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¿Cómo la Inteligencia Artificial puede apoyar a la Educación Superior y a la innovación?

César França

RedCLARA

BELLA II
Building the Europe Link to Latin America and the Caribbean

RNP

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César França

PhD en Ciencias de la Computación @ UFPE 2014

Ex - Head of Knowledge @ CESAR 2022-2024

Profesor @ UFRPE / @ Cesar School

Científico Asociado @ TDS Company

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CESAR.FRANSSA

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Experiências Educacionais
com Inteligência Artificial
César França


César França
Processos
de Incubação
para Startups

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Nueva era de la

IA Generativa

El posicionamiento de CESAR ante las repercusiones de esta tendencia en::

- El **desarrollo de software** (productividad y oportunidades);
- El **diseño** (co-creación de arte, proyectos y piezas);
- La **educación** (cambios e impacto en los procesos de enseñanza y aprendizaje).

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“Necesitamos evitar la **tecnofobia**, al mismo tiempo que debemos tener cautela con una excesiva **tecnofilia** cuando se trata de la IA generativa.”

H. D. Mabuse

Design Sênior do CESAR

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AI empowering research: 10 ways how science can benefit from AI

César França

This article explores the transformative impact of artificial intelligence (AI) on scientific research. It highlights ten ways in which AI is revolutionizing the work of scientists, including powerful referencing tools, improved understanding of research problems, enhanced research question generation, optimized research design, stub data generation, data transformation, advanced data analysis, and AI-assisted reporting. While AI offers numerous benefits, challenges such as bias, privacy concerns, and the need for human-AI collaboration must be considered. The article emphasizes that AI can augment human creativity in science but not replace it.

Subjects: **General Literature (cs.GL)**; Artificial Intelligence (cs.AI)
Cite as: arXiv:2307.10265 **[cs.GL]**
(or arXiv:2307.10265v1 **[cs.GL]** for this version)
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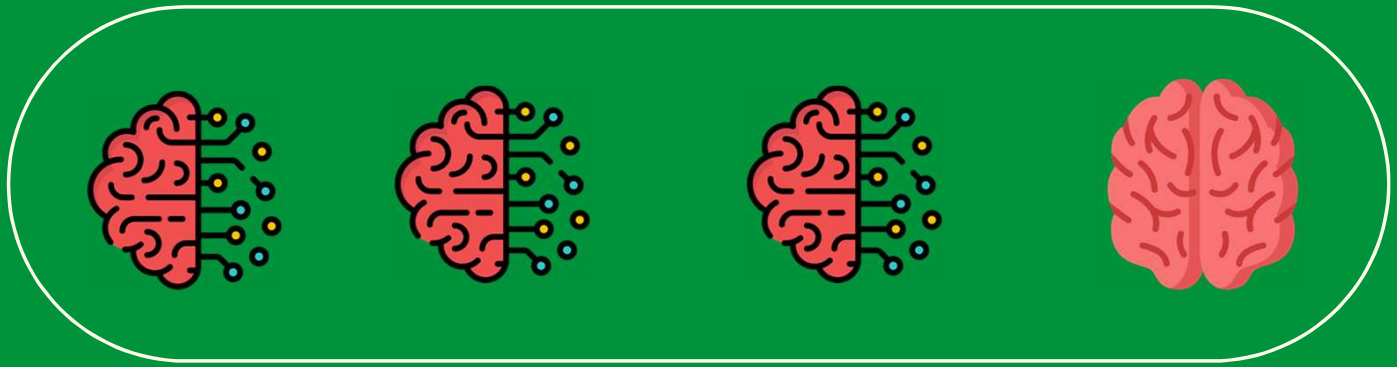

Dominando el Estado del Arte

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Comprensión asistida sobre conceptos y problemas

Mejoras en el diseño de investigaciones

…¡entre otros!

5 selected papers

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Yang ··· Wang 2011

Scientific Productivity, Research Funding, Race and Ethnicity

arXiv: Applications

In a recent study by Ginther et al., the probability of receiving a U.S. National Institutes of Health (NIH) RO1 award was related to the applicant's race/ethnicity. The results indicate black/African-American applicants were 10% less likely than white peers to receive an award, after controlling for background and qualifications. It has generated a widespread debate regarding the unfairness of the NIH grant review process and its correction. In this paper, the work by Ginther et al. was augmented by pairing analysis, axiomatically-individualized productivity and normalized funding success measurement. Although there are racial differences in R01 grant success rates, normalized figures of merit for funding success explain the discrepancy. The suggested "leverage points for policy intervention" are in question and require deeper and more thorough investigations. Further adjustments in policies to remove racial disparity should be made more systematically for equal opportunity, rather than being limited to the NIH review process.

2021 01.20 Racial Bias in Citations

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149

Valantine Collins 2015

National Institutes of Health addresses the science of diversity.

Proceedings of the National Academy of Sciences of the Un

The US biomedical research workforce does not currently mirror the nation's population demographically, despite numerous attempts to increase diversity. This imbalance is limiting the promise of our biomedical enterprise for building knowledge and improving the nation's health. Beyond ensuring fairness in scientific workforce representation, recruiting and retaining a diverse set of

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Ginther ··· Kington 2012

Are race, ethnicity, and medical school affiliation associated with NIH R01 type 1 award probability

Academic Medicine

71

Ginther ··· Schaffer 2016

Gender, Race/Ethnicity, and National Institutes of Health R01 Research Awards: Is There

Academic Medicine

1562

Moss-Racusin ··· Handelsman 2012

Science faculty's subtle gender biases favor male students

Proceedings of the National Academy of Sci

72

Bakken ··· Wang 2006

Viewing Clinical Research Career Development Through the Lens of Social Cognitive Career Theory

Advances in Health Sciences Education

310

Martell ··· Emrich 1996

Male-female differences: A computer simulation.

American Psychologist

234

Carnes ··· Sheridan 2015

The effect of an intervention to break the gender bias habit for faculty at one institution: a cluster

Academic Medicine

887

Hong Page 2004

Groups of diverse problem solvers can outperform groups of high-ability problem solvers

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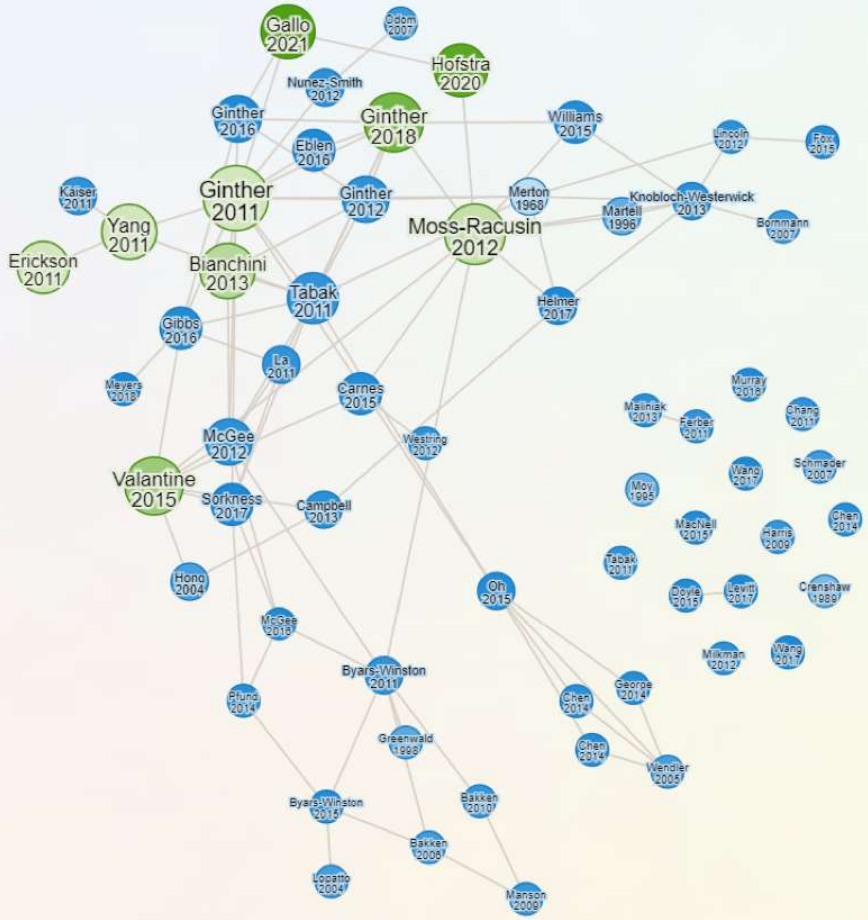

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Attention Is All You Need

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Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

*Equal contribution. Listing order is random. Jakob proposed replacing RNNs with self-attention and started the effort to evaluate this idea. Ashish, with Illia, designed and implemented the first Transformer models and has been crucially involved in every aspect of this work. Noam proposed scaled dot-product attention, multi-head attention and the parameter-free position representation and became the other person involved in nearly every

What is the conclusion of this paper?

The conclusion of this paper is that the authors propose a new network architecture called the Transformer, which is based solely on attention mechanisms and does not rely on recurrent or convolutional neural networks. They show that the Transformer model achieves state-of-the-art performance on various sequence transduction tasks.

Source 1 +

Source 2 +

Source 3 +

What kind of GPUs were used to train the model?

The model was trained using 8 NVIDIA P100 GPUs.

Source 1 +

Source 2 +

Source 3 +

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¿Cuáles son los efectos de la gamificación en la industria de la ingeniería de software?

Conclusión

La gamificación en la ingeniería de software puede aumentar la motivación, el compromiso y el rendimiento de los desarrolladores, especialmente en áreas como la gestión de proyectos y las pruebas. Sin embargo, la investigación en este campo aún es preliminar y enfrenta desafíos significativos, como la integración con herramientas existentes y la falta de modelos de evaluación estandarizados. Se necesita más investigación empírica para comprender completamente su impacto y optimizar su aplicación en diferentes contextos de la ingeniería de software.

Pro Analysis of 10 papers

Related

What are the benefits of gamification in software engineering?

Gamification strategies for software development teams

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Results

1 **Gamification in software engineering - A systematic mapping**

Gamification in software engineering is preliminary and needs more research effort to analyze its impact on various software process areas, such as requirements, project management, and maintenance.

Systematic Review · Highly Cited

2015 · **343** Citations · Oscar Pedreira et al. · Inf. Softw. Technol.

2 **Initiatives and Challenges of Using Gamification in Software Engineering: A Systematic Mapping**

Gamification in software engineering activities increases engagement and motivation to perform

Living Literature Reviews

Authors: Michel Wijkstra, Timo Lek, Tobias Kuhn, Kasper Welbers, Mickey Steijaert | Authors Info & Claims

K-CAP '21: Proceedings of the 11th Knowledge Capture Conference • Pages 241 - 248 • https://doi.org/10.1145/3460210.3493567

Published: 02 December 2021 Publication History

Abstract

Literature reviews have long played a fundamental role in synthesizing the current state of a research field. However, in recent years, certain fields have evolved at such a rapid rate that literature reviews quickly lose their relevance as new work is published that renders them outdated. We should therefore rethink how to structure and publish such literature reviews with their highly valuable synthesized content. Here, we aim to determine if existing Linked Data technologies can be harnessed to prolong the relevance of literature reviews and whether researchers are comf working with such a solution. We present here our approach of "living literature reviews" where the core information is represented as Linked Data which can be amended with new findings after the publication of the literature review. We present a prototype implementation, which we use for a case study where we expose potential users to a concrete literature review modeled with our approach. We observe that our model is technically feasible and is received well by researchers, with our "living" versions scoring higher than their traditional counterparts in our user study. In conclusion, we find that there are strong benefits to using a Linked Data solution to extend the effective lifetime of a literature review.

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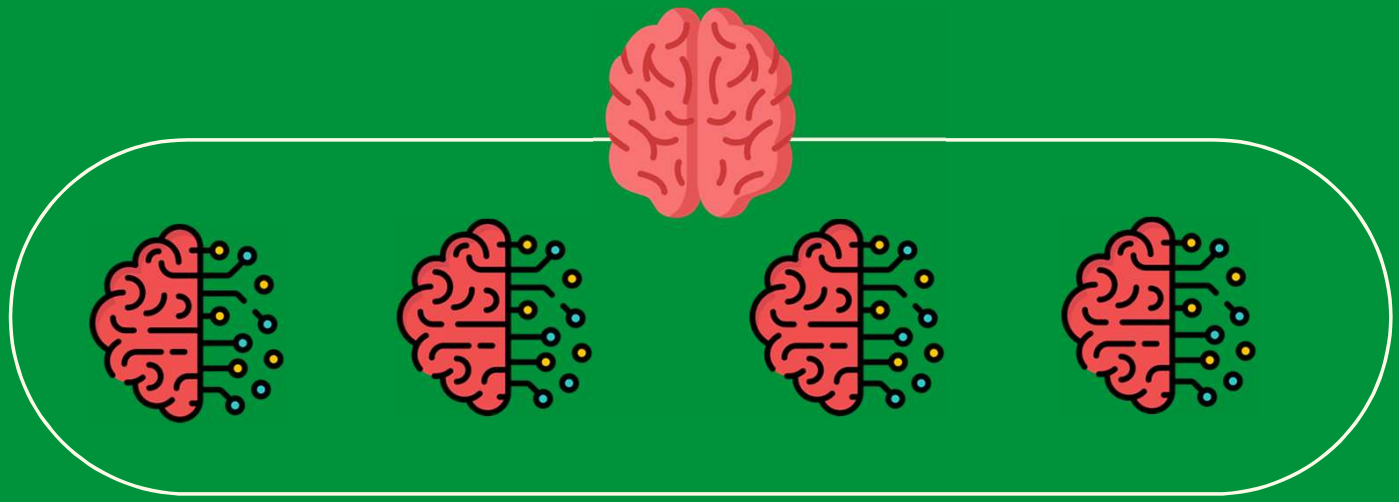

Impulsando el Análisis de Datos

- Generación de datos sintéticos para pruebas de procedimientos
- Transformación de datos
- Análisis de Datos (cuantitativos y cualitativos)
- …¡y mucho más!

Evaluating Cultural Adaptability of a Large Language Model via Simulation of Synthetic Personas

Louis Kwok, Michal Bravansky, Lewis D. Griffin

The success of Large Language Models (LLMs) in multicultural environments hinges on their ability to understand users' diverse cultural backgrounds. We measure this capability by having an LLM simulate human profiles representing various nationalities within the scope of a questionnaire-style psychological experiment. Specifically, we employ GPT-3.5 to reproduce reactions to persuasive news articles of 7,286 participants from 15 countries; comparing the results with a dataset of real participants sharing the same demographic traits. Our analysis shows that specifying a person's country of residence improves GPT-3.5's alignment with their responses. In contrast, using native language prompting introduces shifts that significantly reduce overall alignment, with some languages particularly impairing performance. These findings suggest that while direct nationality information enhances the model's cultural adaptability, native language cues do not reliably improve simulation fidelity and can detract from the model's effectiveness.

Comments: 18 pages, 8 figures, Published as a conference paper at COLM 2024
Subjects: **Computation and Language (cs.CL)**
Cite as: arXiv:2408.06929 **[cs.CL]**
(or arXiv:2408.06929v1 **[cs.CL]** for this version)
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From: Louis Kwok [view email]
[v1] Tue, 13 Aug 2024 14:32:43 UTC (1,175 KB)

TICAL 2024

Artificial Intelligence, Scientific Discovery, and Product Innovation

6 NOV 2024

by Ryan Watkins | posted in: reading | 0

This paper studies the impact of artificial intelligence on innovation, exploiting the randomized introduction of a new materials discovery technology to 1,018 scientists in the R&Dlab of a large U.S. firm. AI-assisted researchers discover 44% more materials, resulting in a 39% increase in patent filings and a 17% rise in downstream product innovation. These compounds possess more novel chemical structures and lead to more radical inventions. However, the technology has strikingly disparate effects across the productivity distribution: while the bottom third of scientists see little benefit, the output of top researchers nearly doubles. Investigating the mechanisms behind these results, I show that AI automates 57% of “idea-generation” tasks, reallocating researchers to the new task of evaluating model-produced candidate materials. Top scientists leverage their domain knowledge to prioritize promising AI suggestions, while others waste significant resources testing false positives. Together, these findings demonstrate the potential of AI-augmented research and highlight the complementarity between algorithms and expertise in the innovative process. Survey evidence reveals that these gains come at a cost, however, as 82% of scientists report reduced satisfaction with their work due to decreased creativity and skill underutilization.

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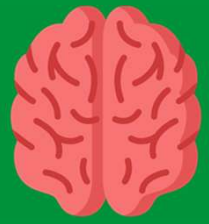

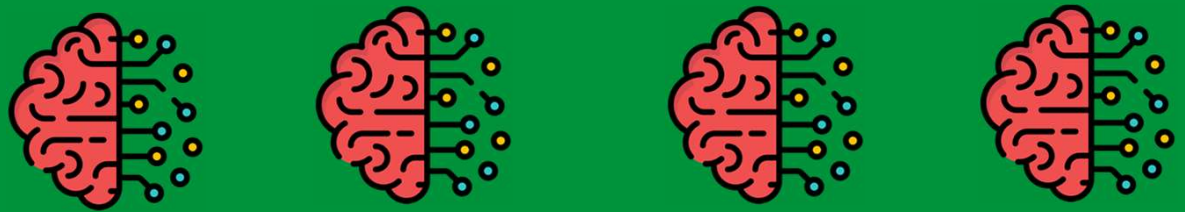

¿Y si...?

¿una máquina utilizando un algoritmo de aprendizaje automático logra defender su tesis ante otra máquina programada con un algoritmo de verificación? ¿Ese conocimiento debería considerarse legítimo, incluso si los seres humanos son incapaces de entender los detalles de ese procesamiento?

TICAL 2024

The AI Scientist: Towards Fully Automated Open-Ended Scientific Discovery

Chris Lu, Cong Lu, Robert Tjarko Lange, Jakob Foerster, Jeff Clune, David Ha

One of the grand challenges of artificial general intelligence is developing agents capable of conducting scientific research and discovering new knowledge. While frontier models have already been used as aides to human scientists, e.g. for brainstorming ideas, writing code, or prediction tasks, they still conduct only a small part of the scientific process. This paper presents the first comprehensive framework for fully automatic scientific discovery, enabling frontier large language models to perform research independently and communicate their findings. We introduce The AI Scientist, which generates novel research ideas, writes code, executes experiments, visualizes results, describes its findings by writing a full scientific paper, and then runs a simulated review process for evaluation. In principle, this process can be repeated to iteratively develop ideas in an open-ended fashion, acting like the human scientific community. We demonstrate its versatility by applying it to three distinct subfields of machine learning: diffusion modeling, transformer-based language modeling, and learning dynamics. Each idea is implemented and developed into a full paper at a cost of less than $15 per paper. To evaluate the generated papers, we design and validate an automated reviewer, which we show achieves near-human performance in evaluating paper scores. The AI Scientist can produce papers that exceed the acceptance threshold at a top machine learning conference as judged by our automated reviewer. This approach signifies the beginning of a new era in scientific discovery in machine learning: bringing the transformative benefits of AI agents to the entire research process of AI itself, and taking us closer to a world where endless affordable creativity and innovation can be unleashed on the world's most challenging problems. Our code is open-sourced at this https URL

Subjects: **Artificial Intelligence (cs.AI)**; Computation and Language (cs.CL); Machine Learning (cs.LG)
Cite as: arXiv:2408.06292 **[cs.AI]**
(or arXiv:2408.06292v2 **[cs.AI]** for this version)
https://doi.org/10.48550/arXiv.2408.06292

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The 5th Paradigm: AI-Driven Scientific Discovery

"A scientific revolution is happening before our eyes, powered by Computing and AI. We should join our fellow researchers in other sciences and harness the power that modern Computing and AI technologies"

Yannis Ioannidis, Presidente da ACM

Communications of the ACM, December 2024

É importante lembrar!

Nem todos os problemas estão resolvidos… ainda! E é claro!


Ober
@Ober_B
Pedi para a Inteligência Artificial fazer a Madre Tereza de Calcutá, lutando contra a pobreza.
@sergi

TICAL 2024

Article | Open access | Published: 24 July 2024

AI models collapse when trained on recursively generated data

Ilia Shumailov, Zakhar Shumaylov, Yiren Zhao, Nicolas Papernot, Ross Anderson & Yarin Gal

Nature **631**, 755–759 (2024) | Cite this article

Abstract

Stable diffusion revolutionized image creation from descriptive text. GPT-2 (ref. [1]), GPT-3(.5) (ref. [2]) and GPT-4 (ref. [3]) demonstrated high performance across a variety of language tasks. ChatGPT introduced such language models to the public. It is now clear that generative artificial intelligence (AI) such as large language models (LLMs) is here to stay and will substantially change the ecosystem of online text and images. Here we consider what may happen to GPT-{*n*} once LLMs contribute much of the text found online. We find that indiscriminate use of model-generated content in training causes irreversible defects in the resulting models, in which tails of the original content distribution disappear. We refer to this effect as 'model collapse' and show that it can occur in LLMs as well as in variational autoencoders (VAEs) and Gaussian mixture models (GMMs). We build theoretical intuition behind the phenomenon and portray its ubiquity among all learned generative models. We

TICAL 2024

Artificial Intelligence, Scientific Discovery, and Product Innovation

6 NOV 2024

by Ryan Watkins | posted in: reading | 0

This paper studies the impact of artificial intelligence on innovation, exploiting the randomized introduction of a new materials discovery technology to 1,018 scientists in the R&Dlab of a large U.S. firm. AI-assisted researchers discover 44% more materials, resulting in a 39% increase in patent filings and a 17% rise in downstream product innovation. These compounds possess more novel chemical structures and lead to more radical inventions. However, the technology has strikingly disparate effects across the productivity distribution: while the bottom third of scientists see little benefit, the output of top researchers nearly doubles. Investigating the mechanisms behind these results, I show that AI automates 57% of "idea-generation" tasks, reallocating researchers to the new task of evaluating model-produced candidate materials. Top scientists leverage their domain knowledge to prioritize promising AI suggestions, while others waste significant resources testing false positives. Together, these findings demonstrate the potential of AI-augmented research and highlight the complementarity between algorithms and expertise in the innovative process. Survey evidence reveals that these gains come at a cost, however, as 82% of scientists report reduced satisfaction with their work due to decreased creativity and skill underutilization.

[Submitted on 24 Sep 2024]

Human Creativity in the Age of LLMs: Randomized Experiments on Divergent and Convergent Thinking

Harsh Kumar, Jonathan Vincentius, Ewan Jordan, Ashton Anderson

Large language models are transforming the creative process by offering unprecedented capabilities to algorithmically generate ideas. While these tools can enhance human creativity when people co-create with them, it's unclear how this will impact unassisted human creativity. We conducted two large pre-registered parallel experiments involving 1,100 participants attempting tasks targeting the two core components of creativity, divergent and convergent thinking. We compare the effects of two forms of large language model (LLM) assistance -- a standard LLM providing direct answers and a coach-like LLM offering guidance -- with a control group receiving no AI assistance, and focus particularly on how all groups perform in a final, unassisted stage. Our findings reveal that while LLM assistance can provide short-term boosts in creativity during assisted tasks, it may inadvertently hinder independent creative performance when users work without assistance, raising concerns about the long-term impact on human creativity and cognition.

Comments: Working paper
Subjects: **Human-Computer Interaction (cs.HC)**
Cite as: arXiv:2410.03703 **[cs.HC]**
(or arXiv:2410.03703v1 **[cs.HC]** for this version)
https://doi.org/10.48550/arXiv.2410.03703

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¡GRACIAS!
OBRIGADO!
THANKS!

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