Introduction aux Sciences Sociales Computationnelles

CSS Marseille 2026

Emilien Schultz

2026-02-19

Section 1

Présentation du module

Une introduction

- Une discussion générale des SSC
  - Orienté NLP
- Une approche pratique sur un petit projet
  - Dimension computationnelle
  - Dimension sciences sociales
- L'occasion d'échanger

Qui suis-je ?

Entre les sciences sociales et les infrastructures numériques

- Formé en physique appliquée
- Thèse & recherche en sociologie
- Data scientist/Ingénieur de recherche @ CREST

CSS@IPP

Me contacter : emilien.schultz@ensae.fr

Déroulement

- Aujourd'hui
  - Introduction aux sciences sociales computationnelles
  - Collecte de données non structurées + [Hands on]
  - Analyse exploratoire et visualisation + [Hands on]
  - Introduction au NLP
- Demain
  - Creuser les aspects sciences sociales (arpentage)
  - Mettre en pratique le NLP
  - Avancer sur le projet

Le dépôt

Le dépôt du cours
https://github.com/emilienschultz/css-centrale-marseille

- Les slides
- Les scripts

Les prérequis

- Avoir un ordinateur
- Programmation (scientifique)
  - Python
  - Local ou cloud ?
- Manipuler des données
- genAI ?

Validation

- Projet seul ou en petit groupe
- A réaliser sur ces deux jours si possible
- Lier computationnel et sciences sociales

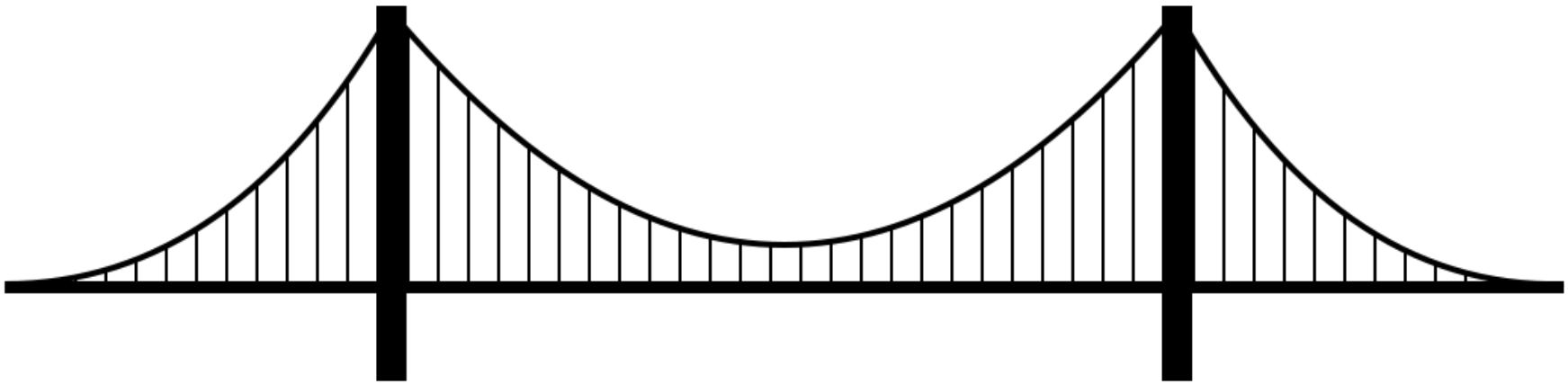
Plus d'information à venir ...

Section 2

Les sciences sociales computationnelles

Deux (trois?) polarités

- Sciences humaines et sociales
- Ingénierie / sciences computationelles



Que sont les SHS ?

- Différence entre sciences humaines & sociales ?
- Quelles disciplines ?
- Quelles questions les animent ?

Projet des sciences sociales

Rendre compte du monde social

Trois mouvements :

- Décrire le monde social
- Problématiser[1]
- Expliquer

[1]« Le savant n'est pas l'homme qui fournit les vraies réponses, c'est celui qui pose les vraies questions. » Claude Lévi-Strauss, Le cru et le cuit.

“Nouvel” axe numérique

- Division historique en SHS
  - quali/quanti
- Recompositions
  - “Quali, quanti, ordi” (É. Ollion)

La promesse des SSC

The golden age of social science

Anastasia Buyalskaya[a,1], Marcos Gallo[a], and Colin F. Camerer[a,b]

Edited by Matthew O. Jackson, Stanford University, Stanford, CA, and approved November 23, 2020 (received for review May 14, 2020)

Social science is entering a golden age, marked by the confluence of explosive growth in new data and analytic methods, interdisciplinary approaches, and a recognition that these ingredients are necessary to solve the more challenging problems facing our world. We discuss how developing a "lingua franca" can encourage more interdisciplinary research, providing two case studies (social networks and behavioral economics) to illustrate this theme. Several exemplar studies from the past 12 y are also provided. We conclude by addressing the challenges that accompany these positive trends, such as career incentives and the search for unifying frameworks, and associated best practices that can be employed in response.

interdisciplinarity | diverse teams | new data | difficult challenges

Social science is entering a golden age (1). A rise in interdisciplinary teams working together to address pressing social challenges, leveraging the explosive growth of available data and computational power, defines this moment. Each of these trends has been written about individually—the "big data revolution" has been transforming social science for several years (1), and the benefits of diverse teams are increasingly

We hope our perspective will encourage scientists to take advantage of new datasets and form diverse collaborations to answer pressing questions. We direct these ideas especially to funding agencies and academic institutions, to convince them to provide more funding for this type of work. Ultimately, we wish to see an acceleration in work that addresses difficult challenges. For instance, the COVID-19 pandemic il-

D'autres étiquettes...

Lien entre sciences sociales et sciences informatiques

- Informatique en sciences sociales
- Humanités numériques
- Sociologie/histoire/... numérique/informatique
- Big data
- Social physics
- Humanités computationnelles
- ...

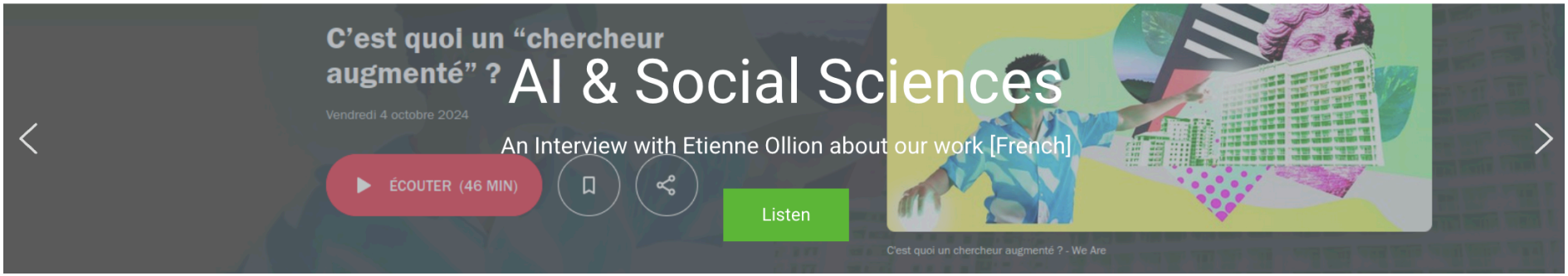
CSS en France : le CREST

CSS @ IP-Paris

The Computational Social Science group of the Institut Polytechnique de Paris

Home | News | AI Seminar | Tutorials and Resources | ActiveTigger | Team | Contact

Passer à la version française



Computational Social Science is an interdisciplinary research endeavor that leverages digital data and new methodologies to generate original insights about society.

The CSS team at Institut Polytechnique de Paris contributes to this field of research at various levels. We are invested in understanding and tackling the many challenges raised by the current digital and computational revolution, for both our societies in general and of the research community in particular.

In our work, we approach this endeavor in several ways:

- Investigating **new social processes** that arise in connection with the digital revolution, and how old social processes change throughout its unfolding;

CSS en France : le médialab

Laboratoire interdisciplinaire, le médialab mène des recherches thématiques et méthodologiques qui interrogent les relations entre le numérique et nos sociétés.

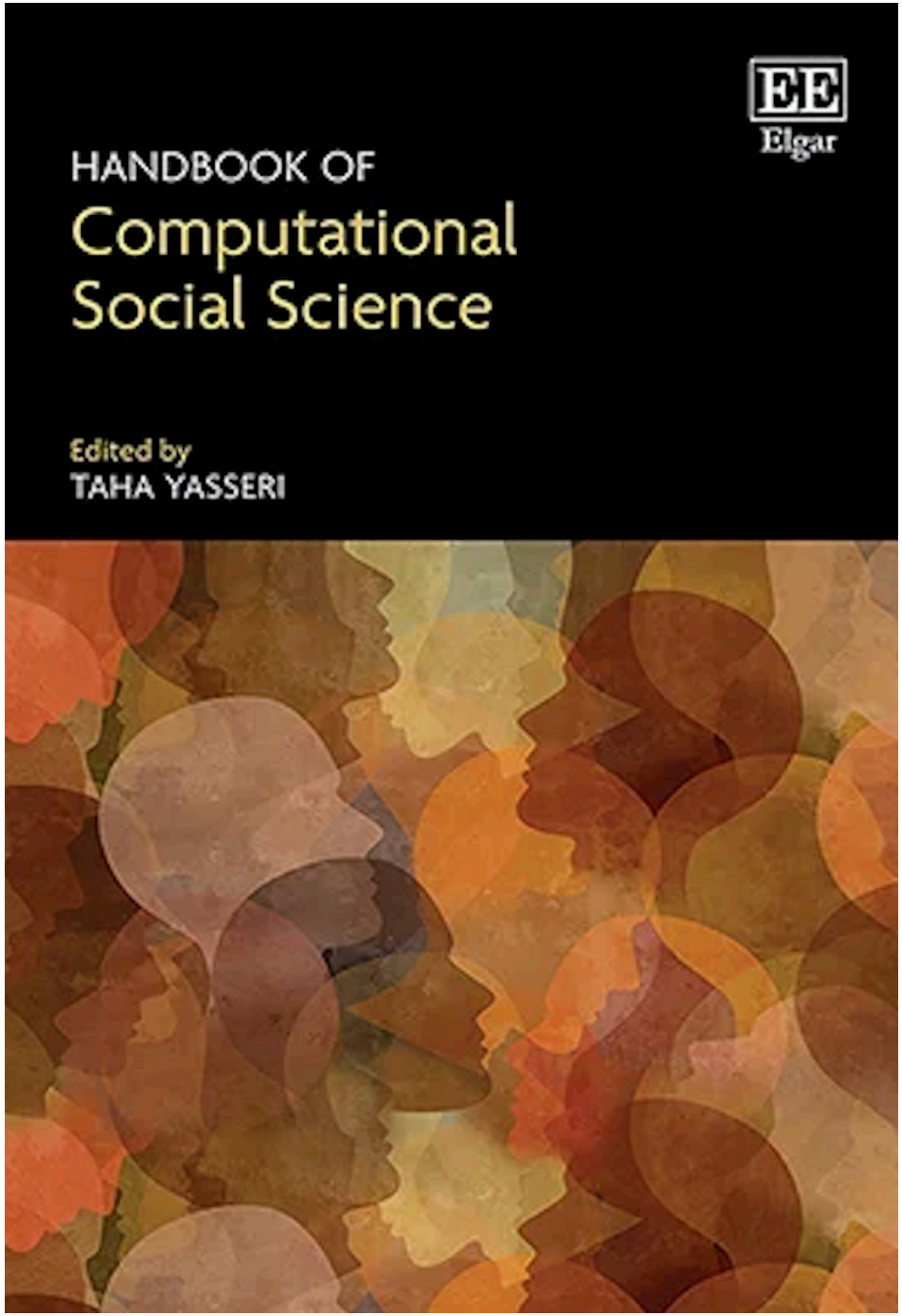
En savoir plus

Tentative de définition

« La notion de « computationnel » appliquée aux humanités renvoie à une utilisation poussée des algorithmes pour analyser les données des sciences humaines, qui transcende la simple numérisation des documents ou l'utilisation superficielle d'un logiciel prêt à l'emploi [...] Autrement dit, les méthodes computationnelles ne viennent pas simplement s'ajouter à la boîte à outils existante ; elles redéfinissent en profondeur les questions que les chercheurs peuvent poser et les connaissances qu'ils peuvent en tirer. » (Henriot et Armand, p. 6)

« We define CSS as the development and application of computational methods to complex, typically large-scale, human (sometimes simulated) behavioral data » (Lazer et al., 2020, p. 1)

« Computational social science is an interdisciplinary field that advances theories of human behavior by applying computational techniques to large datasets from social media sites, the Internet, or other digitized archives such as administrative records. » (Edelmann et al., 2020, p. 2)


EE
Elgar
HANDBOOK OF
Computational
Social Science
Edited by
TAHA YASSERI

"CSS, as a collective endeavor, is like any other emerging field—it has blurry, fluid boundaries and an amorphous structure. It is inherently heterogeneous: Certain datasets, platforms, or questions have received a lot more attention than others. And inevitably, certain groups of people and societies have been studied far more than the majority of others who, for various reasons, are unlikely to be captured by CSS—often because of methodological limitations."

"At an epistemological level, CSS serves both as a scientific paradigm for studying humans using computational tools (broadly defined) and as the study of the changes in our lives brought about by the computationalization of society"

Une évolution récente

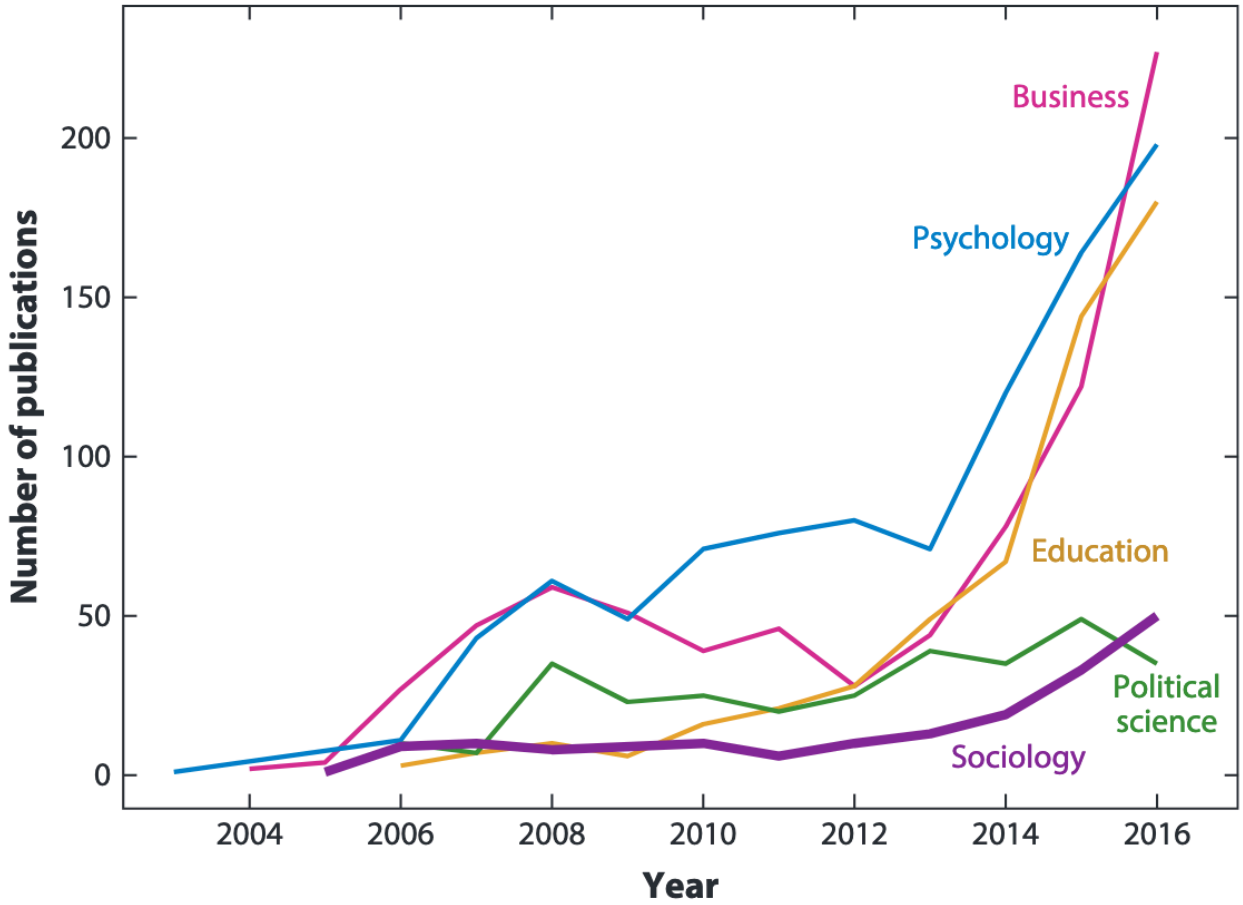
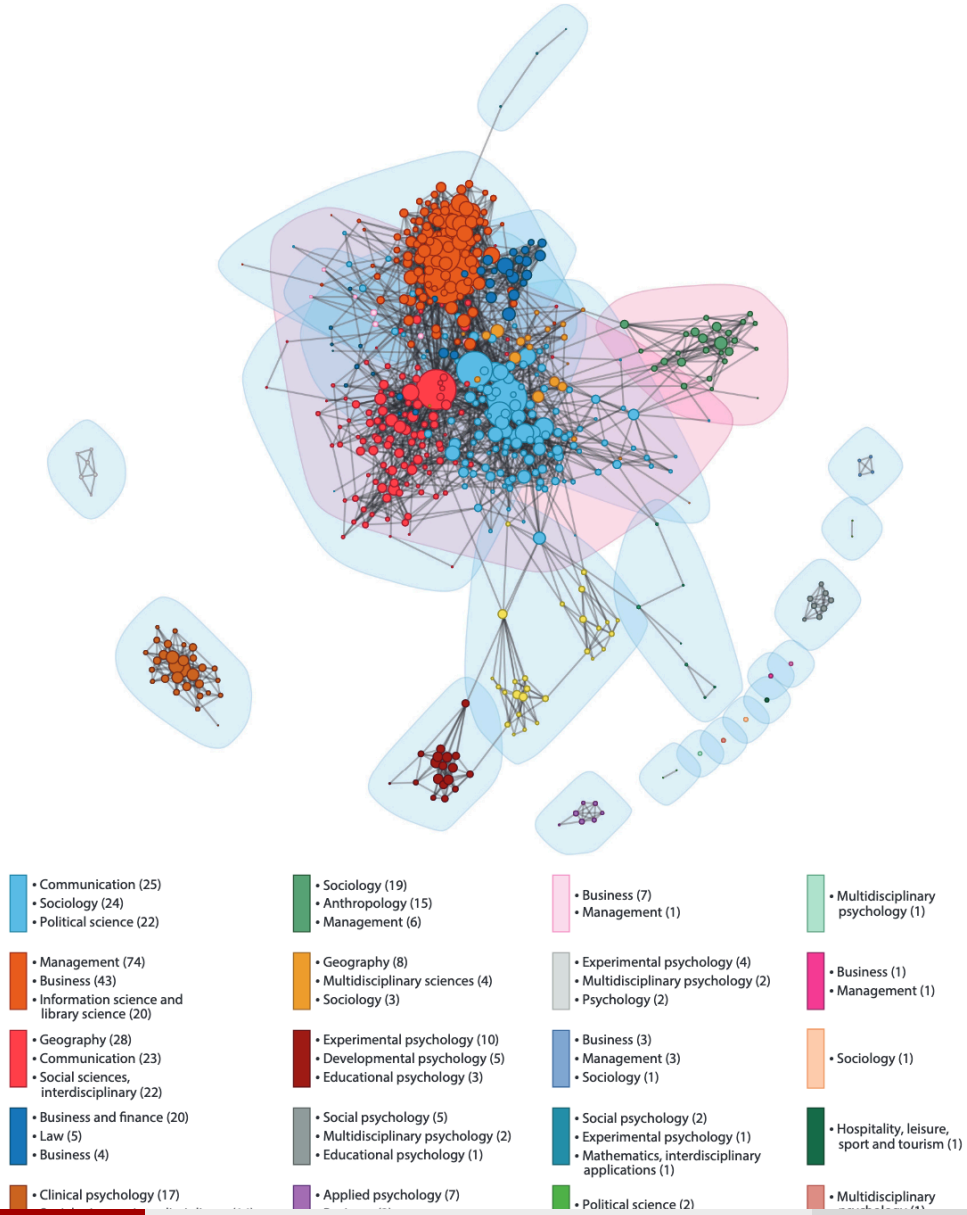


Figure 1

Number of computational social science publications by year—2003–2016—across four scholarly disciplines.

Dans de nombreuses disciplines



Pourquoi ?

- De nouvelles méthodes permises par l'informatique
  - NLP, ABM, ...
- De nouvelles données
  - Administratives, etc.
- De nouveaux objets
  - Médias sociaux
- De nouvelles méthodes:
  - LLM, ...

Amène des promesses :

- De nouveaux résultats
- De nouvelles épistémologies (data-based science)

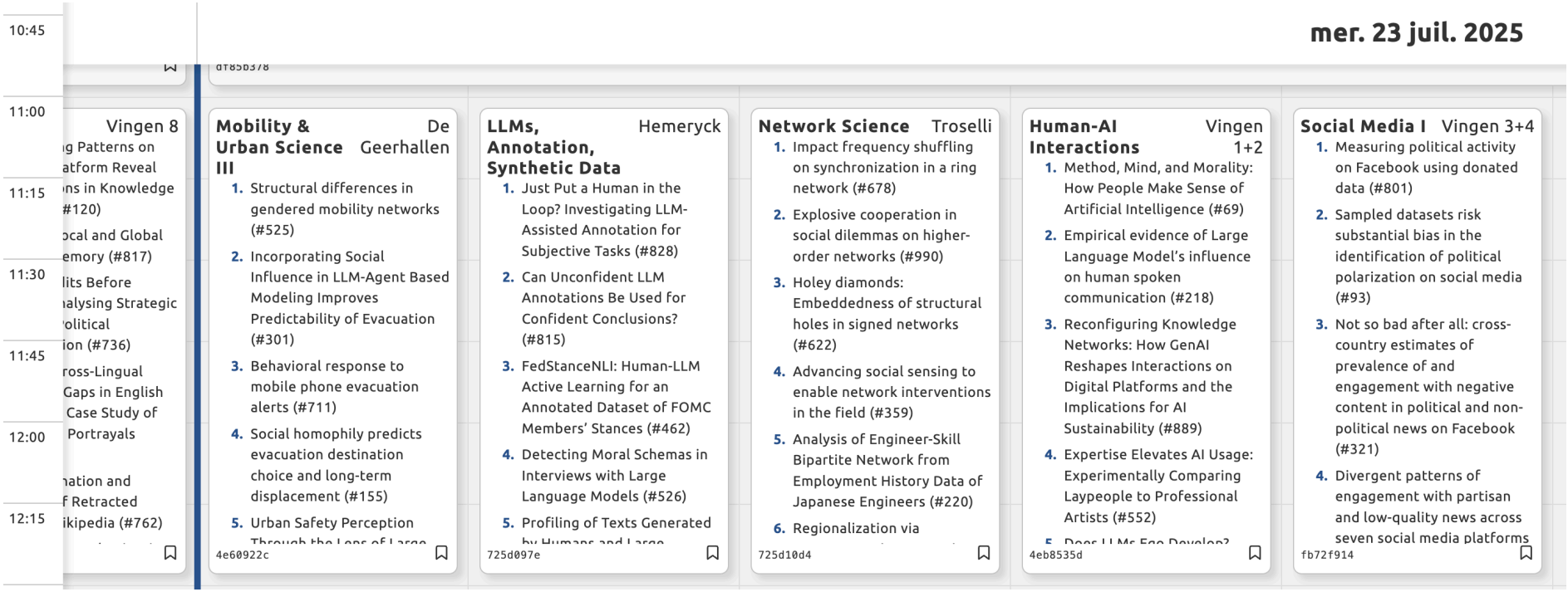
Orientations différentes en fonction des données

- Données observationnelles numériques
  - “traces” des médias sociaux, etc.
- Données expériementales et dispositifs numériques
- Données synthétiques / simulations
- Données plates (tabulaires) vs. non structurées

Particularité des SHS en termes de données par rapport aux sciences expérimentales

Exemple d'IC2S2

Une diversité de thématiques et de tutoriaux

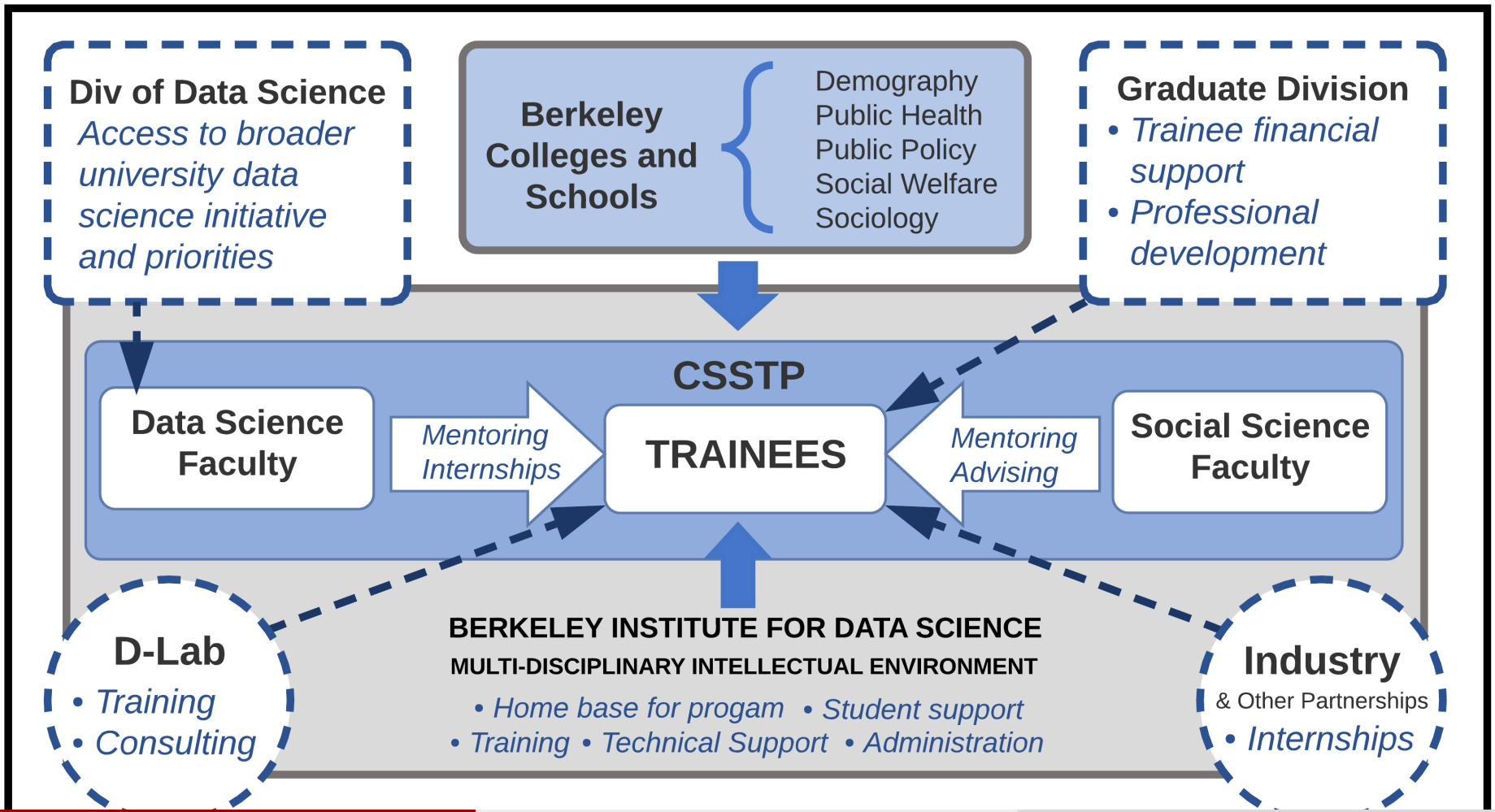


Besoin de nouvelles compétences

- Informatique
  - Programmation
  - Développement
- Mathématiques
  - Modélisation, statistiques
- Spécialisées
  - ML/DL/IA
  - NLP

De nouveaux parcours

Computational Social Science Training Program (CSSTP) au Berkeley Institute for Data Science (BIDS)



Pour y faire quoi ?

Fig G. Representative examples of electives for CSSTP

Course Number	Title
EDUC 274D	Multidimensional Measurement
EDUC 275G	Hierarchical and Longitudinal Modeling
INFO 251	Applied Machine Learning
INFO 254	Data Mining and Analytics
PB HLTH 231A	Analytic Methods for Health Policy and Management
PB HLTH 240B / STAT C245B	Biostatistical Methods: Survival Analysis and Causality
PB HLTH 240C / STAT C245C	Biostatistical Methods: Comp Statistics w/ Applications in Biology & Medicine I
PB HLTH 240D / STAT C245D	Biostatistical Methods: Comp Statistics w/ Applications in Biology & Medicine II
PB HLTH 241	Statistical Analysis of Categorical Data
PB HLTH 242C / STAT C247C	Longitudinal Data Analysis
PB HLTH 244	Big Data: A Public Health Perspective
PB HLTH 250C	Advanced Epidemiologic Methods
PB HLTH 251C	Causal Inference and Meta-Analysis in Epidemiology
PB HLTH 252	Epidemiological Analysis
PB HLTH 252D	Introduction to Causal Inference
PB HLTH 252E	Advanced Topics in Causal Inference
PSYCH 206	Structural Equation Modeling
PUB POL 249	Statistics for Program Evaluation
PUB POL 275	Spatial Data and Analysis
PUB POL 288	Risk and Optimization Models for Policy
EDUC 260F / INFO C260F	Machine Learning in Education
EDUC 274A	Measurement in Education and Social Science I
EDUC 274B	Measurement in Education and Social Science II
EDUC 276A	Models and Methods of Evaluation
INFO 259	Natural Language Processing
PB HLTH 219D	Introduction to Survey Methods
PB HLTH 240A / STAT C245A	Introduction to Modern Biostatistical Theory & Practice

Et d'autres

- MIASHS
- Humanités numériques
- Sociologie quantitative
- ...

Deux types de trajectoires

- **Des sciences sociales vers l'informatique**
  - Forte familiarité à certaines disciplines
  - Compétences acquises progressivement en numérique
- **Des sciences xp / exactes / ing aux SSC**
  - Plus de notions mathématiques / numériques
  - Familiarisation progressive avec les SHS

Au final, tout le monde apprend.

De nouveaux profils

Dans les laboratoires

- Chercheurs spécialisés SSC
- Ingénieurs de recherche données
- Data scientist
- Research software engineer

Dans le privé, gradient :

- data analyst/scientist
- data journalist
- ingénieur NLP, etc.

Arrivée de l'IA générative

PNAS PERSPECTIVE OPEN ACCESS

Can Generative AI improve social science?

Christopher A. Bail[a,b,c,1]

Edited by David Lazer, Northeastern University, Boston, MA; received September 7, 2023; accepted April 5, 2024, by Editorial Board Member Mark Granovetter

Generative AI that can produce realistic text, images, and other human-like outputs is currently transforming many different industries. Yet it is not yet known how such tools might influence social science research. I argue Generative AI has the potential to improve survey research, online experiments, automated content analyses, agent-based models, and other techniques commonly used to study human behavior. In the second section of this article, I discuss the many limitations of Generative AI. I examine how bias in the data used to train these tools can negatively impact social science research—as well as a range of other challenges related to ethics, replication, environmental impact, and the proliferation of low-quality research. I conclude by arguing that social scientists can address many of these limitations by creating open-source infrastructure for research on human behavior. Such infrastructure is not only necessary to ensure broad access to high-quality research tools, I argue, but also because the progress of AI will require deeper understanding of the social forces that guide

in different social milieux. Finally, I argue Generative AI has the potential to transform automated text analysis. Since Generative AI tools can analyze very large groups of documents in many different languages with great speed, I propose they may significantly expand the range of research questions that social scientists can study.

In the third section of this article, I turn to the various limitations and potential dangers associated with Generative AI. Much of the public discourse surrounding this new technology focuses on the possibility of a "singularity" where AI models supersede human intelligence and threaten our well-being. Many scholars believe such concerns eschew well-documented social harms that are already occurring in the short term (1). These include the tendency of Generative AI to exhibit strong bias against stigmatized groups, spread misinformation, and potentially exacerbate social inequality or climate change—among other negative outcomes. I discuss how these issues may negatively impact the quality, efficiency, interpretability, and replicability of social science research as well—and generate new questions about ethics and the protection of human subjects. I also evaluate the

Transformations en cours

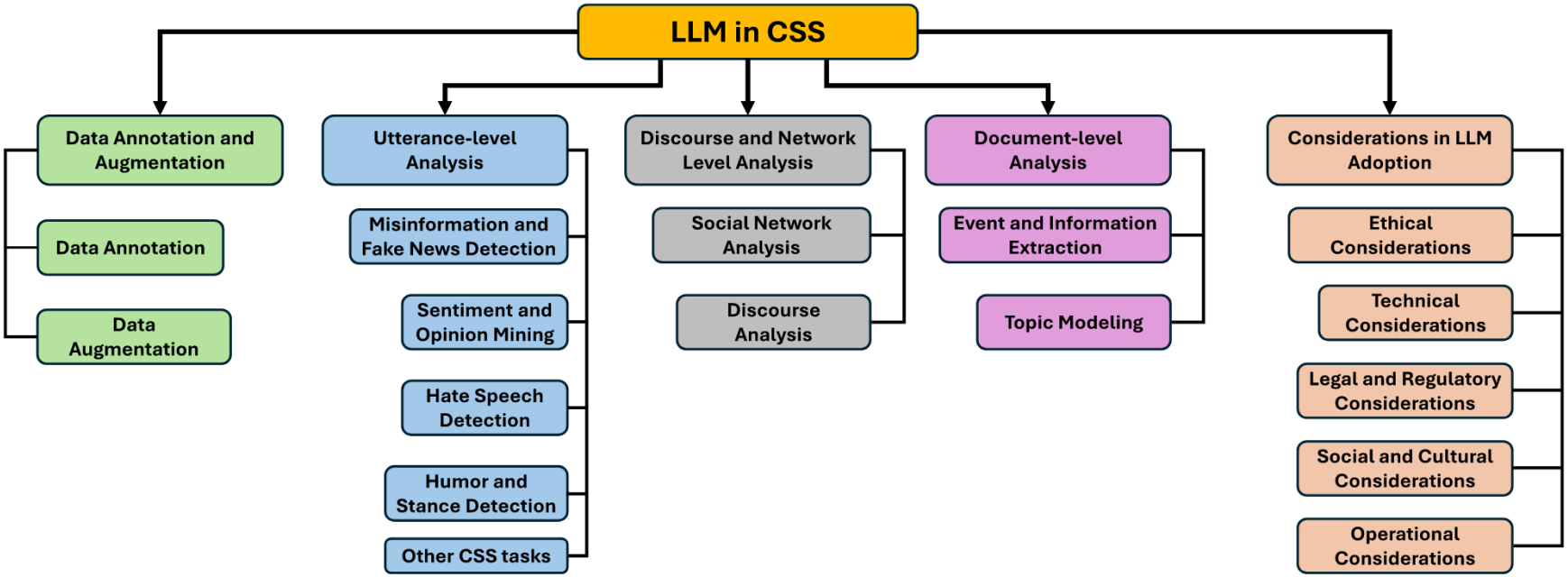


Fig. 2 Overall popular research areas of LLM when applied to CSS. Data Annotation and Augmentation focuses on preparing and enriching CSS data using LLMs. Utterance-level analysis encompasses individual forms of communication. Discourse and Network Level Analysis examine larger contexts in CSS such as social media, discussion forums, and other information networks where users are interconnected in a network. Document-level Analysis analyzes texts in documents, where LLMs have to tackle texts with a very long context. Considerations in LLM Adoption shift the focus from types of analysis to the practical and ethical aspects of incorporating LLMs into CSS research

Une tension fondamentale

- Multiplicité des SHS
- Multiplicité des compétences numériques
  - DevOps
  - NLP
  - ABM
  - SIG

Au final, c'est quoi les SSC ?

Surtout que tout est informatisé

- **Boîte à outils** : un ensemble de méthodes
- **Orienté données**: l'intégration de nouvelles données peu conventionnelles
- **Interface** : lieu d'échange entre SHS et SC

Section 3

Études de cas

Que font les SSC ?

- Poser des questions de sciences sociales
- Y répondre avec des données/méthodes computationnelles

Deux volets :

- recherche : nouvelles méthodes/questions
- ingénierie : mise en oeuvre/outils

Comprendre par la diversité des travaux existants (en recherche)

Genre dans les films

Humanities & Social Sciences Communications

ARTICLE

https://doi.org/10.1057/s41599-021-00815-9 OPEN

Computational appraisal of gender representativeness in popular movies

Antoine Mazières [1✉], Telmo Menezes[1] & Camille Roth[1,2]

Gender representation in mass media has long been mainly studied by qualitatively analyzing content. This article illustrates how automated computational methods may be used in this context to scale up such empirical observations and increase their resolution and significance. We specifically apply a face and gender detection algorithm on a broad set of popular movies spanning more than three decades to carry out a large-scale appraisal of the on-screen presence of women and men. Beyond the confirmation of a strong under-representation of women, we exhibit a clear temporal trend towards fairer representativeness. We further contrast our findings with respect to a movie genre, budget, and various audience-related features such as movie gross and user ratings. We lastly propose a fine description of

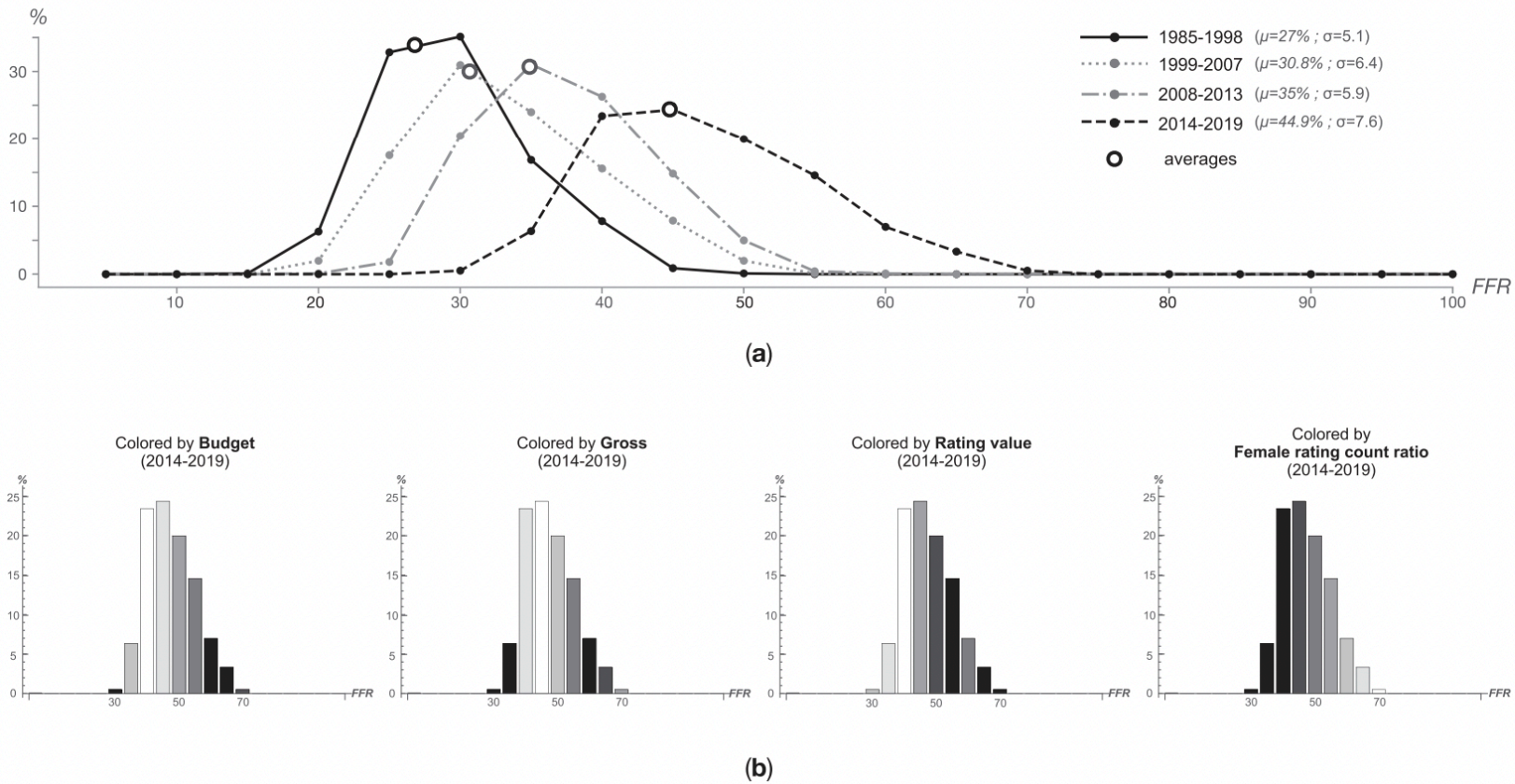


Fig. 4 Distributions of female face ratio (FFR). a Distributions of FFR for each period: Percentage of movies with a given FFR, one data point every 5%. **b** Distributions of several features over the distribution of FFR: Percentage of movies with a given FFR, colored by the given variable mean within the bin, the lighter the higher.

Humanités & images

Les projets en intelligence artificielle à la BnF

GALLICA IMAGES

Avec 10 millions de documents, Gallica est une des plus grandes bibliothèques numériques au monde. Les images et les documents accessibles sur notre bibliothèque numérique sont des exemples uniques de notre patrimoine commun. Cependant, la majorité des images de Gallica ne sont pas identifiées et ne sont accessibles qu'en réalisant un dépouillement manuel minutieux des documents qui les contiennent.

Le projet industriel Gallica Images a pour objectif de rendre les fonds iconographiques de Gallica, la bibliothèque numérique de la BnF et de ses partenaires, accessibles en

Gallica image - BnF

Stylométrie

ScienceAdvances

Current Issue First release papers Archive About

RESEARCH ARTICLE | SOCIAL SCIENCES

Why Molière most likely did write his plays

FLORIAN CAFIERO AND JEAN-BAPTISTE CAMPS Authors Info & Affiliations

SCIENCE ADVANCES • 27 Nov 2019 • Vol 5, Issue 11 • DOI: 10.1126/sciadv.aax5489

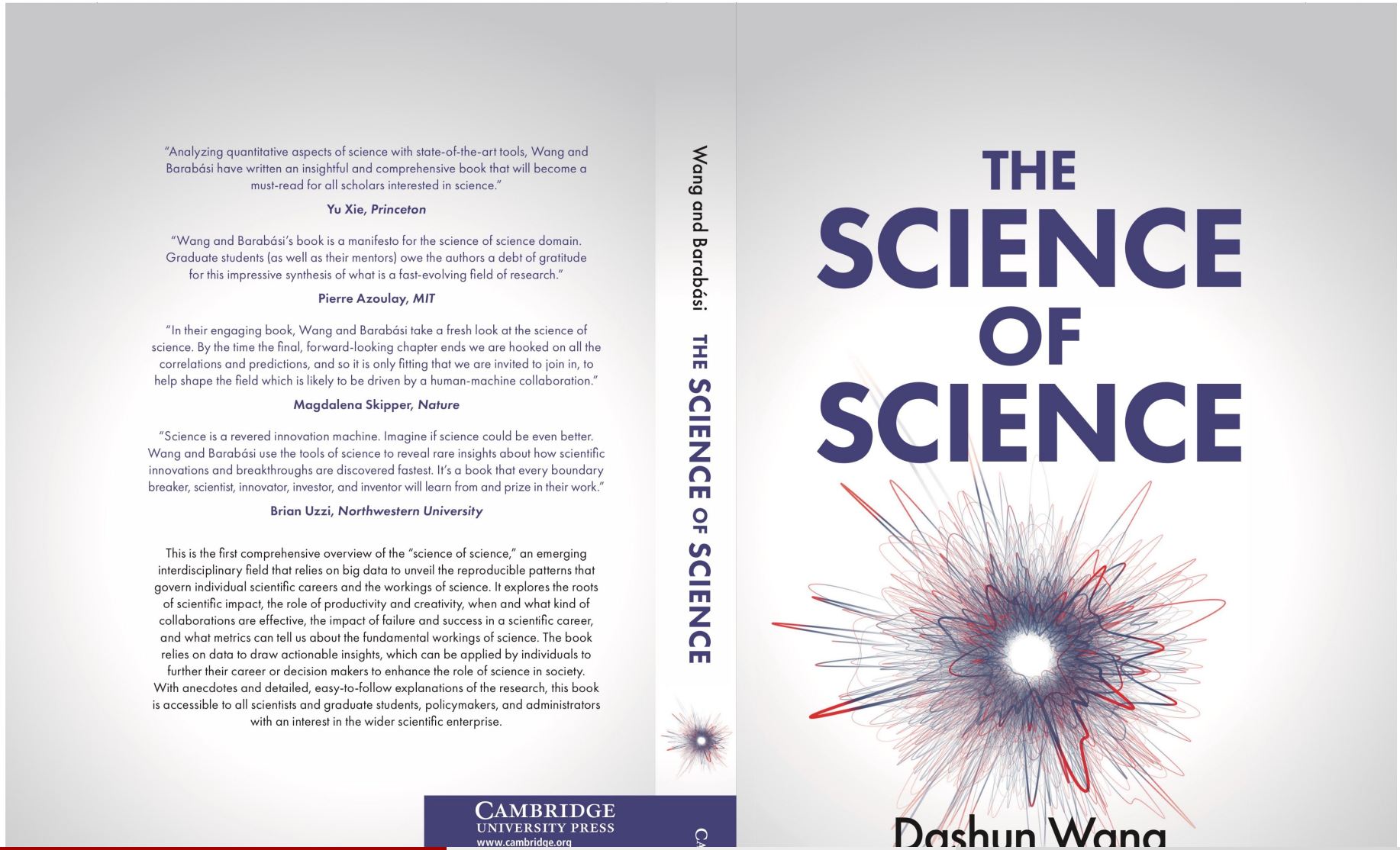
4739 8

Abstract

As for Shakespeare, a hard-fought debate has emerged about Molière, a supposedly uneducated actor who, according to some, could not have written the masterpieces attributed to him. In the past decades, the century-old thesis according to which Pierre Corneille would be their actual author has become popular, mostly because of new works in computational linguistics. These results are reassessed here through state-of-the-art attribution methods. We study a corpus of comedies in verse by major authors of Molière and Corneille's time. Analysis of lexicon, rhymes, word forms, affixes, morphosyntactic sequences, and function words do not give any clue that another author among the major playwrights of the time

Scientométrie

Référence



Article

Artificial intelligence tools expand scientists' impact but contract science's focus

https://doi.org/10.1038/s41586-025-09922-y

Received: 2 January 2025

Accepted: 14 November 2025

Published online: 14 January 2026

Check for updates

Qianyue Hao[1], Fengli Xu[1]✉, Yong Li[1,2]✉ & James Evans[3,4]✉

Developments in artificial intelligence (AI) have accelerated scientific discovery[1]. Alongside recent AI-oriented Nobel prizes[2–9], these trends establish the role of AI tools in science[10]. This advancement raises questions about the influence of AI tools on scientists and science as a whole, and highlights a potential conflict between individual and collective benefits[11]. To evaluate these questions, we used a pretrained language model to identify AI-augmented research, with an F1-score of 0.875 in validation against expert-labelled data. Using a dataset of 41.3 million research papers across the natural sciences and covering distinct eras of AI, here we show an accelerated adoption of AI tools among scientists and consistent professional advantages associated with AI usage, but a collective narrowing of scientific focus. Scientists who engage in AI-augmented research publish 3.02 times more papers, receive 4.84 times more citations and become research project leaders 1.37 years earlier than those who do not. By contrast, AI adoption shrinks the collective volume of scientific topics studied by 4.63% and decreases scientists' engagement with one another by 22%. By consequence, adoption of AI in science presents what seems to be a paradox: an expansion of individual scientists' impact but a contraction in collective science's reach, as AI-augmented work moves collectively towards areas richest in data. With reduced follow-on engagement, AI tools seem to automate established fields rather than explore new ones, highlighting a tension between personal advancement and collective scientific progress.

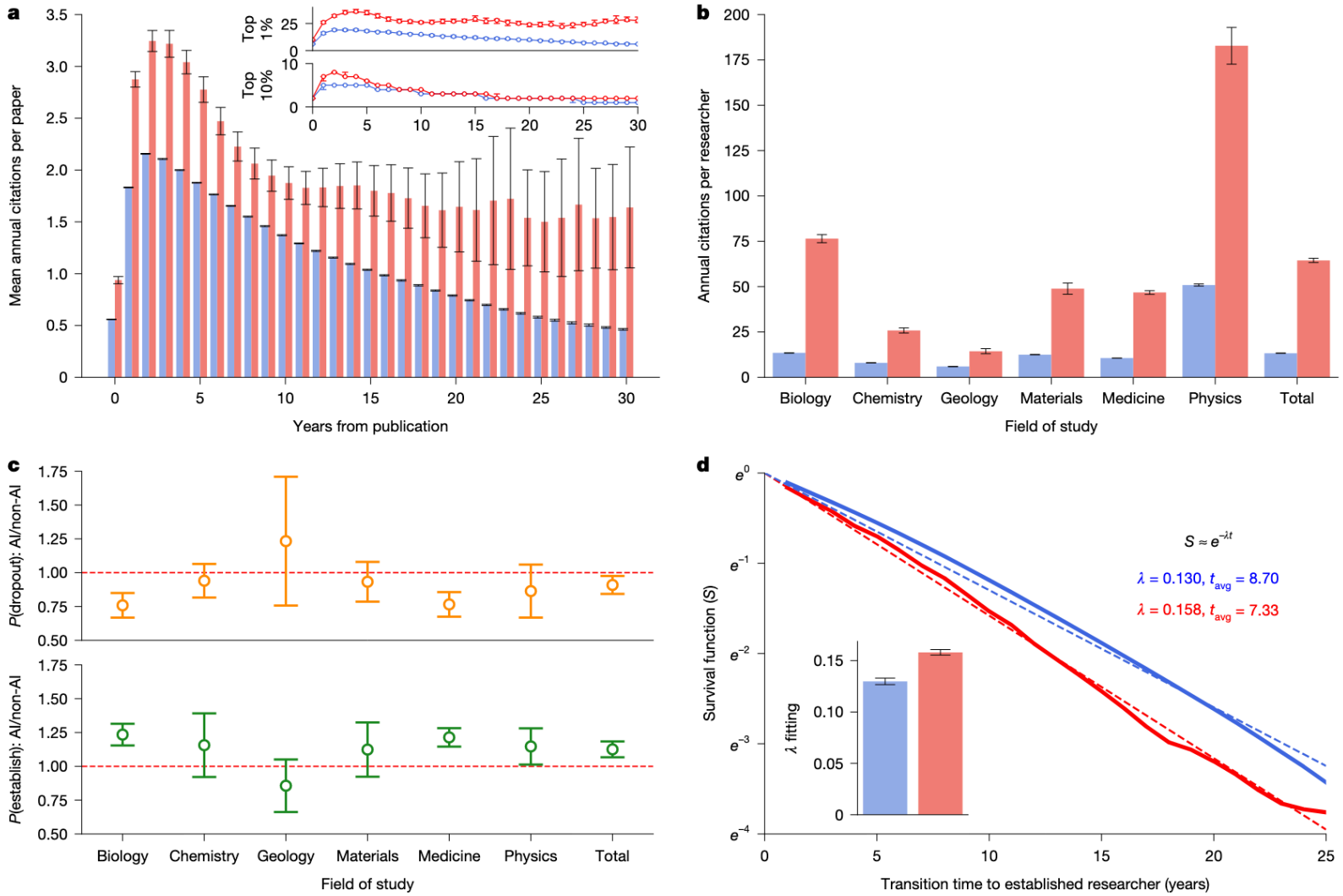


Fig. 2 | AI enlarges paper impact and enhances researcher careers. **a**, Average (insets: top 1% and 10%) annual citations after publication of AI (red) and non-AI (blue) papers (n = 27,405,011), where AI papers attract more citations. **b**, Average annual citations for researchers who use AI and their counterparts who do not (P < 0.001, n = 5,377,346), where researchers who adopt AI receive 4.84 times more citations. **c**, The probability of two role transitions between junior scientists who adopt AI and their counterparts who do not (n = 46 year observations for each field). Junior scientists who adopt AI have a higher probability of becoming established researchers and a lower probability of exiting academia compared with their counterparts who do not adopt AI. **d**, Survival functions for the transition from a junior to an established researcher (P < 0.001, n = 2,282,029). The survival functions can be well-fit with exponential distributions, where junior scientists who adopt AI become established earlier. For all panels, 99% CIs are shown as error bars, with the insets of **a** centred at the 1% and 10% percentiles and other panels centred at the mean. All statistical tests use a two-sided t-test.

Politisation & médias sociaux

Référence

PHYSICAL REVIEW RESEARCH **6**, 013170 (2024)

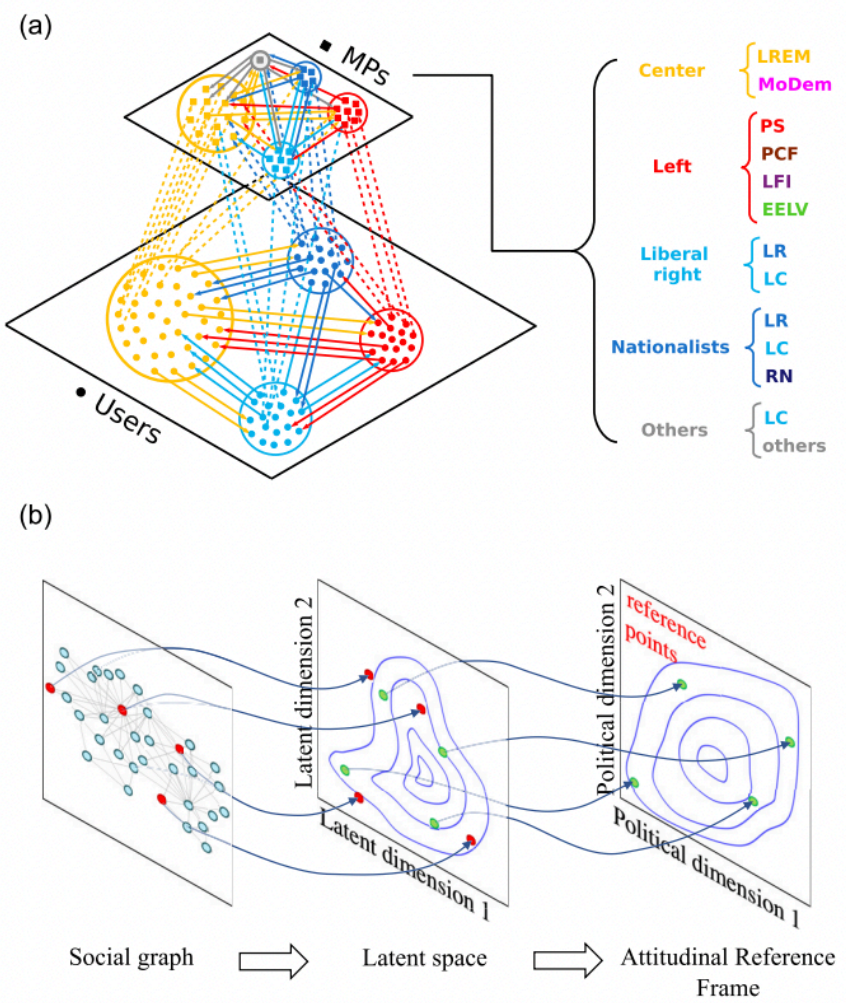
Multidimensional political polarization in online social networks

Antonio F. Peralta [1,2,*] Pedro Ramaciotti,[3] János Kertész [1,4] and Gerardo Iñiguez [1,5,6,7,†]

[1]*Department of Network and Data Science, Central European University, A-1100 Vienna, Austria*
[2]*Helmholtz Institute for Functional Marine Biodiversity (HIFMB), 26129 Oldenburg, Germany*
[3]*CNRS, Complex Systems Institute of Paris Ile-de-France (ISC-PIF), Sciences Po médialab & LPI, Université Paris Cité, France*
[4]*Complexity Science Hub, A-1080 Vienna, Austria*
[5]*Faculty of Information Technology and Communication Sciences, Tampere University, FI-33720 Tampere, Finland*
[6]*Department of Computer Science, Aalto University School of Science, FI-00076 Aalto, Finland*
[7]*Centro de Ciencias de la Complejidad, Universidad Nacional Autonóma de México, 04510 Ciudad de México, Mexico*

(Received 21 June 2023; accepted 21 December 2023; published 16 February 2024)

Political polarization in online social platforms is a rapidly growing phenomenon worldwide. Despite their relevance to modern-day politics, the structure and dynamics of polarized states in digital spaces are still poorly understood. We analyze the community structure of a two-layer, interconnected network of French Twitter users, where one layer contains members of Parliament and the other one regular users. We obtain an optimal representation of the network in a four-dimensional political opinion space by combining network embedding methods and political survey data. We find structurally cohesive groups sharing common political attitudes and relate them to the political party landscape in France. The distribution of opinions of professional politicians is narrower than that of regular users, indicating the presence of more extreme attitudes in the general population. We find that politically extreme communities interact less with other groups as compared to more centrist



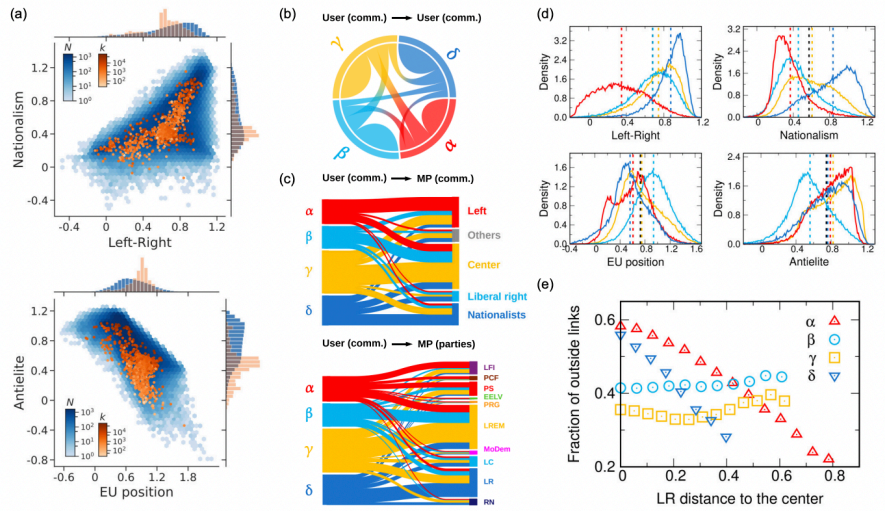


FIG. 3. Communities and ideological positions of regular users and their relation to professional politicians. (a) Number distribution of ideological positions of users (MPs), represented by blue (orange) dots in a two-dimensional opinion space for pairs of opinion variables: LR-NA (top) and EU-AE (bottom) (other pairs in Ref. [25], Sec. S1.3). Color shading for MPs is proportional to the number of followers k (users) of each MP in logarithmic scale, i.e., in-degree in the User → MP network, $k \equiv k_{in}^{in/um}$ (see Ref. [25], Sec. S1.1.1). Corresponding marginal probability densities of users (blue) and MPs (orange) are plotted in linear scale. (b) Communities in the user layer correspond to the best partition (minimum description length) of the planted partition model [28] with a fixed number of communities equal to four. The color of each community is chosen according to its characteristic political attitude in relation to the MP layer. The chord diagram indicates the connectivity (number of links) between and inside communities of users. (c) Sankey diagrams indicating the connectivity between user groups and both MP communities (top) and their parties (bottom). Size of flows is proportional to the number of links in the User → MP network, whose source nodes belong to a particular community of users (indicated by colors). Link colors are chosen according to user communities. (d) Probability densities of opinion variables (LR, NA, EU, and AE) of users in each community (as indicated by line color). Colored dashed lines represent the average opinion of each community, and the black dashed line is the global average. (e) Fraction of links of users (in the user layer) pointing outside of their community as a function of the distance of their opinion from the average opinion of all users. Plot corresponds to the LR dimension (for others see Ref. [25], Sec. S3.3.4). While members of β and γ connect freely to other communities despite of political differences, this function rapidly decreases with ideological distance for members of α and δ.

Appliqué à la lutte contre la désinformation

Référence

Bots and Misinformation Spread on Social Media: Implications for COVID-19

McKenzie Himelein-Wachowiak[1]; Salvatore Giorgi[1,2]; Amanda Devoto[1]; Muhammad Rahman[1]; Lyle Ungar[2]; H Andrew Schwartz[3]; David H Epstein[1]; Lorenzo Leggio[1]; Brenda Curtis[1]

Article | Authors | Cited by (120) | Tweetations (33) | Metrics

Abstract

As of March 2021, the SARS-CoV-2 virus has been responsible for over 115 million cases of COVID-19 worldwide, resulting in over 2.5 million deaths. As the virus spread exponentially, so did its media coverage, resulting in a proliferation of conflicting information on social media platforms —a so-called "infodemic." In this viewpoint, we survey past literature investigating the role of automated accounts, or "bots," in spreading such misinformation, drawing connections to the COVID-19 pandemic. We also review strategies used by bots to spread (mis)information and examine the potential origins of bots. We conclude by conducting and presenting a secondary analysis of data sets of known bots in which we find that up to 66% of bots are discussing COVID-19. The proliferation of COVID-19 (mis)information by bots, coupled with human susceptibility to believing and sharing misinformation, may well impact the course of the pandemic.

ML en économie

Article

Machine learning and phone data can improve targeting of humanitarian aid

https://doi.org/10.1038/s41586-022-04484-9

Received: 15 July 2021

Accepted: 25 January 2022

Published online: 16 March 2022

Open access

Check for updates

Emily Aiken[1,5], Suzanne Bellue[2], Dean Karlan[3], Chris Udry[4] & Joshua E. Blumenstock[1,5]✉

The COVID-19 pandemic has devastated many low- and middle-income countries, causing widespread food insecurity and a sharp decline in living standards[1]. In response to this crisis, governments and humanitarian organizations worldwide have distributed social assistance to more than 1.5 billion people[2]. Targeting is a central challenge in administering these programmes: it remains a difficult task to rapidly identify those with the greatest need given available data[3,4]. Here we show that data from mobile phone networks can improve the targeting of humanitarian assistance. Our approach uses traditional survey data to train machine-learning algorithms to recognize patterns of poverty in mobile phone data; the trained algorithms can then prioritize aid to the poorest mobile subscribers. We evaluate this approach by studying a flagship emergency cash transfer program in Togo, which used these algorithms to disburse millions of US dollars worth of COVID-19 relief aid. Our analysis compares outcomes—including exclusion errors, total social welfare and measures of fairness—under different targeting regimes. Relative to the geographic targeting options considered by the Government of Togo, the machine-learning approach reduces errors of exclusion by 4–21%. Relative to methods requiring a comprehensive social registry (a hypothetical exercise; no such registry exists in Togo), the machine-learning approach

LLM en sciences cognitives

Référence

PNAS RESEARCH ARTICLE | PSYCHOLOGICAL AND COGNITIVE SCIENCES OPEN ACCESS

Evaluating large language models in theory of mind tasks

Michal Kosinski [1]

Edited by Timothy Wilson, University of Virginia, Charlottesville, VA; received March 30, 2024; accepted September 23, 2024

October 29, 2024 | 121 (45) e2405460121 | https://doi.org/10.1073/pnas.2405460121

Significance

Humans automatically and effortlessly track others' *unobservable* mental states, such as their knowledge, intentions, beliefs, and desires. This ability—typically called "theory of mind" (ToM)—is fundamental to human social interactions, communication, empathy, consciousness, moral judgment, and religious beliefs. Our results show that recent large language models (LLMs) can solve false-belief tasks, typically used to evaluate ToM in humans. Regardless of how we interpret these outcomes, they signify the advent of more powerful and socially skilled AI—with profound positive and negative implications.

Eleven large language models (LLMs) were assessed using 40 bespoke false-belief tasks, considered a gold standard in testing theory of mind (ToM) in humans. Each task included a false-belief scenario, three closely matched true-belief control scenarios, and the reversed versions of all four. An LLM had to solve all eight scenarios to solve a single task. Older models solved no tasks; Generative Pre-trained Transformer (GPT)-3-davinci-003 (from November 2022) and ChatGPT-3.5-turbo (from March 2023) solved 20% of the tasks; ChatGPT-4 (from June 2023) solved 75% of the tasks, matching the

Etudier des forums

Référence

New Media & Society

Impact Factor: **4.5** / 5-Year Impact Factor: **7.0**

Open access | Research article | First published online June 6, 2023

Men who hate women: The misogyny of involuntarily celibate men

Michael Halpin, Norann Richard, [...], and Finlay Maguire +2 View all authors and affiliations

Volume 27, Issue 1 | https://doi.org/10.1177/14614448231176777

Contents | PDF/EPUB | Cite article | Share options | Information, rights and permissions

Abstract

This article uses computational data and social science theories to analyze the misogynistic discourse of the involuntary celibate ("incel") community. We analyzed every comment ($N = 3{,}686{,}110$) produced over 42 months on a popular incel discussion board and found that nearly all active participants use misogynistic terms. Participants used misogynistic terms nearly one million times and at a rate 2.4 times greater than

Faire du NLP “simple”

Data and methods

This article examines the discussion board on incels.is, a popular English language incel website. At the time of our data collection (15 April 2021), the site had 13,700 registered members who produced nearly 6 million comments and spent more than 54,000 days on the website. These numbers do not count people who view the site without commenting; the site receives several million visits per month (Similarweb, 2021).

Procedure

We collected all posts (e.g. text posted by a user) that appeared on the incels.is discussion board (“Inceldom Discussion”) from 8 November 2017 until 16 April 2021 ($N = 3{,}686{,}110$). We employed custom scraping scripts[1] to extract all public post data. This script automatically traversed and downloaded the corresponding HTML for every page of posts within each thread of “Inceldom Discussion.” Individual comments and user information were then extracted from the HTML and saved as thread-specific text files. The extracted data include post text along with the associated participant user IDs, posting time, thread titles, threads, and the respective order of posts in threads. Our analyses do not include posts that were deleted before we completed our data collection and excludes text quoting other posts in the same thread.

Analytic approach

We use computational methods to collect and describe incel misogyny, while using social science theories to inform our research questions, as well as interpret and discuss our results. In this sense, we aim to leverage

Augmenter les sciences sociales

Référence - Émission France Culture

Sociological Methods & Research

Impact Factor: **6.5** / 5-Year Impact Factor: **6.0** Journal Homepage Submission Guidelines

Restricted access | Research article | First published online December 4, 2022

The Augmented Social Scientist: Using Sequential Transfer Learning to Annotate Millions of Texts with Human-Level Accuracy

Salomé Do, Étienne Ollion, and Rubing Shen View all authors and affiliations

Volume 53, Issue 3 | https://doi.org/10.1177/00491241221134526

Abstract

The last decade witnessed a spectacular rise in the volume of available textual data. With this new abundance came the question of how to analyze it. In the social sciences, scholars mostly resorted to two well-established approaches, human annotation on sampled data on the one hand (either performed by the researcher, or outsourced to microworkers), and quantitative methods on the other. Each approach has its own merits - a potentially very fine-grained analysis for the former, a very scalable one for the latter - but the combination of these two properties has not yielded highly accurate results so far. Leveraging recent advances in sequential transfer learning, we demonstrate via an experiment that an expert can train a precise, efficient automatic classifier in a very limited amount of time. We also show that, under certain conditions, expert-trained models produce better annotations than humans themselves. We demonstrate these points using a classic research question in the sociology of journalism, the rise of a “horse race” coverage of politics. We conclude that recent advances in transfer learning help us augment ourselves when analyzing unstructured data.

S'auto-étudier avec des classifieurs

Computer Science > Computers and Society

[Submitted on 11 Dec 2024 (v1), last revised 16 Dec 2024 (this version, v2)]

From Division to Unity: A Large-Scale Study on the Emergence of Computational Social Science, 1990-2021

Honglin Bao, Jiawei Zhang, Mingxuan Cao, James A. Evans

We present a comprehensive study on the emergence of Computational Social Science (CSS) - an interdisciplinary field leveraging computational methods to address social science questions - and its impact on adjacent social sciences. We trained a robust CSS classifier using papers from CSS-focused venues and applied it to 11 million papers spanning 1990 to 2021. Our analysis yielded three key findings. First, there were two critical inflections in the rise of CSS. The first occurred around 2005 when psychology, politics, and sociology began engaging with CSS. The second emerged in approximately 2014 when economics finally joined the trend. Sociology is currently the most engaged with CSS. Second, using the density of yearly knowledge embeddings constructed by advanced transformer models, we observed that CSS initially lacked a cohesive identity. From the early 2000s to 2014, however, it began to form a distinct cluster, creating boundaries between CSS and other social sciences, particularly in politics and sociology. After 2014, these boundaries faded, and CSS increasingly blended with the social sciences. Third, shared data-driven methods homogenized CSS papers across disciplines, with politics and economics showing the most alignment due to the combined influence of CSS and causal identification. Nevertheless, non-CSS papers in sociology, psychology, and politics became more divergent. Taken together, these findings highlight the dynamics of division and unity as new disciplines emerge within existing knowledge landscapes. A live demo of CSS evolution can be found in this https URL

Subjects: **Computers and Society (cs.CY)**; Digital Libraries (cs.DL)
Cite as: arXiv:2412.08087 **[cs.CY]**
(or arXiv:2412.08087v2 **[cs.CY]** for this version)
https://doi.org/10.48550/arXiv.2412.08087

Référence

Outiller l'analyse de réseaux

OPEN ACCESS Freely available online

PLOS ONE

ForceAtlas2, a Continuous Graph Layout Algorithm for Handy Network Visualization Designed for the Gephi Software

Mathieu Jacomy[1,2,3]*, Tommaso Venturini[1], Sebastien Heymann[3,4], Mathieu Bastian[3]

1 Sciences Po, médialab, Paris, France, **2** Equipex DIME SHS, Paris, France, **3** Gephi Consortium, Paris, France, **4** LIP6 - CNRS - Universite Pierre et Marie Curie, Paris, France

Abstract

Gephi is a network visualization software used in various disciplines (social network analysis, biology, genomics…). One of its key features is the ability to display the spatialization process, aiming at transforming the network into a map, and ForceAtlas2 is its default layout algorithm. The latter is developed by the Gephi team as an all-around solution to Gephi users' typical networks (scale-free, 10 to 10,000 nodes). We present here for the first time its functioning and settings. ForceAtlas2 is a force-directed layout close to other algorithms used for network spatialization. We do not claim a theoretical advance but an attempt to integrate different techniques such as the Barnes Hut simulation, degree-dependent repulsive force, and local and global adaptive temperatures. It is designed for the Gephi user experience (it is a continuous algorithm), and we explain which constraints it implies. The algorithm benefits from much feedback and is developed in order to provide many possibilities through its settings. We lay out its complete functioning for the users who need a precise understanding of its behaviour, from the formulas to graphic illustration of the result. We propose a benchmark for our compromise between performance and quality. We also explain why we integrated its various features and discuss our design choices.

Citation: Jacomy M, Venturini T, Heymann S, Bastian M (2014) ForceAtlas2, a Continuous Graph Layout Algorithm for Handy Network Visualization Designed for the Gephi Software. PLoS ONE 9(6): e98679. doi:10.1371/journal.pone.0098679

Editor: Mark R. Muldoon, Manchester University, United Kingdom

Received October 2, 2013; **Accepted** May 6, 2014; **Published** June 10, 2014

Funding: The authors have no support or funding to report.

Entre promesses et évolutions

- Beaucoup de promesses
- Mais des changements bien en cours
  - Interdisciplinarité

Des ressources Awesome CSS repo

De nouveaux enjeux éthiques

- Valeur des données & monétarisation
- Ciblage
- Accès aux données sensibles
- Risque de biais spécifiques

Section 4

Validation

Projet & Validation

Max 2 pages avec les éléments suivants dans les parties + un lien vers le dépôt contenant le code :

- Une question d'enquête + une référence en sciences sociales
- Méthode de collecte des données & constitution du corpus
- Éléments de description du corpus (visualisation & tableau)
- Un traitement textuel (à décrire dans la méthodologie)
- Quelques paragraphes d'analyse sur les résultats et leurs implications

Seul ou en groupe (3 max - travail demandé plus approfondi)

- à envoyer à emilien.schultz@ensae.fr
- object [SSC2026]
- avant le **15 mars**

Définir une question d'enquête

- Circonscrite
  - Privilégier la description d'un phénomène
- En lien avec la littérature (éviter les questions isolées)
- Adaptée aux données
- Réflexive (se poser la question des limites)

Section 5

Au début les données

Récupérer des données

- Données existantes : données secondaires
- Traces numériques : scrapping
- Services dédiés : API

Deux API

- Science ouverte : Open Alex
- Médias sociaux ouverts : Bluesky

Récupérer deux jeux de données sur les sciences sociales computationnelles