

Algorithmic Recommendations

Discussion

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Who is the Decision Maker?

- Judges don't always follow algorithmic recommendations...
 - But they sometimes do!
- Why?
 - Judge has other information...
 - Judge may differently weight false positives and false negatives...
 - ...
- And yet: algorithmic fairness focuses on outcomes defined by recommendations: False positive/negative rates.

Who is the Decision Maker?

- How can we e.g. equalize false positive rates for decisions made by the judge?
 - Algorithmic recommendations give us a tool.
 - Model judge's objective, prior beliefs, information? (Bayesian Persuasion)
 - Try a model, observe outcomes, have Megan write a paper, and iterate the model? (Feedback loops/learning from revealed preferences)
 - *Change* judges incentives? Payments based on outcomes? (Principal/Agent)

Your Selfish Waze*

- Algorithmic recommendation can solve *informational problems* making it easier for us to play games.
- Not necessarily a good thing globally!
 - Pushes us to *equilibrium*. But price of anarchy can be large.
- Also presents an opportunity for *equilibrium selection*.
 - And a correlating device...

TECHNOLOGY

The Perfect Selfishness of Mapping Apps

Apps like Waze, Google Maps, and Apple Maps may make traffic conditions worse in some areas, new research suggests.

ALEXIS C. MADRIGAL MAR 15, 2018



A traffic jam in Los Angeles, like always (REUTERS/BRET HARTMAN)

MORE

How
Map
Mea
Ever
ALEXI

*Borrowed from Chapter 3 of *The Ethical Algorithm*

In Recommendation Systems?

- Consumption of goods/media can be viewed as a game as well.
 - You consume goods as an individual, but you have *search costs*.
 - Recommendation engines help reduce search costs, but make the system a game.
 - Your recommendations depend on the actions of others.
 - Nudging: Making certain options salient/low-cost.
- Recommendations can improve welfare by reducing costs
 - But introduce the possibility of bad equilibria...

In Recommendation Systems?

- Bad equilibria?
 - Can lead to polarization
- But what we might view as ok/good in some contexts (shopping) might be objectionable in others (news/media)
 - Can we enunciate when we object?
- Recommendation engines give us tools to fight polarization.
 - They cluster users into groups. Can disrupt feedback loop by sometimes showing items to be recommended to the *other* group.
- In general, think about how algorithm decisions affect equilibria.

What other items do customers buy after viewing this item?



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Unite the Right? How YouTube's Recommendation Algorithm Connects The U.S. Far-Right



D&S Media Manipulation: Dispatches from the Field [Follow](#)
Apr 11, 2018 · 9 min read

by Jonas Kaiser and Adrian Rauchfleisch



But: Humility Warranted

- Economics/Game theory offers powerful tools to reason about counter-intuitive equilibrium effects.
 - But models depend on assumptions.
 - Always simplified to make the model tractable
 - Often brittle.
- We should be cautious about applying insights derived from simple models to consequential domains.

But: Humility Warranted

- Not an indictment of the theoretical approach
 - Good models/definitions lead to real insight.
 - Theoretical analysis is *hard*. Have to start with simplifications.
- But it may be awhile before theory produces actionable recommendations.
 - That's ok. Avoid pressure to act. Take our time to think.

Since I have your attention...

michael kearns + aaron roth

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Shameless book plug:

The Ethical Algorithm

Michael Kearns and Aaron Roth

Coming in October. Available for pre-order!

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