Human Decisions and Machine Predictions (Kleinberg et al., 2017)

In the U.S. justice system, a judge can decide if a criminal awaits their trial in jail or at home. They make the call based on the likelihood for the defendant to commit a crime before their trial. But judges tend mis-predict said likelihood and release a significant number of high-risk defendants. The data shows that 60% of released defendants go on to commit another crime and 4.8% commit serious crimes[1] in their pre-trial period. Can machine learning (ML) help judges improve their accuracy on releases?

One Sentence Summary

A ML prediction of high or low probability that defendants commit a crime before their trial can have significant welfare gains. It can lower overall crime rates, reduce jail cells in use and diminish racial inequality in jails.

Main Findings

The authors created a machine learning model using New York's data on all arrests between 2008 and 2013. Once trained and tested, they compared the performance of this model to judges decisions. Judges performed worse in a comparison with the model. For example, the model predicts that the top 1% of the riskiest defendants has a 60% chance of committing a crime, and judges release almost 50% of them.

How can the ML model be translated into policy? Before a judge releases a high-risk individual, a warning could pop up on the screen. This approach can lead to an improvement on crime rates. Nonetheless this method could worsen the prison overpopulation issue, because they will be no pop up for low-risk defendants. Another way is to re-rank all the defendants according to the model and give a suggestion in all cases. According to the author, replacing judges' decisions with an automatic re-rank system could improve both crime rates and numbers of cells used.

If judges adopt the re-ranking policy, there could be a reduction on 20% without changing the number of cells used or a reduction of 40% cells used maintaining the crime rate. The authors argue that the new policy can improve the distribution of detained defendants according to race, reducing racial inequality.

Concluding Remarks

Machine learning is a novel and interesting tool for the social sciences. This paper provides an excellent use case for ML in a public policy. Social scientists look for elusive causal relationships, and machine learning should always facilitate or enhance the search, never replace it.

[1] The author defines those crimes as murder, rape or robbery.

References

- Kleinberg, J., Lakkaraju, H., Leskovec, J., Ludwig, J., Mullainathan, S., 2017. Human Decisions and Machine Predictions. Q. J. Econ. 133, 237–293. https://doi.org/10.1093/qje/qjx032.