

# AI, algorithm and economics of privacy

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# Artificial intelligence and algorithm bias

- ▶ AI is a **general purpose technologies** like internet, steam engine.... It can be used in different domains and sectors.
- ▶ **Artificial intelligence** is matching or surpassing human performance (Brynjolfsson et al.2018)
- ▶ Application in economics literature in different sectors...

Two main applications in economics

- ▶ Use machine learning for **predictive purpose** (big data, improve the decision of individuals)
- ▶ Study **outcomes of algorithm decision** (discrimination, collusion, performance..)

▶ **Advertising**

- ▶ Machine learning can improve ad distribution as it can help identify potential new consumers (Stitelman et al., 2011)

▶ **Justice**

- ▶ A calibrated algorithm in the context of legal court decisions can help reducing criminality of about 24.8% with fairer decisions toward afro-americans and hispanics (Kleinberg et al., 2017)

▶ **Health**

- ▶ Use trained algorithm to predict the Restaurant Hygiene inspections reduced inspectors bias (Glaeser et al., 2018)

▶ **International trade**

- ▶ Machine translation system has already had a significant effect on international trade on this platform, increasing export quantity. (Brynjolfsson et al., 2018)

▶ **Housing market**

- ▶ Performance of Different Algorithms in Predicting House Values (Mullainathan and Spiess, 2017)

## Algorithm bias

Algorithm of Internet platform can improve their competitiveness however if they are not properly "calibrated" provide apparent discriminatory outcomes:

- ▶ Performing Google Search, Sweeney (2013) shows that black-sounding names receive more displays of an ad about criminal record compared to white-sounding names. Datta et al. (2014) confirm gender bias.
- ▶ Lambrecht et Tucker (2018) show gender discrimination in STEM jobs ad explained by eyeballs and spillovers.
- ▶ My contribution to this literature ....

# Economics of Privacy and Health

→ Disclose personal information can drastically change how individuals are categorized by the algorithm and the type of information they may have access to.

- ▶ Individuals disclose personal data in order to get better services: **immediate gratification** (Acquisti et al., 2016)
- ▶ Unintended spillovers generated by data exploitation, with potential negative effects on short- and long-term (Tucker, 2017)
- ▶ Information asymmetry and externalities of users' data disclosure is exacerbated by AI (Jin, 2018)

## Privacy and health

- ▶ Privacy restrictions slowed the diffusion of electronic medical records (Miller and Tucker, 2009)
- ▶ While state regulation (In USA) reduces the adoption of EMR, 10% increases in basic EMRs adoption can reduce neonatal mortality rates by 16 deaths per 100,000 live births.

## Health and Internet

- ▶ False information related to health on internet, example false news stories surround the safety of vaccinations. Facebook algorithms policy permits to reduce the diffusion of these false information (Tucker and Chiou, 2018 NBER)

## Health and IA

- ▶ "Robotic surgery and machine learning-based diagnosis may shift liability from health care providers to device manufacturers" (Agrawal et al. 2018)

## Research question:

- How can privacy impact the reduction of the use of IA technologies especially in Europe compared to other countries?
- Which is the role of algorithm (false or true) in the diffusion of information related health?
- How does recommendation algorithm aiming to children and teens work..?

# Anti-vax advertising posts on Facebook

Figure 1: Screenshot of Advertising of Fake News on Facebook

**STOP** Mandatory Vaccination  
Sponsored · 🌐 Like Page

AUSTRALIAN PARENTS: If you are on the fence about vaccination, watch Vaccines Revealed, a FREE 9-part miniseries featuring 24 vaccine experts that explains why vaccines are neither safe, nor effective, CLICK HERE TO WATCH >>> <http://bit.ly/2o0b5Cp>



**Vaccines Revealed**  
Click for the Free Weekend Replay viewing of the 9-part docu-series "Vaccines Revealed".  
[VACCINESREVEALED.COM](http://VACCINESREVEALED.COM) Learn More

455 Reactions 21 Comments 322 Shares

*Note: Source is [gofundme.com](http://gofundme.com).*

Figure 1: Exemple of anti-vax advertising

# STEM and teens: An algorithm bias on social media

Cecere G., Jean C., Le Guel F., and Manant M.

- ▶ **Q1:** Are online algorithms discriminatory against girls?  
**Q2:** If so, can we prompt them?
  
- ▶ **Methodology:** a field experiment on a social media
  - ▶ ad campaigns for a school in computer science, targeting French high schools, and teens aged 16-19
  - ▶ **2 groups of high-schools:** neutral ads vs. 'girl-content' message ads
  
- ▶ **Results: Fewer ads displayed to girls...**
  - ▶ ... despite 18-19 girls were more interested by ads (they clicked more on it) a difference **not attributable to a difference in cost**
  - ▶ ... even more for 'girl-content' message ad (crowding out effect)
  - ▶ ... girls in high schools with a higher proportion of **low income households**

# Distribution of Impressions and Reach cost by gender and age group across the treatment and control groups

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# Distribution of Impressions and Reach cost by gender and age group across the treatment and control groups

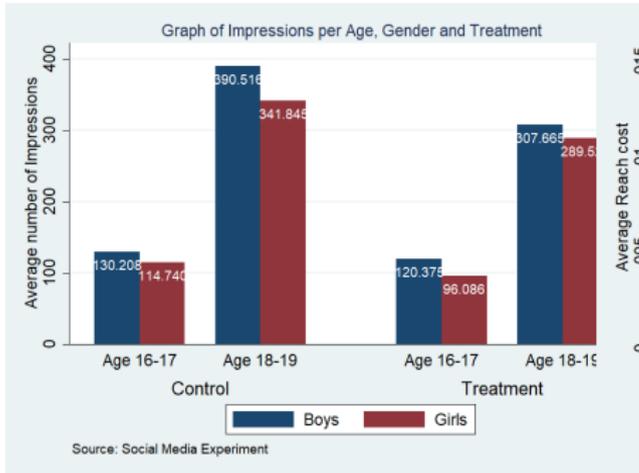


Figure 4: Distribution of Impressions

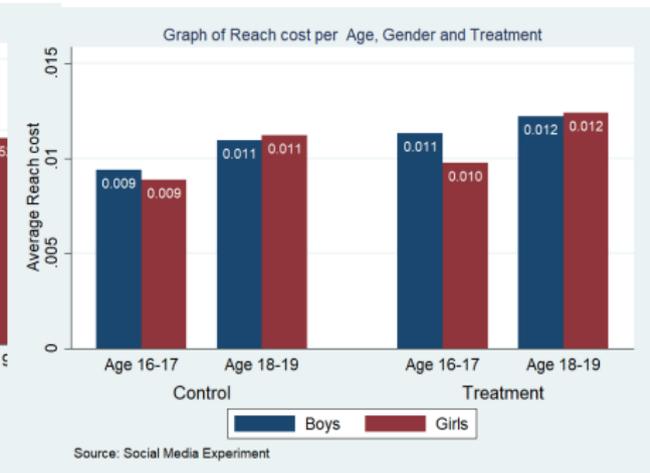


Figure 5: Distribution of Reach costs