'Big data' og politologisk datavidenskab

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'Big data' er overalt. Det gælder i dobbelt forstand: takket være drastiske stigninger i computeres hukommelse og regnekraft indeholder næsten alle computere i dag store, ustrukturerede datamængder. Mange af disse data er biprodukter af menneskelig adfærd, som i dag registreres og kvantificeres i historisk uset omfang. Men big data er også overalt i den forstand at begrebet 'big data' og beslægtede begreber er blevet almindeligt kendte og bredt anvendte, og ikke mindst genstand for stor kommerciel interesse. En hyppigt citeret artikel fra *Harvard Business Review* kaldte således "data scientist" for "det 21. århundredes mest sexede job" (Davenport and Patil, 2012).

Alene den begrebslige udbredelse af big data gør det relevant at vide hvad det nærmere dækker over. Men big data er også reelt et væsentligt nybrud i forhold til de data og metoder, politologi og samfundsvidenskab traditionelt har betjent sig af. Big data muliggør analyser af politologiske emner som ville have været umulige med traditionelle metoder, men kræver også nye teknikker og metodiske værktøjer.

Formålet med dette kapitel er at introducere til de datatyper og metoder, begrebet big data dækker over. Først opridser vi begrebets betydning og historie. Dernæst diskuterer vi hvordan en række karakteristika ved big data skaber særlige udfordringer i forhold til at udvikle stærke forskningsdesigns. Herefter præsenterer vi en række specifikke tekniske værktøjer til behandling af big data. Afslutningsvis opridser vi nogle væsentlige etiske problematikker i relation til brugen af big data.

cites: Mullainathan and Spiess (2017), Varian (2014)

1   Hvad er big data?

I en toneangivende artikel peger Lazer et al. (2009) på big data som kilden til en ny type samfundsvidenskab, "computational social science", med "kapacitet til at indsamle og analysere data med historisk uset bredde, dybde og omfang". Men begrebet big data lever to liv. På den ene side er den populære definition af begrebet forbundet med futuristiske løfter om ny, datadrevet videnskab og teknologi. På den anden side står hvad man kunne kalde den operationelle definition af hvordan store datamængder indsamles, lagres og analyseres af samfundsvidenskabsfolk. For at belyse betydningen af big data for politologi betragter vi først denne anden, operationelle betydning af begrebet inden vi vender tilbage til den første, populære betydning.

En bredt anvendt operationel definition identificerer big data med de såkaldte 'tre V'er': *Volume, Variety*

og *Velocity*, dvs. omfang, variation og hastighed (Laney, 2001). Big data refererer her til foranderlige og meget store datasæt – inklusive data der er for store til at gemme på en almindelig pc – der indeholder masser af variation. Datakilder af denne art er ofte interessante for samfundsvidenskab: søgemaskinelogfiler, sociale medieaktiviteter, offentlige registre, mobiltelefonregistre eller endda data gemt ved passiv overvågning udført af digitale enheder i den fysiske verden er alle blevet anvendt til samfundsvidenskabelig forskning (Salganik, 2017). Adgang til disse data kræver partnerskaber med deres ejere – telefonfirmaer, regeringer, teknologiselskaber osv. Dette kan betyde, at man skriver software til at få adgang til websteder eller eksterne databaser eller kan involvere mere formaliserede partnerskaber for at dele information sikkert (Einav and Levin, 2014). I afsnittet om "Anskaffelse af data" nedenfor beskriver vi nærmere hvordan det kan finde sted.

This highlights an important difference between big data and traditional social science data: traditional social science data were collected for the purpose of social science. Big data, by contrast, is sometimes referred to as "found data" or "digital exhaust" (Harford, 2014). What does this mean? Virtually all big data are purpose-built for goals *other than* social research. Metadata like timestamps, follower counts, or activity frequencies on social media web sites are not stored for science or, necessarily, according to scientific standards.

Even government data sources present this problem, sometimes in confusing ways. Consider a minor example: lov nr 1049 af 11/12/1996. The law is short, fewer than 20 words. The only thing it does is ophæve lov om skoleskibsafgift. Civilstyrelsens database of all Danish law, *retsinformation.dk*, lists several pieces of metadata about lov nr 1049.[1] For example, the metadata capture the law it repeals, several related documents, its publication date, and ministerområdet. This last one is confusing, however. Ministerområdet for lov nr 1049 is currently listed as Uddannelses- og Forskningsministeriet. However, the law was signed by Mimi Jakobsen. If you do some further research, you will find that Mimi Jakobsen var Erhvervsminister i Regeringen Poul Nyrup Rasmussen II.[2] Why, then, is this law not connected to Erhvervsministeriet? This confusion is caused because Civilstyrelsen opdaterer ministerområder løbende based on *today's* legal framework and ministries. Connecting lov nr 1049 to Uddannelses- og Forskningsministeriet is obviously wrong if you want to build a historical data set of Danish law. Unfortunately for political scientists, it is correct if—like Civilstyrelsen—your goal is not historical research, but instead to organize the legislation currently in force in Denmark. To make matters worse for researchers, retsinformation.dk will continue to evolve in ways that may or may not benefit political science research, depending on Civilstyrelsens future needs and goals.

When using big data built for some official or private purpose, problems of this nature are always lurking. Although big data can be extremely useful for social science, their scientific value is an *unintended byproduct* (i.e. exhaust) of business or government activity. When applying big data to social science research we must always understand why and how the data were assembled and probe the implications of the data's purpose for our scientific applications.[3]

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[1] See: https://www.retsinformation.dk/Forms/R0710.aspx?id=83509

[2] https://www.regeringen.dk/regeringer-siden-1848/regeringen-poul-nyrup-rasmussen-ii/

[3] As Salganik (2017) puts it, the challenges and opportunities created by big data follow from asking why the data were collected.

2 Big data og forskningsdesign

Big data in political science research designs: - addressing confounding - it's dirty (re: Salganik) – human behavior is mixed together with actions taken by bots/automated systems - drifting – Needs of *actual* system maintainers / users may be completely orthogonal to needs of political science research (or even opposed, consider FB) - algorithmically confounded – large-scale systems have robot nannies. These include everything from spell checkers to YouTube's recommendation algorithm. The observed behavior we find in big data is a consequence of the (generally) unobservable interaction between humans and these algorithms. - Standard sampling issues (nonrepresentative, systematic sampling bias) - its role - uncommon to directly analyze - more often: measurement

3 Behandling af big data

3.1 Anskaffelse af data

- Getting data: scraping, APIs, text databases

3.2 Usuperviserede tilgange

3.3 Superviserede tilgange

3.4 Tekst som data

- Pattern discovery (dimensionality reduction – a la argument in Lowe 2013WP)

    - Generic data: Clustering, IRT, etc.
    - Fundamental unity of goals and approach
    - Variety in methods results from variation in:
        * Assumptions re: underlying model/geometry of latent space
        * Related to above: something like, "format" of output
        * Structure/nature of input data
        * Amount of domain expertise applied to structure results
        * Assumptions about what is correlated with what
        * Level of computational intensity

- Text: Topic modeling, text scaling, dictionaries

- Classification / prediction

- Explanatory modeling

4 Etiske problemer ved big data

emotional contagion example: Kramer, Guillory and Hancock (2014)

problem: lack of informed consent

complication: under surveillance capitalism, all citizens are subject to constant experimentation w/o consent

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