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...

*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...

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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.

*Borrowed from Chapter 3 of The Ethical Algorithm
**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...

Shameless book plug:

*The Ethical Algorithm*

Michael Kearns and Aaron Roth

Coming in October. Available for pre-order!