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INESC TEC

Living Guidelines for Responsible Use of GenAI in Research

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Introduction

Generative Artificial Intelligence (GenAI) provides many opportunities for different sectors. Research is one of the areas that could be most significantly disrupted by GenAI, namely, by accelerating scientific discovery and improving the effectiveness and pace of research and verification processes. Therefore, researchers should leverage upon, but must also maintain a critical approach to using the output produced by GenAI, and shall be aware of the tools' intended purpose, capacities and limitations.

The typical intent of textual GenAI is to produce the most likely sequence of words based on the training it has received, usually with a component of randomization which makes sense for an AI assistant but hampers reproducibility. Some tools, sometimes called RAG (Retrieval- Augmented Generative AI), add to the global training mechanism complementary steps of information retrieval, of reasoning and of cultural appropriateness. Nevertheless, there are several reported situations of inadequate results of GenAI use in scientific activity, such as biases, hallucinations and inaccuracies.

The impact of GenAI on research and on scientific processes therefore calls for reflection and careful consideration, for example, when summarising papers, generating hypotheses, brainstorming or exploring ideas, analysing data, drafting or translating. In many respects and contexts, the use of these tools could harm research integrity and raise questions about possible deceptive scientific practices and misinformation. Some risks are due to the tool's technical limitations, and others have to do with the (intentional or unintentional) use of the tool in ways that erode sound research practices. As such, it is important that researchers are aware of the potential benefits and pitfalls of using GenAI. These guidelines aim at preventing misuse and ensure that GenAI plays a positive role in improving research practices.

To this end, using the existing guidelines developed by the European Research Area Forum [1]as a foundation, and complementing them with an overview of existing guidelines in peer institutions, INESC TEC is proposing a set of orientations for the use of GenAI in research, grounded on key ethical principles, for the benefit of its community. Given the recent and fast pace of technological developments in this particular field, these orientations should necessarily be seen as a set of general and living guidelines, helping researchers to assess and reflect upon possible ethical, integrity, privacy related or other implications arising from the use of GenAI in their research work. These guidelines should go hand in hand with a broad individual and collective engagement of research actors, to develop a culture of responsible use of GenAI that is both appropriate and effective. AI literacy and training initiatives will surely play a decisive role as to the enhancement of competencies in this domain.

[1] The present Guidelines are an adaptation of the "Living guidelines on the responsible use of generative AI in research, European Commission, Directorate-General for Research and Innovation Directorate E-Prosperity, © European Union, 2024, licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence. Other sources of inspiration and obligatory references are found in the European Code of Conduct for Research Integrity and the work and the guidelines on trustworthy AI, developed by the High-Level Expert Group on AI, as well as the Code of Ethics of INESC TEC.

Guidelines for responsible use of GenAI in research

Key principles of the use of GenAI in research are that research is conducted responsibly, lawfully and transparently, and is built upon the foundational principles of research integrity. Additionally, researchers should consider the following guidelines that are more specific to the use of GenAI.

1. Remain ultimately responsible for your scientific output.

- Researchers are accountable for the integrity of the content generated by or with the support of AI tools, bearing in mind that AI systems are neither authors nor co-authors. Authorship implies agency and responsibility, so it lies with human researchers. Researchers are therefore responsible for the correct usage of AI (primarily as help and support), and for the output that is shared or published.

2. Maintain a critical approach to using the output produced by GenAI.

- Researchers must maintain a critical approach to using the output produced by GenAI and shall be aware of the tools' limitations, such as biases, hallucinations and inaccuracies.
- Researchers should also be aware and take a critical view of the value frameworks, cultural standards and social norms embedded in each GenAI model, according to its origin, cultural and political context.
- Always verify GenAI outputs to ensure accuracy of results. The outputs of GenAI may be inaccurate, for example when citing references that may be fabricated. Researchers should always verify these outputs.
- Never use fabricated material created by GenAI in the scientific process, for example falsifying, altering or manipulating original research data.

3. Use GenAI transparently.

- Researchers, to be transparent, shall detail which GenAI tools have been used substantially in their research processes. For example, using GenAI as a basic author support tool such as proof reading is not considered a substantial use. However, interpreting data analysis, carrying out a literature review, identifying research gaps, formulating research aims, developing hypotheses, etc. could have a substantial impact and should therefore be explicitly reported.
- Reference to the tool can include the name, version, date, etc. and how it was used and affected the research process. If relevant, researchers should make the input (prompts) and output available, in line with open science principles.
- Researchers shall take into account the stochastic (random) nature of GenAI tools, which is the tendency to produce different outputs from the same input. This poses a challenge to the aim of ensuring reproducibility and robustness in research results and conclusions. Therefore researchers shall disclose or discuss the limitations of GenAI tools used, including possible biases in the generated content, as well as possible mitigation measures.
- Researchers are advised to additionally consult the guidelines of the scientific journals they aim to submit their research to, regarding the use of AI in their work.

4. Pay attention to issues of privacy, confidentiality and intellectual property rights.

- Researchers shall remain mindful that the input they upload to AI tools (text, data, prompts, images, etc.) may be used for other purposes, such as the training of AI models. Therefore, it is important to protect unpublished or sensitive work (such as their own or others' unpublished work) by taking care not to upload it into an online AI system unless there are assurances that the data will not be re-used, e.g., to train future language models or to the untraceable and unverifiable reuse of data.
- Researchers should take care not to provide third parties' personal data to online GenAI systems unless this is made in conditions that ensure strict compliance with applicable data protection rules and ethical principles of autonomy and respect.
- Researchers should check, for example, the privacy options of the tools, who is

managing the tool (public or private institutions, companies, etc.), where the tool is running and implications for any information uploaded. This could range from closed environments, hosting on a third-party infrastructure with guaranteed privacy, to open internet-accessible platforms.

5. When using outputs from GenAI, respect applicable national, EU and international legislation

- Consider that the output produced by GenAI may raise issues in relation to the protection of intellectual property rights and personal data.
- Researchers should pay attention to the potential for plagiarism (text, code, images, etc.) when using outputs from generative AI. In particular, researchers should bear in mind that the output of a generative AI (such a large language model) may be based on someone else's results and require proper recognition and citation. Therefore, researchers should ensure that the outputs they use acknowledge and respect others' authorship and cite their work where appropriate.
- Using GenAI to summarize documents on a topic may be useful in organizing the review but does not substitute reading the sources.
- Likewise, the output produced by GenAI can contain personal data. If this becomes apparent, researchers are responsible for handling any personal data output responsibly and appropriately, and EU data protection rules are to be followed.

6. Refrain from using GenAI tools substantially in sensitive activities that could severely impact other researchers or organisations.

- When you are asked to perform peer review, evaluation of research proposals, or assessment of position applications, it is your personal judgement that is demanded.
- Avoid the use of GenAI tools for such duties, so as to eliminate the potential risks of unfair treatment or assessment that may arise from these tools' limitations.

7. Continuously engage and learn how to use GenAI tools properly.

- GenAI tools are evolving quickly, and new ways to use them are regularly discovered. Researchers using these tools shall engage with learning about these tools, to stay up to date on the best practices and share them with colleagues and other stakeholders.
- Be aware of the methods of production of these tools, the associated energy costs, the concentration of the main actors, and the legitimacy of data gathering.
- Researchers and the research organizations shall foster a culture of experimentation and learning around AI, seeking to share information with each other about new opportunities.

Overall, GenAI tools have a large potential for research, but researchers should use them thoughtfully, staying transparent, critical, and responsible.

Sources

INESC TEC

- INESC TEC Code of Ethics
- Science & Society: The responsibilities of Responsible AI

European Commission

- Guidelines for the Responsible Use of Generative AI in Research – European Research Area Forum (2024)

Universities and Academic Institutions

- MIT – Guidelines on AI
- Universidade Lusófona – AI
- Harvard University – Guidelines on AI
- Harvard University – Use of ChatGPT and Other Generative AI Tools
- Carnegie Mellon University – AI Services and Guidelines
- KU Leuven – Information on GenAI
- University of Oxford – Communication Resources and Guidelines on AI