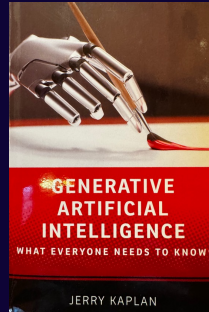


Our system of Peer Review is flawed; how might AI help?

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Peer Review

Has only been utilized since the 1960s
Prompted by government-funded research
Prior to that, papers and letters were published and
later reviewed and critiqued by Peers

A. Mastroianni. The rise and fall of peer review.
<https://www.meritstation.com>, 2022

Peer Review

By some estimates, Reviewers spend a collective
15,000 person-years reviewing scientific papers annually
Is it ethical for publishers to have so much of the
work (reviews) done for free?

Does Peer Review work?

Who Reviews the Reviewers? Feasibility of
Using a Fictitious Manuscript to Evaluate Peer
Reviewer Performance

Authors: Nick Black, Stephen Frazee, Peter Gader, Lydia Olovina, and Richard Smith

Reviewers caught 30% of MAJOR flaws

Reviewers caught 25% of MAJOR flaws

Training has minimal impact



An epidemic of scientific fakery

10,000 retractions of scientific papers in 2023

Many generated by 'paper mills'
Manuscripts generated by AI
'Publish or perish'

Reviewers are not privy to raw data
Occasionally requested *after* publication if there are concerns
Surgisphere

Strong financial incentive for Open Access journals
to accept papers

A. Marcus, I. Oransky. Washington Post, June 11, 2024

Potential bias in Peer Review

- Authors can suggest Reviewers, many of whom are their colleagues
- Authors are blinded to the identity of Reviewers
- Reviewers are not blinded as to the identity of authors or their institutions
- The same issues (bias) have been raised as a concern for the use of AI in Peer Review

Types of Artificial Intelligence

Artificial Narrow Intelligence

ANI
Machine Learning
Specializes in one area
Solves one problem

Artificial Super Intelligence

ASI
Machine Consciousness
Much smarter than humans

Artificial General Intelligence

AGI
Machine Intelligence
A computer that is as smart as a human

Policy on AI in Peer Review NIH, Elsevier

To protect authors' rights and research confidentiality,
does not allow the use of Generative AI or
AI-assisted technologies
for Peer Review

Do we currently use AI in the Review process?

- Editorial Manager (Elsevier)
- Uses Machine Learning (ANI)
 - Similarity check
 - Duplicate submission check

When is it OK to use AI in publishing?

- To improve the readability and language of a manuscript
- Must have human oversight
- The use of AI must be disclosed
- Generative AI must not be listed as an author or co-author

How might AI help in the Peer Review process?

- Check for duplicate submissions
- Identify AI-generated submissions from 'paper mills'
- Plagiarism check
- Collate Reviewer scores

How might AI help in the Peer Review process?

- Help ensure that research Methods are well-described
- Validate Conclusions
- Ensure that submission requirements are met
- Provide for more timely Reviews, that could help inform human decisions on a manuscript

Conclusions

- Our system of Peer Review works, but could be improved upon
- Artificial Intelligence may help streamline the process and provide for more timely Reviews, and help inform human decisions regarding a manuscript
- Current guidelines do not allow the use of AI in Peer Review, due to confidentiality concerns

