

Social Data Science

Privacy, law and Ethics in Big Data

Production and Use

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Why privacy?

- Privacy for its own good – a principle of privacy
- Privacy to preserve informational rents
 - Consumers, firms
- Privacy and politics

Why privacy?

- Privacy for its own good – a principle of privacy
 - May simply value privacy in itself
 - But: public goods problems
 - Example: medical research. Share existing info on medical history, no cost to individuals. Some will not contribute, citing privacy concerns – but benefits of research accrue to everybody
 - DK: no consent necessary for register studies or re-use of data
 - Similar: Privacy for social science research, or monitoring in public places
- For the weekend: visit <https://teol.ku.dk/privacy/>
Center for Privacy Studies, on how the concept originally evolved

Why privacy?

- Privacy to preserve informational rents
 - Consumers: willingness to pay (WTP), characteristics, and behavior often private information
 - Willingness to pay: 1st class vs. 2nd class
 - Characteristics: Taste, Genetics, Personality
 - Behavior: e.g. driving and insurance, [physical activity](#)
 - Value of time / search costs
 - Example: [Internet steering](#)
 - Firms: Intellectual Property Rights, strategy
 - Industrial espionage major problem
 - LinkedIn-story; Firms where data is only asset

Why privacy?

- Privacy and politics
 - Authorities may not register party identification
 - Originally for freedom of political expression but also: majority in city council could pay out cash assistance / kontanthjælp based on, say, union membership
 - These days: Privacy as a political platform

Legal framework guiding personal data

- Before 2018:
Persondataloven
- After 2018: GDPR +
”Lov om supplerende
bestemmelser til
forordning om
beskyttelse af fysiske
personer i forbindelse
med behandling af
personoplysninger og om
fri udveksling af sådanne
oplysninger
(databeskyttelsesloven)”

From 2018: Danish law under EU data protection directive (GDPR)

- Link: <https://gdpr-info.eu>
- "The objective of this new set of rules is to give citizens back control over of their personal data, and to simplify the regulatory environment for business."
- **Individual consent** plays a much larger role (but special rules for DK)
- Some types of personal data are considered sensitive (health, political views, social problems)

GDPR

- Very different rules for
 - Research
 - Public administration
 - Private firms / organizations
- Potentially large penalties for non-compliance or misuse
- New job: DPO – Data Protection Officer
- Fair to say that interpretations of GDPR is work-in-progress, everywhere

Research and business don't mix

- What can we know from Facebook-likes? Quite a lot
- ["Private traits and attributes are predictable from digital records of human behavior"](#) Kosinski et al. PNAS 2013.
- 58,000 volunteers gave access to Facebook-likes, demographic info + took psychometric test
- Results: Facebook-likes -> stat learning model that correctly predicts
 - Sexual orientation 88%
 - Afri-Am vs Causcasian 95%
 - Dem vs. Rep 85 %
- As good as personality test for traits & FB uses this
- Implications for privacy and online behavior?
- When is a probability personal data?
- What if these data were passed on to private companies and political parties? (Cambridge Analytica, The Great Hack on Netflix)

- § 10. Oplysninger som nævnt i databeskyttelsesforordningens artikel 9, stk. 1, og artikel 10 må behandles, hvis dette alene sker med henblik på at udføre statistiske eller videnskabelige undersøgelser af væsentlig samfundsmæssig betydning, og hvis behandlingen er nødvendig af hensyn til udførelsen af undersøgelserne.

- Stk. 2. De oplysninger, der er omfattet af stk. 1, må ikke senere behandles i andet end videnskabeligt eller statistisk øjemed. Det samme gælder behandling af andre oplysninger, som alene foretages i statistisk eller videnskabeligt øjemed efter databeskyttelsesforordningens artikel 6.

Special for DK, also under GDPR:

Can re-use data collected for other purposes for research or stats

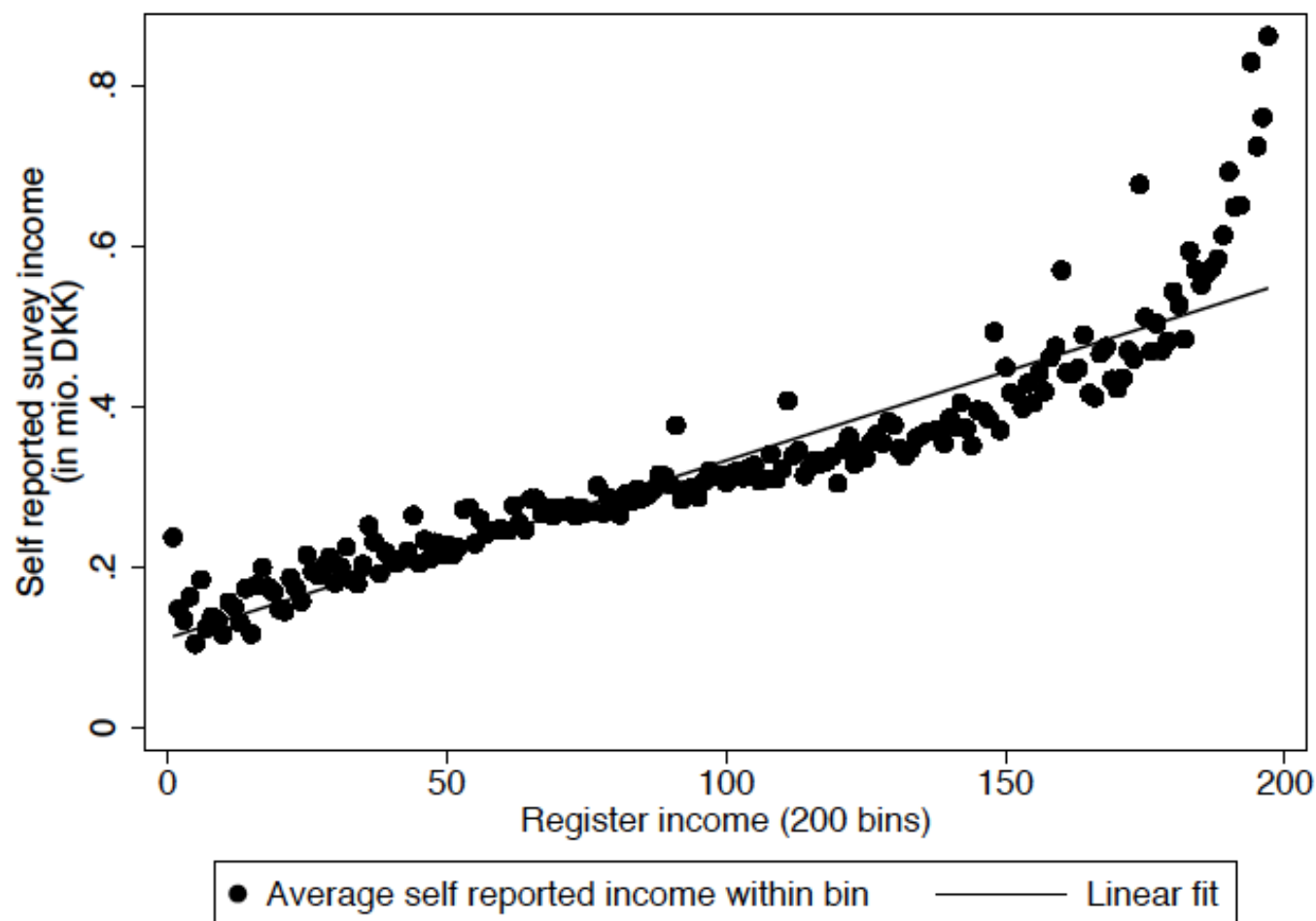
- (50) Behandling af personoplysninger til andre formål end de formål, som personoplysningerne oprindeligt blev indsamlet til, bør kun tillades, hvis behandlingen er forenelig med de formål, som personoplysningerne oprindeligt blev indsamlet til. I dette tilfælde kræves der ikke andet retsgrundlag end det, der begrundede indsamlingen af personoplysningerne.
- Hvis behandling er nødvendig for at udføre en opgave i samfundets interesse eller henhører under offentlig myndighedsudøvelse, som den dataansvarlige har fået pålagt, kan EU-retten eller medlemsstaternes nationale ret fastsætte og præcisere de opgaver og formål, hvortil det bør være foreneligt og lovligt at foretage viderebehandling. Viderebehandling til arkivformål i samfundets interesse, til videnskabelige eller historiske forskningsformål eller til statistiske formål bør anses for at være forenelige lovlige behandlingsaktiviteter.

Individual data and privacy

- Statistics Denmark: Data users cannot present data at the individual level
- Examples that are no-go
 - Max of the income distribution
 - Median of income distribution
 - Max income in parish
- Things are different if you can anonymize data (e.g. a man in his 20s in Copenhagen)
- But! Well-known examples of re-identification from public data
 - Often in combination with auxiliary data
 - An [overview](#)
 - An [example based on credit card data](#)

Trade-offs

- Sometimes: Sacrifice accuracy for privacy
- In some cases: no trade-off in analysis, only in presentation



Notes. The horizontal axis shows register based income in 200 equal-sized bins ranked from lowest income to highest income. The first bin is defined as the $N/200=25$ lowest ranked individuals and the figure plots the average register income for this group against their average survey reported income – and continues to do so for the 199 other income bins. The vertical axis has been censored at self reported survey income above 1 mio. DKK. Figure A.1 in the online appendix shows the full sample.

Trade-offs

- Sometimes: Sacrifice accuracy for privacy
- In some cases: no trade-off in analysis, only in presentation
- Sometime: only have, say, interval data
- Danish firm data: Stat Denmark does not report figures for industries with very few firms
- New approaches: analysts don't see data, but can make calculations on it
 - May limit *fee* for data
- More general problem: how much info do we get from data under constraint of 'no (re)identifiability'?
Active research area in computer science

Economic analysis of privacy

- Heffetz and Ligett:
Principles for privacy
preserving data handling
 - a bit complicated in places
- Active research area
 - Combine with mechanism design
 - Economic theory
 - Combine computer science and economics
- See Acquisti et al. for more on this (if interested)
- Also: behavioral economics aspects + genuine uncertainty:
“Even ex post, only few of the consequences of privacy decisions are actually quantifiable; ex ante, fewer yet are.”
 - from Acquisti&Grossklags, 2007
“What Can Behavioral Economics Teach Us About Privacy?”

Social Fabric data



Phone locations 0500h Monday morning -> can predict where people at given time with 85% accuracy

Ethics of Big data

- Bit by Bit chapter 6
- Also:
 - "Web scraping: a journalist's guide" + "on the ethics of web scraping and data journalism"
 - For journalists, but interesting for us as well
- Additional readings:
 - Neuhaus and Webmoor 2012: "Agile ethics for massified research and visualization"
 - Also (google): Zimmer (2010) "But the data is already public": on the ethics of research in Facebook.

What is Ethics?

- In practice, so far:
 - social science: Ethics as a set of constraints; mixture of law and "corporate social responsibility" / impression management
 - Data science: No ethics as absence of constraints; this is changing
- Compare: Medical science
Are invasive procedures proportional to expected benefit?
- Ethics:
- A *systematic* approach to moral judgments based on reason, analysis, synthesis and reflection
- Moral standards: Impartial, take precedence over self-interest, universal
- But not *one* set of standards
Are student or researcher ethics different from personal ethics?

Ethics of Big data

- Ethics in universities and research often governed by
 - Institutional Reviews Boards (IRBs)
 - Personal ethics or feelings of right and wrong
 - Professional norms and codes of conduct (e.g. Econ vs Psychology); "dual use" technology (research w military use)
- The law: (also) the institutional embodiment of ethics
- Denmark: Only formal ethics board for bio-medical research
 - Recently estbl. at Faculty of Social Sciences
- But what about firms?

Key goal of ethical considerations

- Reduce potential risk for participants in research
 - In medicine: benefits vs. harms
 - In social science: typically identifiability/privacy, but could also be stigma or long term consequences in field experiments
- Is informed consent enough?
 - Is consent informed if shrouded in 80 pages of legal click-thru?
 - If photographing people in public places is ok, is noting what they say on Facebook also ok?
 - Monopoly, mobility and informed consent

Is informed consent enough?

Is it too much?

- Is informed consent enough?
 - Is consent informed if shrouded in 80 pages of legal click-thru?
 - If photographing people in public places is ok, is noting what they say on Facebook also ok?
 - Monopoly, mobility and informed consent
- Before GDPR: Firms often limited in what they could collect by law; now: just ask for informed consent
- But: Informed consent and public goods problems. Easy to say no and not give consent, but what if everyone does this?

Challenges

- Is it unethical find correlation btw smoking and lung cancer, even if insurance companies use this to increase premiums for smokers?
 - What about correlation between genetic markers and, say, chronic diseases, increased mortality risk?
- ethics is not about preventing stuff from being done
 - but reasonable balance between costs and benefits (ex: hidden camera/mike : not ok for mundane things, but maybe ok if benefits are huge; random drug screening of employees may violate privacy, but ok if job involves public safety)

ethical considerations for big data


- What about business ethics?
 - Example: Google Location. Show where friends/family are in real time – but requires consent
 - Are predictive location algorithms ethical?
- Algorithms as “Weapons of Math Destruction”
 - Insurance based on where you live, your name/ethnicity
 - Entry into university based on prediction of completion?
 - Loan interest rates based on past behavior?
 - FAT ML: Fair, Accountable, and Transparent Machine Learning

Ethical/legal considerations for big data

- Is it ethical to scrape competitors' *likes* on Facebook?
Is it illegal?
 - ethics (and law) sometimes used as arguments to stifle competition. See [LinkedIn case](#), also [here](#) and [here](#)

LinkedIn Data Scraping Ruled Legal



Emma Woollacott Senior Contributor 
[Cybersecurity](#)

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Photocredit: Getty GETTY

A court has ruled that it's legal to scrape publicly available data from LinkedIn, despite the company's claims that this violates user privacy.

San Francisco-based start-up hiQ Labs harvests user profiles from LinkedIn and uses them to analyze workforce data, for example by predicting when employees are likely to leave their jobs, or where skills shortages may emerge.

After LinkedIn took steps to block hiQ from doing this, hiQ won an injunction two years ago forcing the Microsoft-owned company to remove the block. That injunction has now been upheld by the 9th US Circuit Court of Appeals in a 3-0 decision.

Ethical/legal considerations for big data

- Is it ethical to scrape competitors' *likes* on Facebook?
Is it illegal?
 - ethics (and law) sometimes used as arguments to stifle competition. See [LinkedIn case](#), also [here](#) and [here](#)
- Can you scrape data and resell? Or repackage?
- Does data collection cause significant costs (time or money) to firms and/or individuals?
- Typically more welcoming towards students, but be careful – and if in doubt, ask us!

Questions for proposed projects

- Do you respect privacy?
- Can single individuals be identified?
- What are potential consequences of (re)identification?
- What are terms and conditions for scraping and using data?
- Are there ethical considerations
 - With respect to individuals?
 - With respect to firms or organizations?