

Using Writing Assistants to Accelerate the Peer Review Process

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ABSTRACT

With the rapidly increasing number of submissions, challenges emerge in the peer review process. It is therefore necessary to support reviewers so that they can complete review tasks efficiently. By participating in this workshop, we hope to discuss and exchange ideas on how to better design writing assistants to meet the needs of reviewers and how to integrate them with existing review systems and review tools. Our vision for the future is to develop writing assistant tools that can help reviewers produce high-quality reviews in less time and with reduced workload.

KEYWORDS

Writing assistant, peer review

1 MOTIVATION

Despite peer review being a fundamental part of scientific research for centuries [9, 15], many academic communities are experiencing a peer-review crisis [1]: whilst the number of papers submitted continues to rise, reviewers are overburdened [8], and academics are increasingly unwilling to review [14]. This crisis in the peer review process affects all of the key stakeholders involved [10]: editors have difficulty recruiting reviewers; reviewers struggle to balance their review tasks with their own work, and sometimes they may review manuscripts perfunctorily due to the lack of time; authors complain about low-quality reviews and delayed reviews which might slow down their research and negatively impact their career progression.

We are a research group interested in exploring how technology can enhance academic peer review. While there have been efforts made to automate the peer review process [2], we hold the belief that fully automating the peer review process is currently not feasible due to technical limitations and ethical concerns – human experts are still best-placed to assess the quality of academic research papers.

The focus of our research is on identifying and developing innovative solutions that can make peer review easier for reviewers to complete while ensuring the quality of reviews meets or exceeds established standards. Specifically, we aim to design a writing assistant that can help junior reviewers write high-quality reviews without struggling with review structure and tone. Research has shown that junior reviewers tend to be harsher and produce lower-quality reviews [11], making a writing assistant particularly helpful for them. For senior reviewers who have busy work schedules, we hope the writing assistant can also help them complete review tasks efficiently to save them time.

In the following sections, we elaborate on our belief that fully automating peer review is not currently feasible, and we describe in detail our ideas for the functionality of the writing assistant.

2 AUTOMATED PEER REVIEW: LIMITATIONS REMAIN

Document parsing tools, such as GROBID [6] and PDFFigCapX [3], can extract figures, tables, mathematical expressions from PDF files; Software, such as UNSILO (<https://unsilo.ai/>), can automatically provide a summary of key findings and concepts extracted from the manuscript; Statcheck (<http://statcheck.io/>) and StatReviewer (<http://www.statreviewer.com/>) can assess the statistics in manuscripts; and ReviewRobot [12] can generate scores and reviews.

Despite attempts to transform peer review from a human-led to an automated process, existing tools still have limitations [4]. Improvements are still needed in terms of the accuracy of these tools to extract key information from manuscripts and to process long manuscripts. In addition, existing tools and technologies rely on datasets to provide functionality; In multidisciplinary domains like human-computer interaction, the datasets used should integrate knowledge from multiple disciplines, yet this is difficult for computers to proceed with challenges in knowledge-based logic reasoning. In addition, automatic peer review system was found to generate more biased reviews than reviewers [13].

Fully automating the peer review process has the potential to revolutionize the field, but only if current technological limitations are addressed and ethical concerns are properly accounted for. This requires extensive discussion on the potential risks and rigorous regulation to ensure the confidentiality of the review process is upheld and agreed upon by all stakeholders (i.e., authors, reviewers, and editors). However, the majority of automated peer review research has so far utilized public manuscripts and reviews from sources like "<https://openreview.net/>" to train their models and test the performance of the tools. Many publication venues, on the other hand, still require confidentiality in the review process. For instance, The alt.chi paper about Authorship and Reviews had to conceal all review quotes with black according to the ACM policy [5]. It is essential to discuss whether papers and reviews submitted to such venues can be used to train automated review tools, and what risks this may pose to authors when their unpublished manuscripts are analysed by these tools. It is also crucial to conduct studies to understand the level of acceptance and trust authors and editors have towards the reviews generated by AI-automated tools.

Automated peer review, in addition to its technical and ethical issues, may also have negative impacts on reviewers. One potential consequence of fully automated peer review is the loss of a valuable learning channel for reviewers. Research [7] has shown that reviewers are motivated to accept review requests to stay informed

about the latest knowledge in their research field, to remain up-to-date, and to stay engaged in the community. However, with the implementation of automated tools, this opportunity for learning may disappear. One potential solution is to use AI-assisted tools to generate a review that human reviewers will then read and check before presenting it to the editors and authors. However, this approach may also raise concerns about the risk of undetected errors and the bias that the automated results may influence reviewers to make decisions that differ from their original assessments.

We believe that fully automating the peer review process is not currently feasible, due to both technical challenges and ethical concerns. We believe most of review work which involves experts' knowledge and judgments should still be done by reviewers themselves. Since the expected outcome of peer review is to provide fair and constructive comments on a manuscript, and the main tasks of the peer review process involve critical reading and structuring comments into a review, we are curious about how writing assistants can help reviewers complete these tasks more efficiently and with a good quality.

3 USING WRITING ASSISTANT TO SUPPORT REVIEWERS

In recent years there has been an explosion of AI writing tools that can help improve the quality of written text. Some AI writing assistants can automatically generate the entire content for us. For example, we can simply get well-written paragraphs from ChatGPT (<https://openai.com/blog/chatgpt/>) after asking it to "write an introduction about human-computer interaction". Some other AI writing assistants, such as Grammarly (<https://www.grammarly.com/>), need the draft written by users and can help with grammar and phrasing to improve the quality of content written by users themselves.

We wonder if in the future we can embed AI writing assistant in the review system to reduce reviewers' burden and help reviewers write good reviews in less time. We briefly explore some of our design ideas as to how writing assistants can help reviewers complete review tasks:

- Easily create a review draft: the writing assistant can transform reviewers' bullet points into logically coherent paragraphs, enabling reviewers to focus solely on their judgments of the manuscripts. Reviewers can simply write their judgments in bullet points, input them into the assistant, and receive a draft review without having to spend time and energy structuring it themselves.
- Proofreading for reviewers: the writing assistant can quickly correct typos and grammatical errors in reviews to ensure reviews are in good quality.
- No "MEAN REVIEWER 2" anymore: the writing assistant can flag emotionally charged words or phrases, and rephrase them so that reviewers' language is more acceptable and helpful to the authors.
- Judgment guidance: for reviewers who require instructions on how to make judgments of the manuscripts and draft their comments, such as PhD students, the writing assistant can provide prompts to guide them in making notes about the paper and forming a fair judgment.

With the rate of current progress in the development of AI writing tools, it seems entirely conceivable that a future tool could be developed to reduce reviewers' burden by generating text directly from reviewers' notes and checking grammar and tone for them. We would like to gather ideas from the workshop about the classification of latest writing assistants, and to explore more ways in which we could support peer review using writing assistants.

4 CONCLUSION

In this workshop, we propose to explore the future of writing assistant used by peer reviewers. Peer review plays a decisive role in academia. By using writing tools to assist with review tasks, we expect to see an improvement in the quality and efficiency of reviewers' work.

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