

IRVAPP, spring 2019

Machine learning and policy evaluation.

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In this brief course, I will provide an introduction to some exciting new areas at the intersection of machine learning and policy evaluation. I plan to cover the following topics

1. Morning: Taxation, insurance, and machine learning.
 - (a) An introduction to Gaussian Processes for machine learning.
 - (b) Review of optimal tax theory and sufficient statistics.
 - (c) Combining the two.
2. Afternoon: Experimental design and machine learning for policy choice.
 - (a) Optimal experimental design for estimating treatment effects.
 - (b) An introduction to bandit problems.
 - (c) Adaptive experimental design for policy choice.

Slides for this class are posted at
<https://maxkasy.github.io/home/IRVAPP2019>

Readings

Williams, C. and Rasmussen, C. (2006). *Gaussian processes for machine learning*. MIT Press, chapters 2 and 7.

<http://www.gaussianprocess.org/gpml/chapters/>

Chetty, R. (2009). Sufficient statistics for welfare analysis: A bridge between structural and reduced-form methods. *Annual Review of Economics*, 1(1):451–488.

https://dash.harvard.edu/bitstream/handle/1/9748528/suffstat_ar.pdf

Kasy, M. (2019). Optimal taxation and insurance using machine learning – sufficient statistics and beyond. *Journal of Public Economics*.

<https://maxkasy.github.io/home/files/papers/PolicyDecisions.pdf>

Kasy, M. (2016). Why experimenters might not always want to randomize, and what they could do instead. *Political Analysis*, 24(3):324–338.

<https://maxkasy.github.io/home/files/papers/experimentaldesign.pdf>

Russo, D. J., Roy, B. V., Kazerouni, A., Osband, I., and Wen, Z. (2018). A Tutorial on Thompson Sampling. *Foundations and Trends® in Machine Learning*, 11(1):1–96.

<https://www.nowpublishers.com/article/Details/MAL-070>

Kasy, M. and Sautmann, A. (2019). Adaptive treatment assignment in experiments for policy choice. *Working Paper*.

<https://maxkasy.github.io/home/files/papers/adaptiveexperimentpolicy.pdf>