

1.
PRÉSENTATION

1.
PRÉSENTATION

3.
OUVRONS LA
BOÎTE NOIRE

2.
UN PEU DE
SOCIOLOGIE

4.
À VOUS DE
JOUER

Gilles Bastin

IA, ALGORITHMES ET INÉGALITÉS

Ensimag, 5 avril 2022

Cette séance

1h30 cours

Présentation

Un peu de sociologie

Ouvrons la boîte noire

5 mn break

30 mn travail en groupes

Proposer le design d'une application de matching assurant la plus grande diversité des couples formés

1h restitution et discussion

INTRODUCTION

Gilles Bastin

Professeur de Sociologie

Institut d'Etudes Politiques / UGA

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Pourquoi la société algorithmique est à la fois omniprésente et invisible ?

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LA TECH ET
L'ÉGALITÉ

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ALGORITHMIQUE ?

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DES TECHNIQUES
D'INVISIBILITÉ ?

4.
TROUBLE ET
PROBLÈME

Sur le marché du travail, sur celui des relations amoureuses, dans les rues et les tribunaux, dans l'espace public animé par les plateformes de réseaux sociaux, des infrastructures algorithmiques complètent, concurrencent et parfois prennent la place des règles institutionnelles, des routines organisationnelles ou des principes édictés par des groupes professionnels pour arbitrer des situations, décider du devenir des individus ou des connaissances auxquelles ils ou elles sont exposé•es. Cette présentation prendra appui sur des exemples récents d'algorithmes contestés et des recherches en sciences sociales sur la production et le fonctionnement de ces algorithmes pour mettre en évidence leur contribution à la production des inégalités dans notre société et la façon dont nous pourrions envisager de limiter ces inégalités.

UNE SOCIÉTÉ ALGORITHMIQUE ?

Pourrez-vous obtenir un prêt de votre banque ?

Qui sera votre prochain match sur Tinder ?

Serez-vous contrôlé par la police en rentrant chez vous tout à l'heure ?

Qui va louer votre chambre d'amis sur Airbnb ?

Obtiendrez-vous la place que vous convoitez en école d'ingénieur ?

Qui pourra lire votre prochain tweet ?



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“ We have this promise that the data and the tech are going to democratize and flatten inequality, but the truth is that the technology is profoundly implicated in the concentration of wealth and power in the hands of the few.

– Safiya Umoja Noble, *Unfinished Conference*, Sept. 2021

**DES
EXEMPLES ?**

LA TECH ET L'ÉGALITÉ

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Artificial Intelligence

A biased medical algorithm favored white people for health-care programs

by Charlotte Jee | 2 months ago



Artificial Intelligence

Apple Card is being investigated over claims it gives women lower credit limits

by Niall Firth | 2 months ago



Artificial Intelligence

A US government study confirms most face recognition systems are racist

by Karen Hao | 17 days ago



Tech Policy

An AI app that "undressed" women shows how deepfakes harm the most vulnerable

DeepNude has now been taken offline, but it won't be the last time such technology is used to target vulnerable populations.

by Karen Hao | 6 months ago



Humans and Technology

Should colleges really be putting smart speakers in dorms?

Administrators say installing listening devices like Alexa in student bedrooms and hallways could help lower dropout rates. Not everyone agrees.

by Kathryn Miles | 10 days ago



UN OPTIMISME DÉMESURÉ ?



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“The revolution will not be supervised”: Consent and open secrets in data science

Coleen Carrigan , Madison W Green
and Abibat Rahman-Davies

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Keywords

Feminism, surveillance, gender harassment, data science, consent, privacy

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Diana E. Forsythe

Studying Those Who Study Us

AN ANTHROPOLOGIST
IN THE WORLD OF ARTIFICIAL
INTELLIGENCE

Writing Science



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Jérôme Denis

Le travail invisible des données

Éléments pour une sociologie des infrastructures scripturales

Préface de Delphine Gardey



Presses des Mines

LE BACK-OFFICE DE L'IA EXISTE-T-IL ?

J. Denis propose de passer par une ethnographie de l'activité de fabrication, de transformation et de maintenance des données. L'ouvrage est clos par deux études de cas. La première est une enquête par observation menée dans le service administratif d'une banque. Elle procède par l'observation du travail des opératrices chargées de recevoir des dossiers, de vérifier leurs pièces, et d'enregistrer les actes (comme une ouverture de compte) ou, au contraire, de les refuser s'ils ne sont pas adéquatement documentés. (...) Ce travail est invisibilisé : les dispositifs de standardisation (comme l'interdiction de la communication orale au nom de la transparence de l'écrit) suggèrent qu'il est aisément automatisable, alors qu'il n'en est rien. (<https://journals-openedition-org.ieppnomade-2.grenet.fr/sdt/30418>)

“The revolution will not be supervised”: Consent and open secrets in data science

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Brad Wyble @bradpwyble

This image speaks volumes about the dangers of bias in AI

Chicken3gg @Chicken3gg
 Replying to @tg_bomze
 🙄🙄🙄

Original		Result	

6:36 PM · Jun 20, 2020

1.8K 35 Copy link to Tweet

[Tweet your reply](#)

Yann LeCun @ylecun · Jun 21, 2020

ML systems are biased when data is biased.
 This face upsampling system makes everyone look white because the network was pretrained on FlickrFaceHQ, which mainly contains white people pics.
 Train the "exact" same system on a dataset from Senegal, and everyone will look African.

Brad Wyble @bradpwyble
 This image speaks volumes about the dangers of bias in AI
[twitter.com/Chicken3gg/sta...](https://twitter.com/Chicken3gg/status/1268111111111111111)

Timnit Gebru @timnitGebru

Yann, I suggest you watch me and Emily's tutorial or a number of scholars who are experts in this are. You can't just reduce harms to dataset bias. For once listen to us people from marginalized communities and what we tell you. If not now during worldwide protests not sure when.

10:57 PM · Jun 21, 2020

750 14 Copy link to Tweet

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WILL THE REVOLUTION BE SUPERVISED ?

La nature non "human-readable" de l'IA contemporaine renforce les problèmes de biais liés aux données et au design des algorithmes.

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L'ÉTRANGE
ANTHROPOMORPHISME
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LE RETOUR DE LA
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Elish, Madeleine Clare and boyd, danah,
« Situating Methods in the Magic of Big
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Communication Monographs, 2017.
<https://ssrn.com/abstract=3040201>

L'ÉTRANGE ANTHROPOMORPHISME DE L'IA



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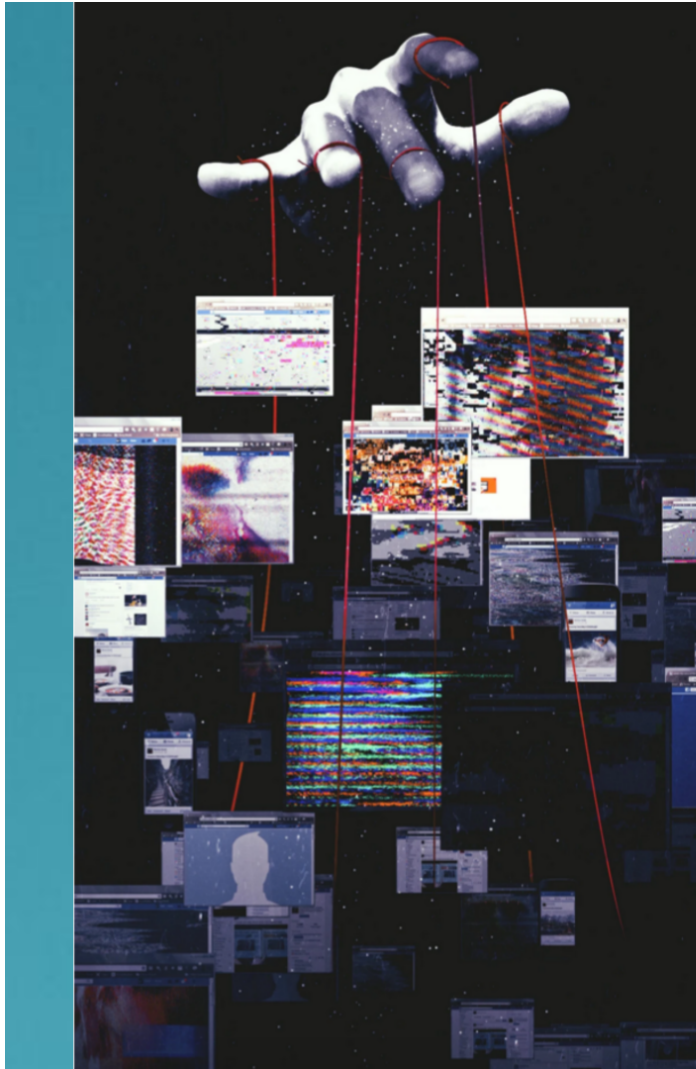
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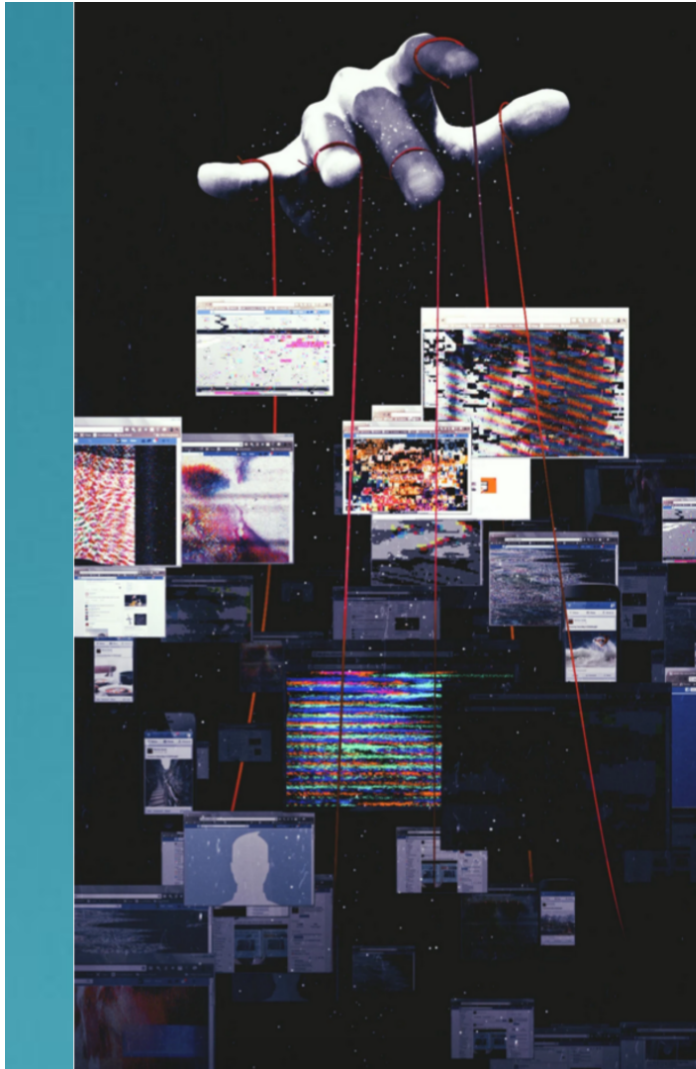
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LE RETOUR DE LA MANIPULATION ?

Le cas Cambridge Analytica offre un bon exemple de perception de l'IA comme outil efficace de manipulation des masses. Voir par exemple Berit Anderson qui décrit CA comme « Weaponized AI Propaganda Machine ». A droite l'illustration de l'article d'opinion de McKenzie Funk sur CA dans le NYT du 19 novembre 2016 intitulé « Cambridge Analytica and the Secret Agenda of a Facebook Quiz ». Voir aussi le documentaire The Great Hack.



LE RETOUR DE LA MANIPULATION ?

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Experimental evidence of massive-scale emotional contagion through social networks

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Emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. Emotional contagion is well established in laboratory experiments, with people transferring positive and negative emotions to others. Data from a large real-world social network, collected over a 20-y period suggests that longer-lasting moods (e.g., depression, happiness) can be transferred through networks [Fowler JH, Christakis NA (2008) *BMJ* 337:a2338], although the results are controversial. In an experiment with people who use Facebook, we test whether emotional contagion occurs outside of in-person interaction between individuals by reducing the amount of emotional content in the News Feed. When positive expressions were reduced, people produced fewer positive posts and more negative posts; when negative expressions were reduced, the opposite pattern occurred. These results indicate that emotions expressed by others on Facebook influence our own emotions, constituting experimental evidence for massive-scale contagion via social networks. This work also suggests that, in contrast to prevailing assumptions, in-person interaction and nonverbal cues are not strictly necessary for emotional contagion, and that the observation of others' positive experiences constitutes a positive experience for people.

computer-mediated communication | social media | big data

Emotional states can be transferred to others via emotional contagion, leading them to experience the same emotions as those around them. Emotional contagion is well established in laboratory experiments (1), in which people transfer positive and negative moods and emotions to others. Similarly, data from a large, real-world social network collected over a 20-y period suggests that longer-lasting moods (e.g., depression, happiness) can be transferred through networks as well (2, 3).

The interpretation of this network effect as contagion of mood has come under scrutiny due to the study's correlational nature, including concerns over misspecification of contextual variables or failure to account for shared experiences (4, 5), raising important questions regarding contagion processes in networks. An experimental approach can address this scrutiny directly; however, methods used in controlled experiments have been criticized for examining emotions after social interactions. Interacting with a happy person is pleasant (and an unhappy person, unpleasant). As such, contagion may result from experiencing an interaction rather than exposure to a partner's emotion. Prior studies have also failed to address whether nonverbal cues are necessary for contagion to occur, or if verbal cues alone suffice. Evidence that positive and negative moods are correlated in networks (2, 3) suggests that this is possible, but the causal question of whether contagion processes occur for emotions in massive social networks remains elusive in the absence of experimental evidence. Further, others have suggested that in online social networks, exposure to the happiness of others may actually be depressing to us, producing an "alone together" social comparison effect (6).

Three studies have laid the groundwork for testing these processes via Facebook, the largest online social network. This research

demonstrated that (i) emotional contagion occurs via text-based computer-mediated communication (7); (ii) contagion of psychological and physiological qualities has been suggested based on correlational data for social networks generally (7, 8); and (iii) people's emotional expressions on Facebook predict friends' emotional expressions, even days later (7) (although some shared experiences may in fact last several days). To date, however, there is no experimental evidence that emotions or moods are contagious in the absence of direct interaction between experimenter and target.

On Facebook, people frequently express emotions, which are later seen by their friends via Facebook's "News Feed" product (8). Because people's friends frequently produce much more content than one person can view, the News Feed filters posts, stories, and activities undertaken by friends. News Feed is the primary manner by which people see content that friends share. Which content is shown or omitted in the News Feed is determined via a ranking algorithm that Facebook continually develops and tests in the interest of showing viewers the content they will find most relevant and engaging. One such test is reported in this study: A test of whether posts with emotional content are more engaging.

The experiment manipulated the extent to which people ($N = 689,003$) were exposed to emotional expressions in their News Feed. This tested whether exposure to emotions led people to change their own posting behaviors, in particular whether exposure to emotional content led people to post content that was consistent with the exposure—thereby testing whether exposure to verbal affective expressions leads to similar verbal expressions, a form of emotional contagion. People who viewed Facebook in English were qualified for selection into the experiment. Two parallel experiments were conducted for positive and negative emotion: One in which exposure to friends' positive emotional content in their News Feed was reduced, and one in which exposure to negative emotional content in their News Feed was reduced. In these conditions, when a person loaded their News Feed, posts that contained emotional content of the relevant emotional valence, each emotional post had between a 10% and

Significance

We show, via a massive ($N = 689,003$) experiment on Facebook, that emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. We provide experimental evidence that emotional contagion occurs without direct interaction between people (exposure to a friend expressing an emotion is sufficient), and in the complete absence of nonverbal cues.

Author contributions: A.D.I.K., J.E.G., and J.T.H. designed research; A.D.I.K. performed research; A.D.I.K. analyzed data; and A.D.I.K., J.E.G., and J.T.H. wrote the paper.

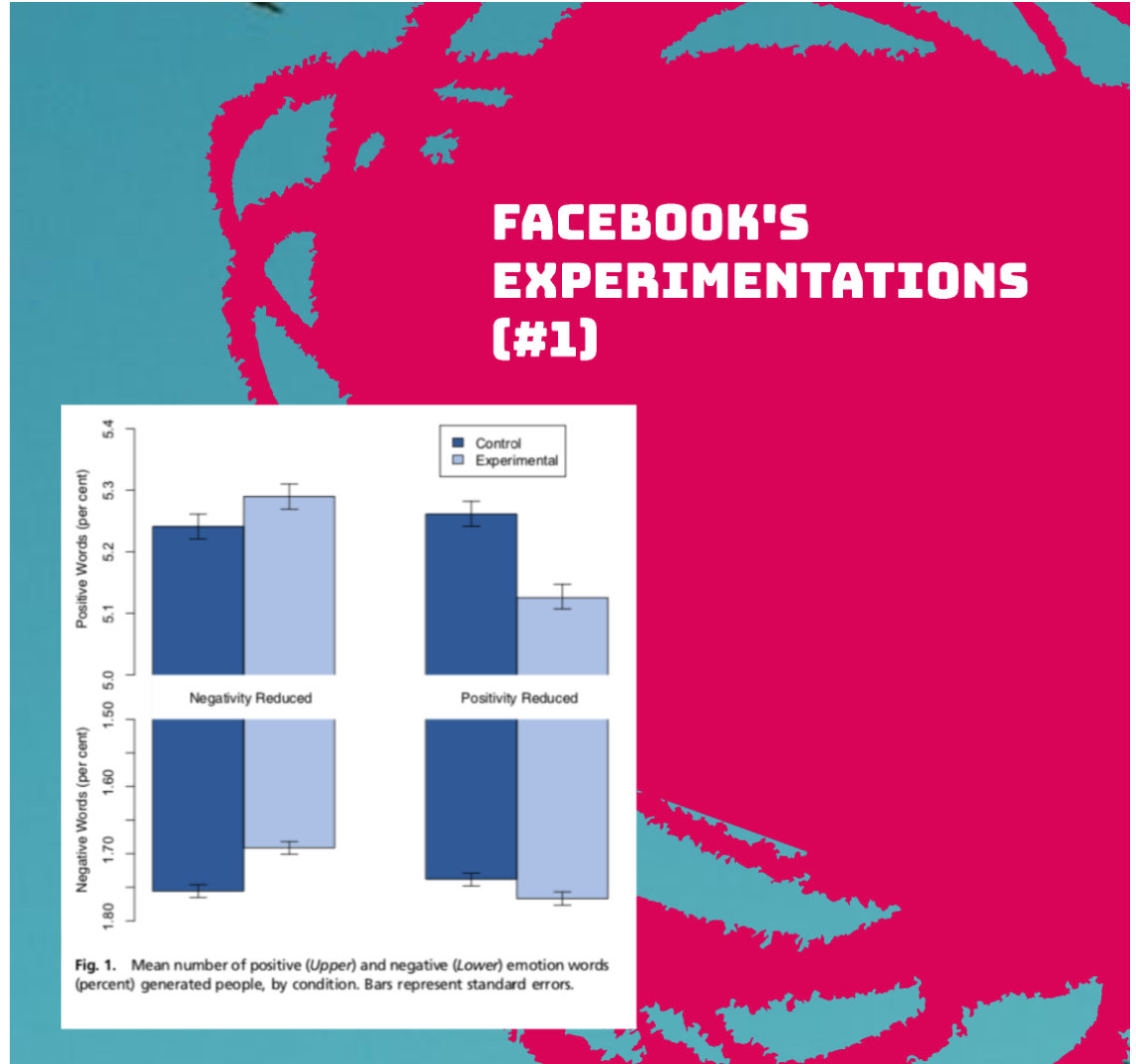
The authors declare no conflict of interest.

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A 61-million-person experiment in social influence and political mobilization

Robert M. Bond¹, Christopher J. Fariss¹, Jason J. Jones², Adam D. I. Kramer³, Cameron Marlow³, Jaime E. Settle¹ & James H. Fowler^{1,4}

Human behaviour is thought to spread through face-to-face social networks, but it is difficult to identify social influence effects in observational studies^{1,2}, and it is unknown whether online social networks operate in the same way³⁻¹⁹. Here we report results from a randomized controlled trial of political mobilization messages delivered to 61 million Facebook users during the 2010 US congressional elections. The results show that the messages directly influenced political self-expression, information seeking and real-world voting behaviour of millions of people. Furthermore, the messages not only influenced the users who received them but also the users' friends, and friends of friends. The effect of social transmission on real-world voting was greater than the direct effect of the messages themselves, and nearly all the transmission occurred between 'close friends' who were more likely to have a face-to-face relationship. These results suggest that strong ties are instrumental for spreading both online and real-world behaviour in human social networks.

Recent experimental studies⁴⁻¹⁴ have attempted to measure the causal effect of social influence online. At the same time, there is increasing interest in the ability to use online social networks to study and influence real-world behaviour¹⁵⁻¹⁹. However, online social networks are also made up of many 'weak-tie' relationships²⁰ that may not facilitate social influence²¹, and some studies suggest that online communication may not be an effective medium for influence²². An open question is whether online networks, which harness social information from face-to-face networks, can be used effectively to increase the likelihood of behaviour change and social contagion.

One behaviour that has been proposed to spread through networks is the act of voting in national elections. Voter turnout is significantly correlated among friends, family members and co-workers in observational studies^{23,24}. Voter mobilization efforts are effective at increasing turnout²⁵, particularly those conducted face-to-face and those that appeal to social pressure²⁶ and social identity²⁷. There is also evidence from one face-to-face field experiment that voting is 'contagious', in the sense that mobilization can spread from person to person within two-person households²⁸. Although anecdotal accounts suggest that online mobilization has made a big difference in recent elections²⁹, a meta-analysis of email experiments suggests that online appeals to vote are ineffective⁴.

Voter mobilization experiments²⁶⁻²⁸ have shown that most methods of contacting potential voters have small effects (if any) on turnout rates, ranging from 1% to 10%. However, the ability to reach large populations online means that even small effects could yield behaviour changes for millions of people. Furthermore, as many elections are competitive, these changes could affect electoral outcomes. For example, in the 2000 US presidential election, George Bush beat Al Gore in Florida by 537 votes (less than 0.01% of votes cast in Florida). Had Gore won Florida, he would have won the election.

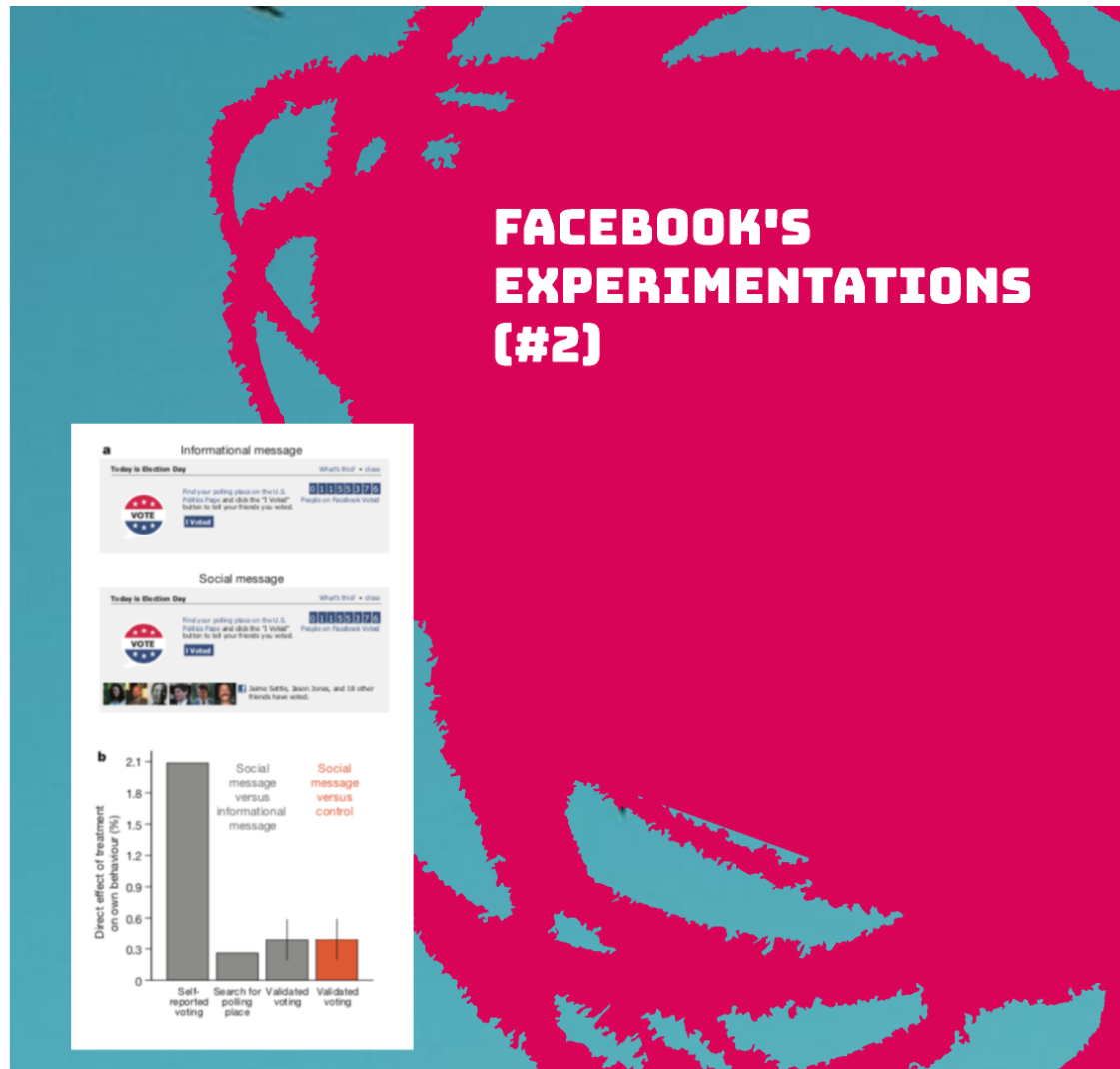
To test the hypothesis that political behaviour can spread through an online social network, we conducted a randomized controlled trial

with all users of at least 18 years of age in the United States who accessed the Facebook website on 2 November 2010, the day of the US congressional elections. Users were randomly assigned to a 'social message' group, an 'informational message' group or a control group. The social message group ($n = 60,055,176$) was shown a statement at the top of their 'News Feed'. This message encouraged the user to vote, provided a link to find local polling places, showed a clickable button reading 'I Voted', showed a counter indicating how many other Facebook users had previously reported voting, and displayed up to six small randomly selected 'profile pictures' of the user's Facebook friends who had already clicked the 'I Voted' button (Fig. 1). The informational message group ($n = 61,044$) was shown the message, poll information, counter and button, but they were not shown any faces of friends. The control group ($n = 613,096$) did not receive any message at the top of their News Feed.

The design of the experiment allowed us to assess the impact that the treatments had on three user actions: clicking the 'I Voted' button, clicking the polling-place link and voting in the election. Clicking the 'I Voted' button is similar to traditional measures of self-reported voting, but here users reported their vote to their social community rather than to a researcher. We therefore use this action to measure political self-expression, as it is likely to be affected by the extent to which a user desires to be seen as a voter by others. In contrast, social desirability should not affect other user actions in the same way. Clicking the polling-place link took users to a separate website that helped them to find a polling location, and this action was not reported to the user's social community. We therefore use this action to measure a user's desire to seek information about the election. Finally, we used a group-level decision to study the validated voting behaviour of 6.3 million users matched to publicly available voter records (see Supplementary Information).

We first analyse direct effects. We cannot compare the treatment groups with the control group to assess the effect of the treatment on self-expression and information seeking, because the control group did not have the option to click an 'I Voted' button or click on a polling-place link. However, we can compare the proportion of users between the two treatment groups to estimate the causal effect of seeing the faces of friends who have identified themselves as voters (Fig. 1). Users who received the social message were 2.08% (s.e.m., 0.05%; t -test, $P < 0.01$) more likely to click on the 'I Voted' button than those who received the informational message (20.04% in the social message group versus 17.96% in the informational message group). Users who received the social message were also 0.26% (s.e.m., 0.02%; $P < 0.01$) more likely to click the polling-place information link than users who received the informational message (Fig. 1).

Although acts of political self-expression and information seeking are important in their own right, they do not necessarily guarantee that a particular user will actually vote. As such, we also measured the effect that the experimental treatment had on validated voting, through examination of public voting records. The results show that users



¹Political Science Department, University of California, San Diego, La Jolla, California 92093, USA. ²Psychology Department, University of California, San Diego, La Jolla, California 92093, USA. ³Data Science, Facebook, Inc., Menlo Park, California 94025, USA. ⁴Medical Genetics Division, University of California, San Diego, La Jolla, California 92093, USA.

« On the other hand, as we will argue further below, contemporary discourses around AI rely on the potentials of such technologies as much, if not more, than current functionalities. Popular media coverage often, albeit inadvertently, reinforces a blurring of the line between fantasy and reality. For instance, news coverage of the deployment of predictive policing in American cities inevitably references the science fiction thriller, *Minority Report* (Koepke, 2016). A particular example illustrates the point : a CBS Sunday Morning (2015) news segment covering the DARPA robotics challenge showcase was reported on and discussed through an interview with the director of the science fiction film, *Ex Machina*, which featured a sentient robot (CBS, 2015). That is, the morning news show used the director of a popular science fiction movie as the main commentator for the culmination of the most prestigious federally funded robotics challenge. Such a framing is only possible if there is an assumption that the science fictions of AI are relevant to the actual functioning of AI. If the topic was medicine, would such a segment have been produced ? Would it be appropriate to have an actor who plays a doctor on television be the main commentator on the latest medical advances ? »

L'ÉTRANGE
ANTHROPOMORPHISME
DE L'IA

LE RETOUR DE LA
MANIPULATION ?

TROUBLE ET PROBLÈME

Elish, Madeleine Clare and boyd, danah,
« Situating Methods in the Magic of Big
Data and Artificial Intelligence »
Communication Monographs, 2017.
<https://ssrn.com/abstract=3040201>



INTRODUCTION

Pourquoi la société algorithmique est à la fois omniprésente et invisible ?

2.
LA TECH ET
L'ÉGALITÉ

1.
UNE SOCIÉTÉ
ALGORITHMIQUE ?

3.
DES TECHNIQUES
D'INVISIBILITÉ ?

4.
TROUBLE ET
PROBLÈME

1.
PRÉSENTATION

1.
PRÉSENTATION

3.
OUVRONS LA
BOÎTE NOIRE

2.
UN PEU DE
SOCIOLOGIE

4.
À VOUS DE
JOUER

Gilles Bastin

IA, ALGORITHMES ET INÉGALITÉS

Ensimag, 5 avril 2022



UN PEU DE SOCIOLOGIE

Nous devons discuter un peu plus la notion d'égalité pour avancer dans la discussion...



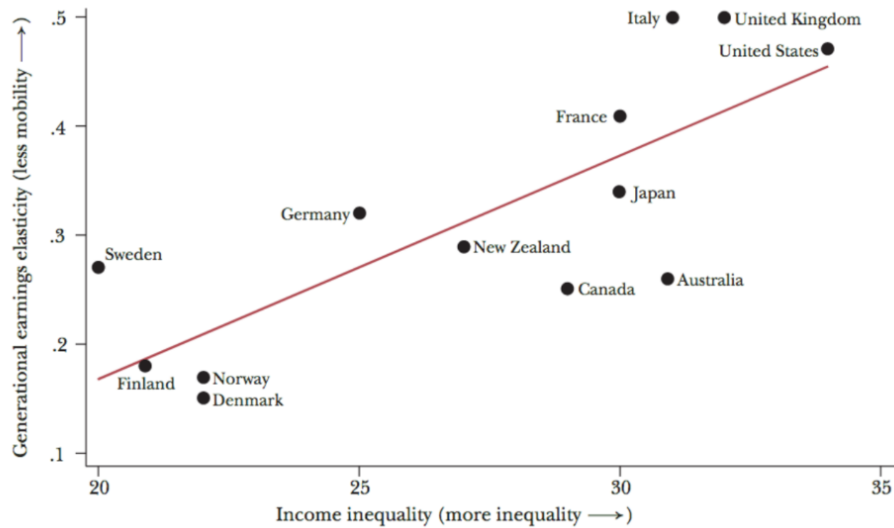
**POURQUOI PRÉFÉRER
L'ÉGALITÉ ?**

**L'INÉGALITÉ
DIMINUE LA
PERFORMANCE
SCOLAIRE**

**L'INÉGALITÉ
SE PERPÉTUE**

Figure 1

The Great Gatsby Curve: More Inequality is Associated with Less Mobility across the Generations



INÉGALITÉ ET (IM)MOBILITÉ

Miles Corak, « Income Inequality, Equality of Opportunity, and Intergenerational Mobility », *Journal of Economic Perspectives*—Volume 27, Number 3—Summer 2013
<https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.27.3.79>



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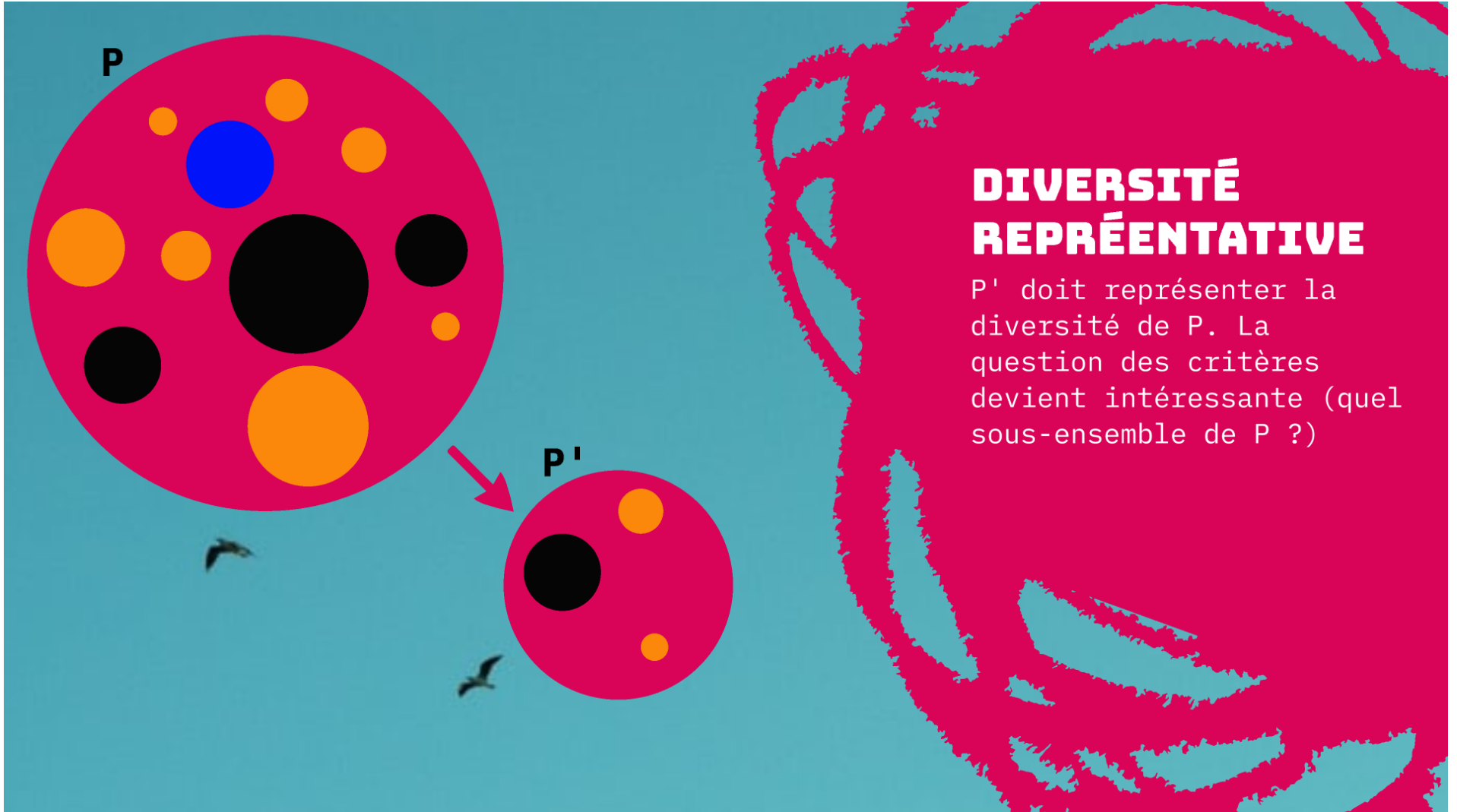
MAX DIVERSITÉ DANS P'

On peut chercher à maximiser l'entropie de P'. C'est la conception égalitaire de la diversité. Celle-ci est considérée comme bonne en soi car elle permet une variété de points de vue maximale



QU'EST-CE QUE L'ÉGALITÉ ?

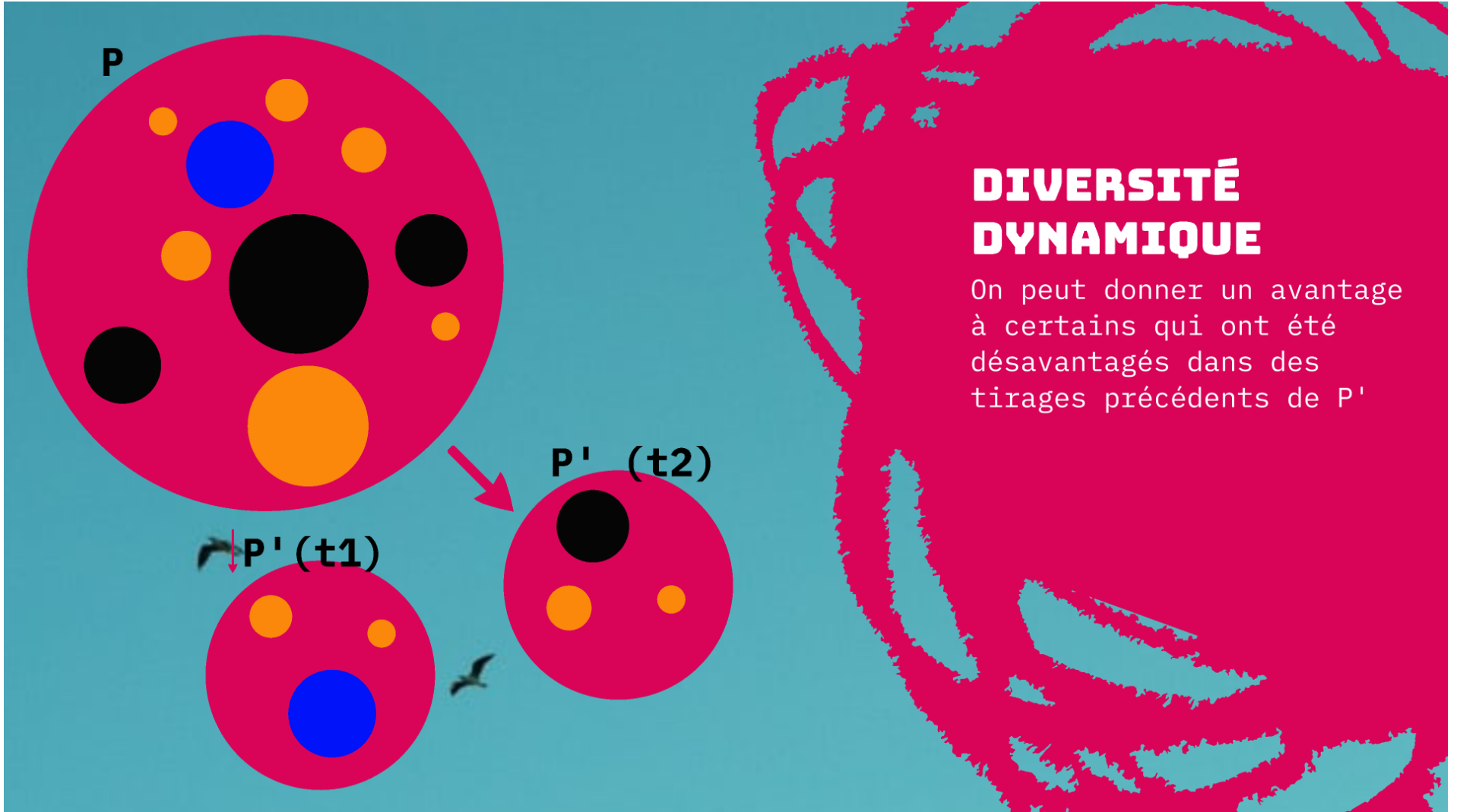
Un problème de discrimination et de diversité



DIVERSITÉ REPRÉSENTATIVE

P' doit représenter la diversité de P . La question des critères devient intéressante (quel sous-ensemble de P ?)









UN PEU DE SOCIOLOGIE

Nous devons discuter un peu plus la notion d'égalité pour avancer dans la discussion...

1.
PRÉSENTATION

1.
PRÉSENTATION

3.
OUVRONS LA
BOÎTE NOIRE

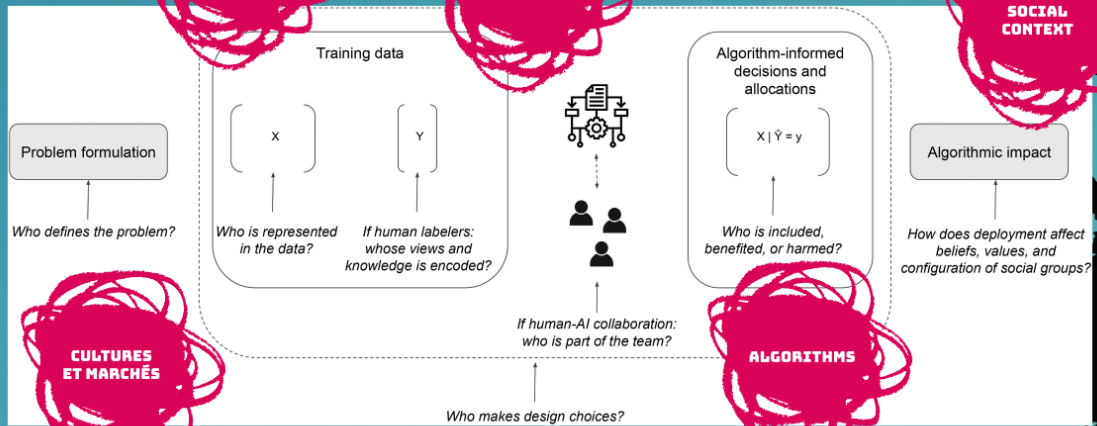
2.
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SOCIOLOGIE

4.
À VOUS DE
JOUER

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IA, ALGORITHMES ET INÉGALITÉS

Ensimag, 5 avril 2022



OUVRONS LA BOÎTE NOIRE

D'où vient l'inégalité dans l'IA ? Pour le savoir il faut ouvrir la boîte noire algorithmique...

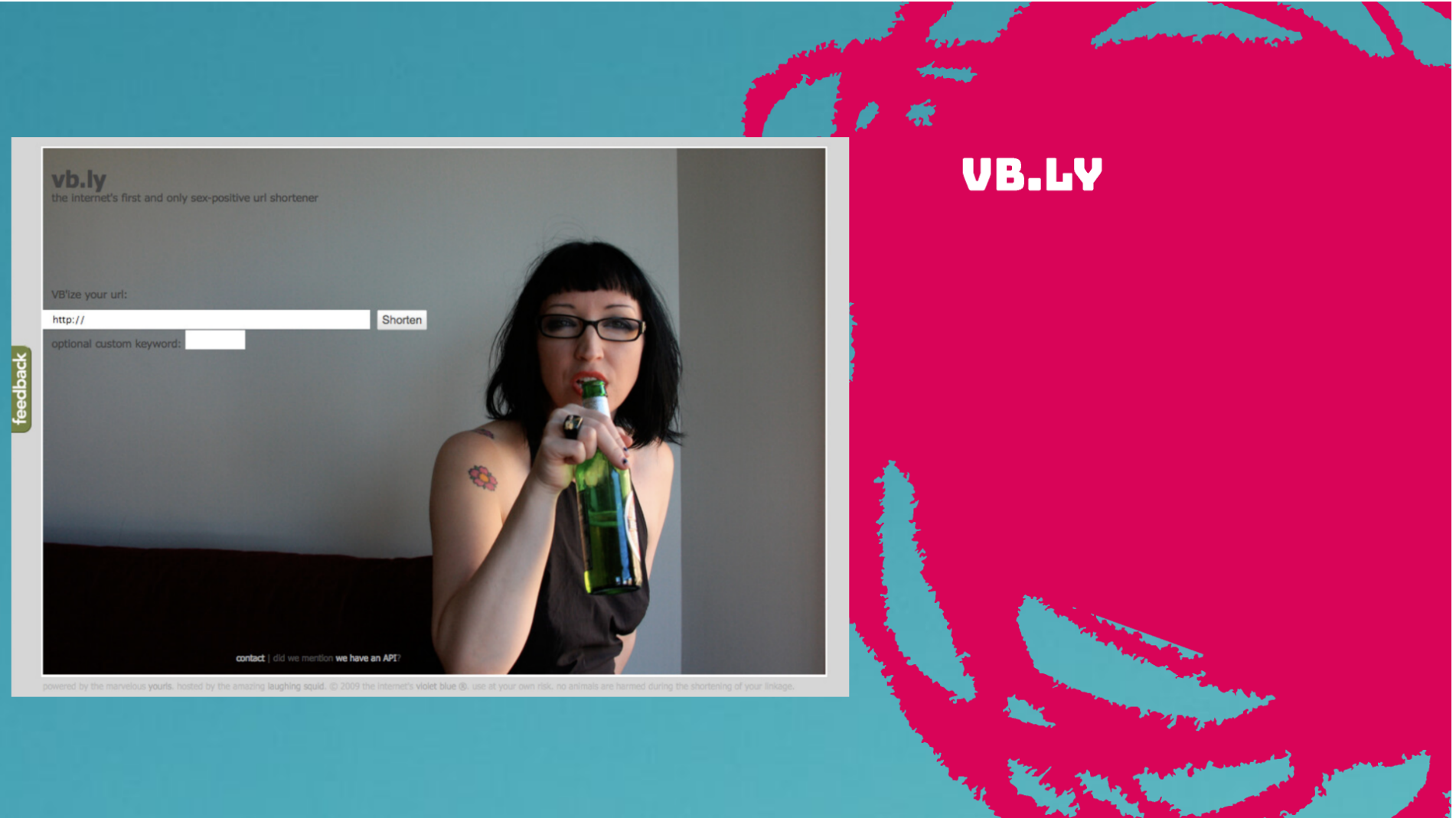


CULTURES & MARCHÉS

CULTURE ET
MARCHÉS
SONT
PARTOUT

TECH-BRO
CULTURE ?

PLATEFO
RMES



vb.ly

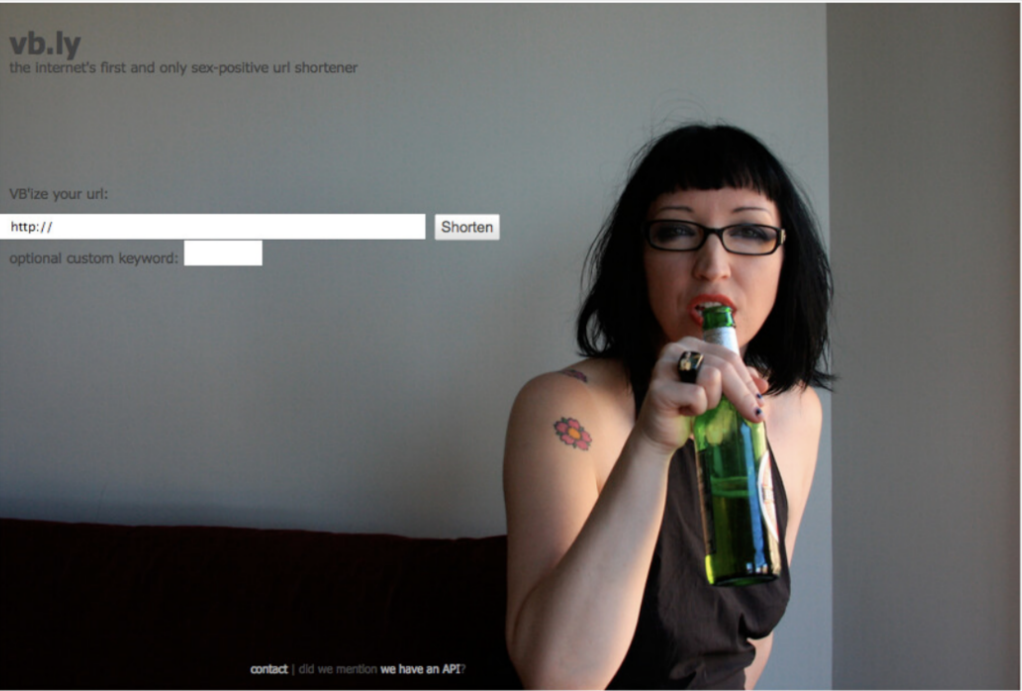
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feedback



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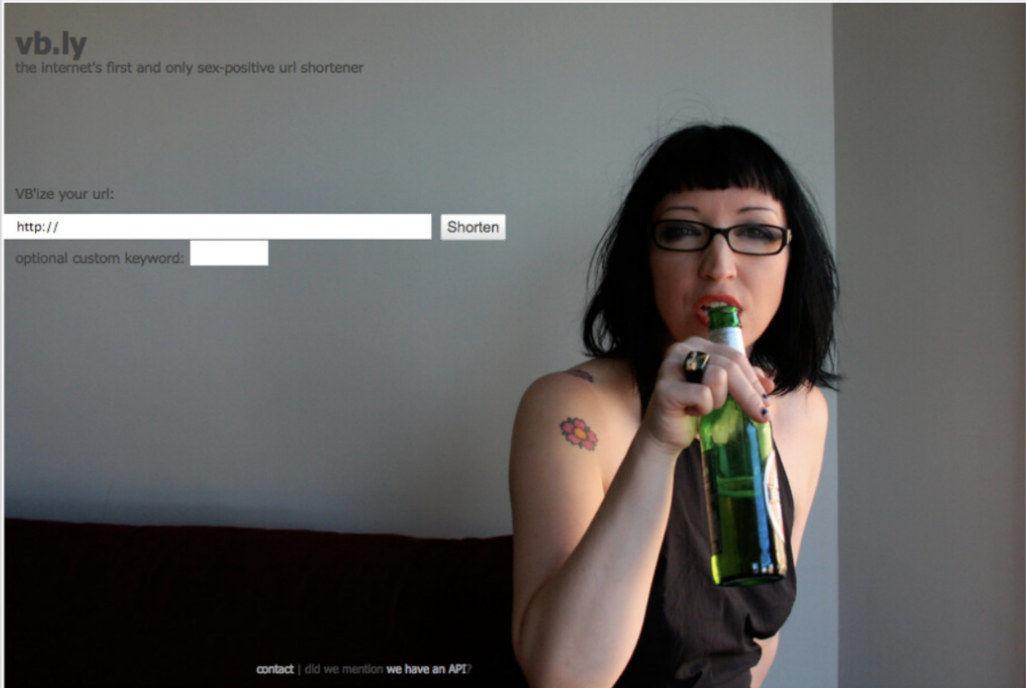
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VB.LY

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scIt ..was here

Type the two words: