
TESTING WELFARE IMPROVABILITY

A PREPRINT

Joseph R. Paul

Heriot-Watt University

steve@curvenote.com

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ABSTRACT

Here is a placeholder for the abstract.

Keywords Empirical Welfare Maximisation • Algorithmic Decision Making • Algorithm Discrimination

1 Introduction

Potential Names - Comparing Algorithmic Impacts with Doubly-Robust Estimation - Statistical Inference for Comparing Treatment Assignment Algorithms - Making Informed Choices: A Framework for Evaluating the Impact of Competing Algorithms - Statistical Inference for Comparing Treatment Assignment Algorithms

2 (old) Policy Evaluation

The use of algorithmic decision-making systems is becoming increasingly pervasive across many areas of society. There is a growing critical need for robust methods to evaluate their performance and impacts on those they make decisions about. From healthcare and criminal justice to financial services and education, these systems are increasingly shaping outcomes that profoundly affect individual lives and social structures. While there is great potential for algorithms to enhance efficiency and fairness, their use raises significant concerns about their impacts on well-being. However, the potential of algorithms to enhance efficiency and fairness should instil optimism about their future impact.

Algorithms have emerged as powerful and valuable tools for addressing complex economic decision problems, offering substantial benefits across various domains. Ludwig, Mullainathan, and Rambachan, in their study on “The Unreasonable Effectiveness of Algorithms,” argue that they can also provide a “free lunch in terms of public spending. For instance, in the criminal justice system, an algorithm applied to pretrial release decisions in New York City demonstrated the potential to reduce pretrial detentions by up to 40% Without increasing failure rates (REF). In healthcare, an algorithmic approach to diagnosing heart attacks could potentially reduce unnecessary stress tests and catheterisations, leading to significant cost savings, potentially billions in Medicare costs annually.

Given the promise, we need robust methods to help us decide *which* algorithm to use.

The power of algorithms lies in their ability to extract signals from complex datasets, often outperforming human judgement in ranking and prediction tasks. This capability allows for more efficient allocation of resources and more accurate decision-making in various economic contexts. In education, Bergman et al. (2023) found that an algorithm for college course placement increased enrollments in college-level classes without compromising pass rates while also reducing disparities across racial and ethnic groups. In workplace safety regulation, Johnson et al. (2023) demonstrated that an algorithm could better predict which work sites will likely have future injuries, potentially preventing thousands of severe injuries and saving hundreds of millions of dollars in lost income.

However, it is crucial to note that the effectiveness of algorithms has its challenges. These promising results should not lead to immediate large-scale implementation but encourage further research and development in algorithmic solutions to policy problems. The need for this research is urgent and of utmost importance. Key challenges remain, such as

By offering a pragmatic yet rigorous approach to assessing the welfare impacts of algorithmic decisions, this research aims to contribute to the ongoing dialogue about the role and use of algorithms. The tools presented here will help develop a more transparent, accountable, and welfare-enhancing use of algorithmic decision policies.
