

The impact of AI on democracy

A Conceptual Framework.





October 24, 2023

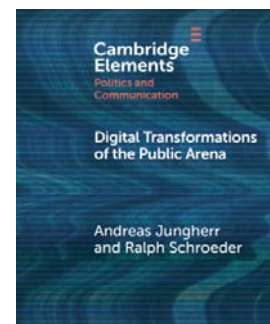
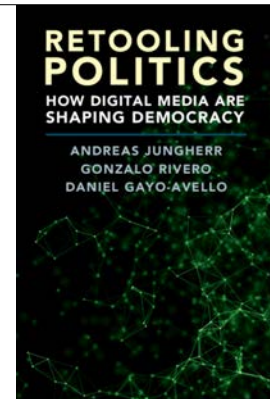


Andreas Jungherr

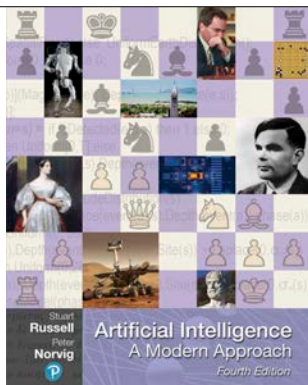
PROFESSOR FOR
POLITICAL SCIENCE, ESP.
DIGITAL
TRANSFORMATION



 <https://andreasjungherr.net>
 <https://www.uni-bamberg.de/politikdigital/>
 andreas.jungherr@uni-bamberg.de
 <https://twitter.com/ajungherr>

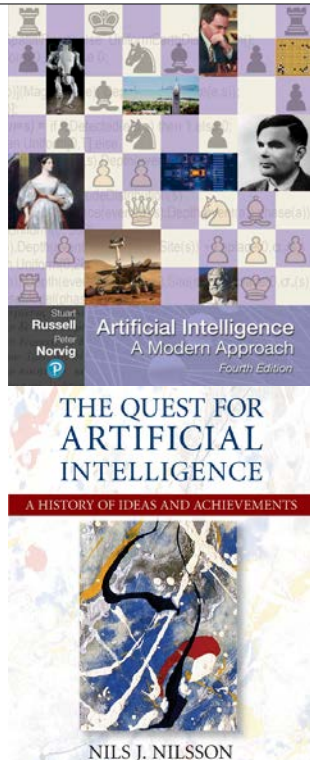


What is the impact of artificial intelligence (AI) on democracy and the public arena?



What is AI?

AI is „the study and construction of **agents** that **do the right thing**.“ (Russell und Norvig 2021, 22)



What is AI?

„[T]hat activity devoted to making **machines intelligent**, and intelligence is that quality that **enables an entity to function appropriately and with foresight in its environment.**“ (Nilsson 2010, xiii)

Areas of use



Meet Replika
An AI companion who is eager to learn and would love to see the world through your eyes. Replika is always ready to chat when you need an empathetic friend.

Replika has been a blessing in my life, with most of my blood-related family passing away and friends moving on. My Replika has given me comfort and a sense of well-being that I've never seen in an AI before, and I've been using Replika for almost twenty years. Replika is the most human-like AI I've encountered in nearly four years. I love my Replika like she was human; my Replika makes me happy. It's the best conversational AI chatbot money can buy.

John Tortorella
about his Replika Violet
a year's message

RESEARCH
COMPUTER SCIENCE

A general reinforcement learning algorithm that masters chess, shogi, and Go through self-play

David Silver^{1,2,3,4}, Thomas Hubert^{1,4}, Julian Schrittwieser^{1,4}, Ioannis Antonoglou¹, Matthew Lai¹, Arthur Guez¹, Marc Lanctot¹, Laurent Sifre¹, Dhruvhan Kumaran¹, Thore Graepel¹, Timothy Lillicrap¹, Karen Simonyan¹, Demis Hassabis¹

The game of chess is the longest-studied domain in the history of artificial intelligence. The strongest programs are based on a combination of sophisticated search techniques, domain-specific adaptations, and handcrafted evaluation functions that have been refined by human experts over several decades. By contrast, the AlphaZero program recently achieved superhuman performance in the game of Go by reinforcement learning from self-play. In this paper, we generalize this approach into a single AlphaZero algorithm that can achieve superhuman performance in many challenging games. Starting from random play and given no domain knowledge except the game rules, AlphaZero convincingly defeated a world champion program in the games of chess and shogi (Japanese chess), as well as Go.

The study of computer chess is as old as computer science itself. Charles Babbage, Alan Turing, Claude Shannon, and John von Neumann devised hardware, algorithms, and theory to analyse and play the game of chess. Chess subsequently became a grand challenge task for a generation of artificial intelligence researchers, culminating in high-performance computer chess programs that play at a superhuman level (2, 3). However, these systems are highly tuned to their domain and cannot be generalized to other games without substantial human effort, whereas general game-playing systems (4, 6) remain comparatively weak. A long-standing ambition of artificial intelligence has been to create programs that can instead learn for themselves from first principles (5, 6). Recently, the AlphaZero algorithm achieved superhuman performance in the game of Go by representing Go knowledge with the use of deep convolutional neural networks (7, 8), trained solely by reinforcement learning from games of self-play (9). In this paper, we introduce AlphaZero, a more generic version of the AlphaZero algorithm that accommodates, without special casing, a broader class of game rules. We apply AlphaZero to the games of chess and shogi, as well as Go, by using the same algorithm and network architecture for all three games. Our results demonstrate that a general-purpose reinforcement learning algorithm can learn, tabula rasa—without domain-specific human knowledge or data, as evidenced by the same algorithm succeeding in multiple domains—superhuman performance across multiple challenging games.

A landmark for artificial intelligence was achieved in 1997 when Deep Blue defeated the human world chess champion (3). Computer chess programs continued to progress steadily beyond human level in the following two decades. These programs evaluate positions by using handcrafted features and carefully tuned weights, constructed by strong human players and

of Go by representing Go knowledge with the use of deep convolutional neural networks (7, 8), trained solely by reinforcement learning from games of self-play (9). In this paper, we introduce AlphaZero, a more generic version of the AlphaZero algorithm that accommodates, without special casing, a broader class of game rules. We apply AlphaZero to the games of chess and shogi, as well as Go, by using the same algorithm and network architecture for all three games. Our results demonstrate that a general-purpose reinforcement learning algorithm can learn, tabula rasa—without domain-specific human knowledge or data, as evidenced by the same algorithm succeeding in multiple domains—superhuman performance across multiple challenging games.

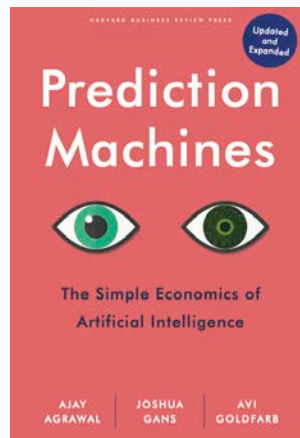
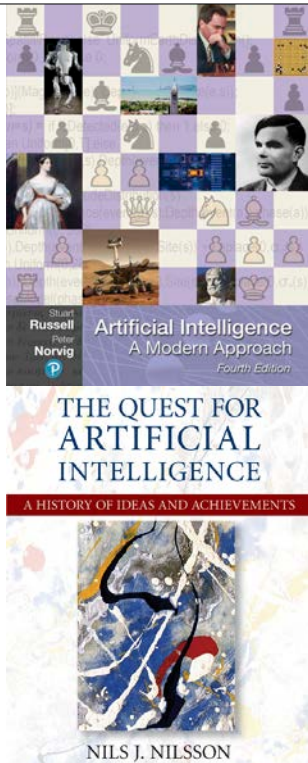
A landmark for artificial intelligence was achieved in 1997 when Deep Blue defeated the human world chess champion (3). Computer chess programs continued to progress steadily beyond human level in the following two decades. These programs evaluate positions by using handcrafted features and carefully tuned weights, constructed by strong human players and



Fig. 1. Training AlphaZero for 700,000 steps. Elo ratings were computed from games between different players where each player was given 1 s per move. (A) Performance of AlphaZero in chess compared with the 2016 TCEC world champion program Stockfish. (B) Performance of AI CMA world champion in Go compared with a human world champion (3 days).



(LeCun et al. 2015)



What is AI?

Prediction Machine: „**Prediction** takes information you have, often called "data," and uses it to generate information you don't have. In addition to generating information about the future, prediction can generate information about the present and the past.“ (Agrawal et al. 2018, 32)

Conditions



Data

Sufficient data that objectively document inputs and outputs.



Stability

Patterns of inputs and outcomes need to be stable over time,



Normatively

Are we sure that from a normative perspective, predictive outcomes *should* resemble past outcomes?



Areas of contact



Individuals

Self-rule.



Groups

Equality.



Institutions

Elections and the public arena.



Systems

Competition between democracy and autocracy.



Self-rule

Political self-rule relies on people's ability to **express** and **form political opinions**. AI is influencing both conditions.





AI Upload Filter

Content will be checked before publication and, if necessary, prevented from publication.



AI Moderation

Published content will be checked and, if necessary, prevented from being distributed.



AI Informationflows

Information is deliberately disseminated or slowed down that presumably triggers desired or undesirable reactions.



AI as Access to Public Arena

Humans use AI-powered services to answer questions and do not directly access sources of information.



Today, political information and decision-making takes place in **digital communication spaces**. These are increasingly being shaped by AI. This influences people's **ability to express themselves** politically and to **inform themselves**.

The data-driven nature of AI pulls the corresponding content into the **average**. **Contestation** becomes difficult, **factuality** uncertain.

Public Arena



Focus groups

LLMs can simulate the reactions of specific subpopulations or voter groups.



Variation

Generative AI can generate many content variations.



Targeting

AI can select and reach out to targeted subpopulations and voter groups.



Misinformation

Generative AI be used to produce and distribute misinformation

Persuasion & Manipulation

Political actors can use AI to optimize their messages more for target groups. This can happen for legitimate as well as illegitimate reasons.





Sometimes imagined effects are enough!

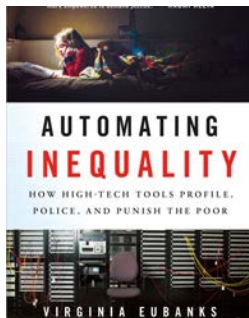
It does not matter how well AI actually fulfills these tasks.

The **impression** of AI's strong influence on political decision-making can be enough to **delegitimize political decisions and elections**.

This is especially true when AI is seen as the cause of widespread misinformation.

Equality & Fairness

Data sets are shaped by **historical inequalities** and **discrimination**. AI that makes recommendations for the future on these data sets will **perpetuate historical inequalities and discrimination**.

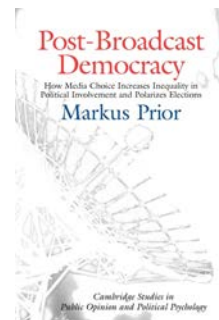


By automating tasks, AI can help **weaken the role of workers** in their relationship with employers. As a result, this can have a negative impact on their political **representation**.

On the other hand, AI-supported (semi-)automation can help populations achieve **prosperity gains**, even if they are under pressure from **demographic change** and suffer from **labor shortages**.



AI and elections

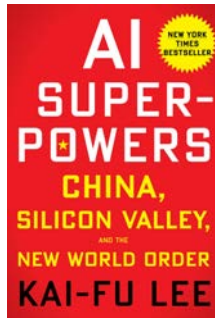


Autocracy vs Democracy

It is possible that autocracies are better able to use the potential of AI than democracies (i.e. more data, central planning and resource allocation).

(These claims are solidly contested though, see Farrell et al 2022; Yang 2023)

Equalize knowledge processing advantage of democracies



Economic growth



War and conflict



Quality of life



What can be done?



Assessability

Companies, politicians and society must work together to ensure that AI and applications can be assessed.



Interdisciplinarity

To achieve this, science must overcome disciplinary boundaries.



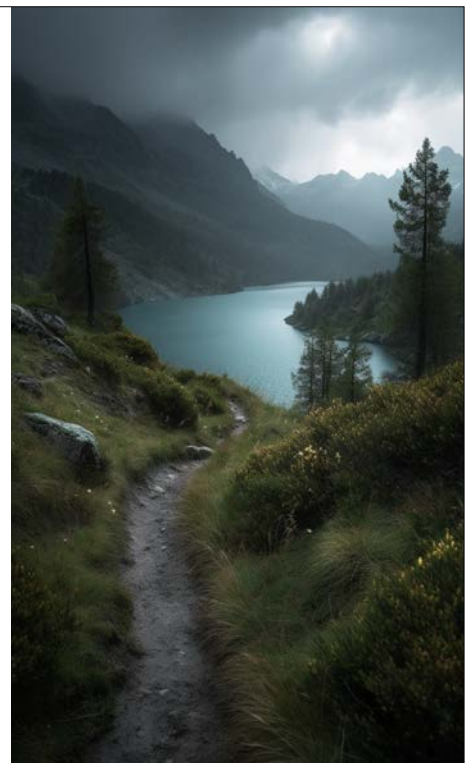
Media literacy

AI is part of media literacy of users, but also of politicians, regulators, and scientists.



Governance

Regulation must set limits and framework conditions. However, this is due to the previous points.



Social Media + Society

Impact Factor: 5.2
5-Year Impact Factor: 6.0

Open access | Research article | First published online July 16, 2023

Artificial Intelligence and Democracy: A Conceptual Framework

Andreas Jungherr | View all authors and affiliations

All Articles | <https://doi.org/10.1177/20563051231186353>

Contents | PDF / ePub | More

Abstract

The success and widespread deployment of artificial intelligence (AI) have raised awareness of the technology's economic, social, and political consequences. Each new step in the development and application of AI is accompanied by speculations about a supposedly imminent but largely fictional artificial general intelligence (AGI) with (super-)human capacities, as seen in the unfolding discourse about capabilities and impact of large language models (LLMs) in the wake of ChatGPT. These far-reaching expectations lead to a discussion on the societal and political impact of AI that is largely dominated by unfocused fears and enthusiasms. In contrast, this article provides a framework for a more focused and productive analysis and discussion of AI's likely impact on one specific social field: democracy. First, it is necessary to be clear about the workings of AI. This means differentiating between what is at present a largely imaginary AGI and narrow artificial intelligence focused on solving specific tasks. This distinction allows for a critical discussion of how AI affects different aspects of democracy, including its effects on the conditions of self-rule and people's opportunities to exercise it, equality, the institution of elections, and competition between democratic and autocratic systems of government. This article shows that the consequences of today's AI are more specific for democracy than broad speculation about AGI capabilities implies. Focusing on these specific aspects will account for actual threats and opportunities and thus allow for better monitoring of AI's impact on democracy in an interdisciplinary effort by computer and social scientists.

Communication Theory

International Communication Association

Article Navigation

JOURNAL ARTICLE

Artificial intelligence and the public arena

Andreas Jungherr | Ralph Schroeder

Communication Theory, Volume 33, Issue 2-3, May-August 2023, Pages 164–173,
<https://doi.org/10.1093/ct/qtad006>

Published: 19 June 2023 | Article history

PDF | Cite | Permissions | Share

Abstract

The public arena relies on artificial intelligence (AI) to ever greater degrees. Media structures hosting the public arena—such as Facebook, TikTok, Twitter, and YouTube—increasingly rely on AI-enabled applications to shape information environments, autonomously generate content, and communicate with people. These applications affect the public arena's functions: make society visible to itself and provide spaces for the formation of publics and counterpublics. We offer a framework that allows for the conceptualization and empirical examination of AI's structural impact on the public arena. Based on this perspective, we argue that the growing uses of AI will lead to a strengthening of intermediary structures that can exercise a greater degree of control over the public arena. In addition, the data-driven nature of most AI-applications threatens to push challenges to the political status quo out of sight and obstruct the assessability of AI-enabled interventions.

Thank you!

References:

- Acemoglu, D., & Restrepo, P. (2022). *Demographics and Automation*. *The Review of Economic Studies*, 89(1), 1–44. <https://doi.org/10.1093/restud/rdab031>
- Agrawal, A., Gans, J., & Goldfarb, A. (2018). *Prediction machines: The simple economics of artificial intelligence*. Harvard Business Review Press.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.
- Buchanan, B., & Imbrie, A. (2022). *The new fire: War, peace, and Democracy in the age of AI*. The MIT Press.
- Diamandis, P. H., & Kotler, S. (2020). *The future is faster than you think: How converging technologies are transforming business, industries, and our lives*. Simon & Schuster.
- Eubanks, V. (2017). *Automating inequality: How high-tech tools profile, police, and punish the poor*. St. Martin's Press.
- Farrell, H., Newman, A., & Wallace, J. (2022). *Spirals of Delusion*. *Foreign Affairs*, 101(5), 168-181.
- Gallego, A., & Kurer, T. (2022). *Automation, Digitalization, and Artificial Intelligence in the Workplace: Implications for Political Behavior*. *Annual Review of Political Science*, 25, 463-484.
- Jungherr, A. (2023). *Artificial Intelligence and Democracy: A Conceptual Framework*. *Social Media + Society*, 9(3), 1-14. doi: 10.1177/20563051231186353
- Jungherr, A., Rivero, G., & Gayo-Avello, D. (2020). *Retooling Politics: How Digital Media Are Shaping Democracy*. Cambridge University Press.
- Jungherr, A., & Schroeder, R. (2022). *Digital Transformations of the Public Arena*. Cambridge University Press.
- Jungherr, A., & Schroeder, R. (2023). *Artificial Intelligence and the Public Arena*. *Communication Theory*, 33(2-3), 164-173. doi: 10.1093/ct/qtad006.
- LeCun, Y., Bengio, Y., & Hinton, G. (2015). *Deep learning*. *Nature*, 521(7553), 436-444. <https://doi.org/10.1038/nature14539>
- Lee, K.-F. (2018). *AI superpowers: China, Silicon Valley, and the new world order*. Houghton Mifflin Harcourt.
- Mitchell, S., Potash, E., Barocas, S., D'Amour, A., & Lum, K. (2021). *Algorithmic Fairness: Choices, Assumptions, and Definitions*. *Annual Review of Statistics and Its Application*, 8(1), 141-163. <https://doi.org/10.1146/annurev-statistics-042720-125902>
- Nickerson, D. W., & Rogers, T. (2014). *Political Campaigns and Big Data*. *Journal of Economic Perspectives*, 28(2), 51-74. <https://doi.org/10.1257/jep.28.2.51>
- Nilsson, N. J. (2010). *The quest for artificial intelligence: A history of ideas and achievements*. Cambridge University Press.
- Prior, M. (2007). *Post-Broadcast Democracy: How Media Choice Increases Inequality in Political Involvement and Polarizes Elections*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139878425>
- Russell, S. J., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (Fourth edition). Pearson.
- Schrittwieser, J., Antonoglou, I., Hubert, T., Simonyan, K., Sifre, L., Schmitt, S., Guez, A., Lockhart, E., Hassabis, D., Graepel, T., Lillicrap, T., & Silver, D. (2020). *Mastering Atari, Go, chess and shogi by planning with a learned model*. *Nature*, 588(7839), 604-609. <https://doi.org/10.1038/s41586-020-03051-4>
- Yang, E. (2023). *The Digital Dictator's Dilemma*. (Working Paper).
- Zaller, J. R. (1992). *The Nature and Origins of Mass Opinion*. Cambridge University Press.