

# Conformal Inverse Optimization

**Bo Lin**

University of Toronto

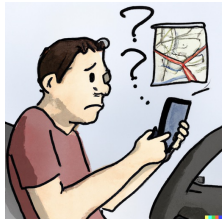
Joint with

Timothy C. Y. Chan  
University of Toronto

Erick Delage  
HEC Montréal

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# Algorithm aversion is prevalent and costly



**Rideshare**  
Routing & repositioning  
(Liu et al. 2023)



**Last-mile Delivery**  
Order assignment & routing  
(Liu et al. 2021, Fu et al. 2023)



**Real Estate Market**  
Property appraisal  
(Bauer et al. 2023)



**Warehouse Operations**  
Bin packing  
(Sun et al. 2022)



**Banking**  
Peer-to-Peer Lending  
(Ge et al. 2021)

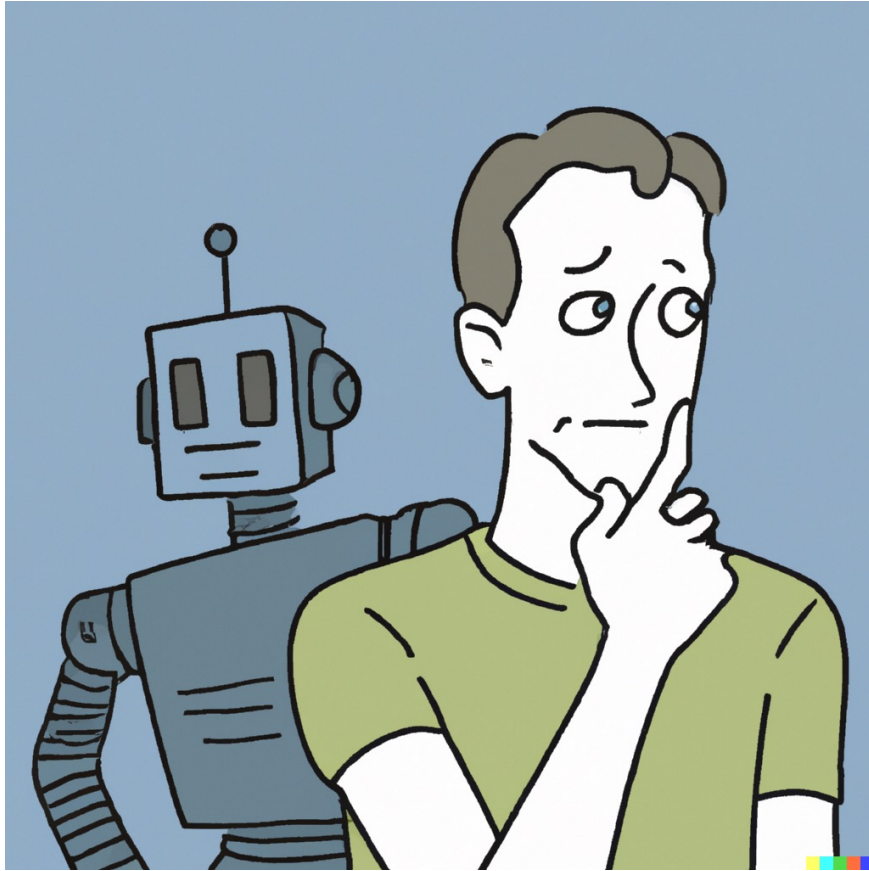


**Retail Operations**  
Product assortment  
(Kawaguchi 2021, Kesavan et al. 2020)



Algorithm decisions are overridden **over 50%** of the time,  
resulting in a **5.77%** reduction in profitability  
(Kesavan and Kushwaha 2020)

# Why are we averse to algorithms?



## **Misalignment with intuition**

(Bauer et al. 2023, Chen et al. 2023, Donahue et al. 2023, Liu et al. 2023)

## **Transparency/interpretability**

(Kizilcec 2016, Sun et al. 2023)

## **Previous (negative) experience**

(Yin et al. 2019, Dietvorst et al. 2015)

## **Lack of human control**

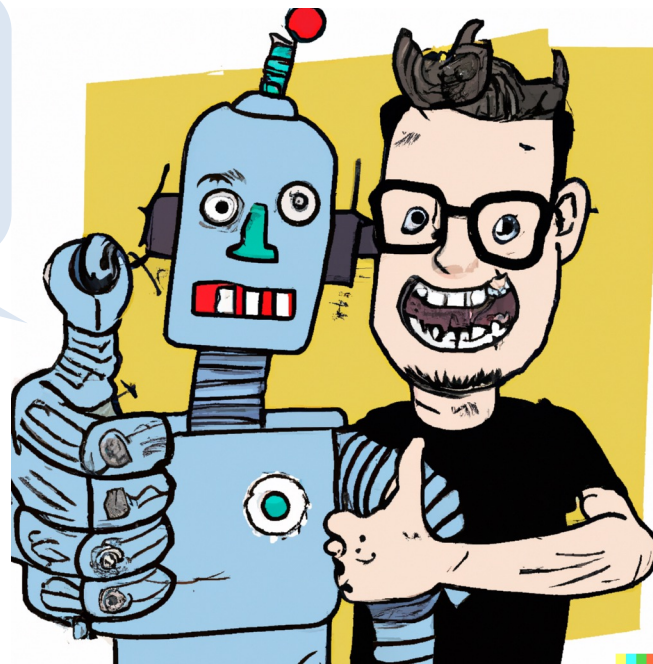
(Dietvorst et al. 2015, Meissner et al. 2021)

## **And many others**

# Research Question

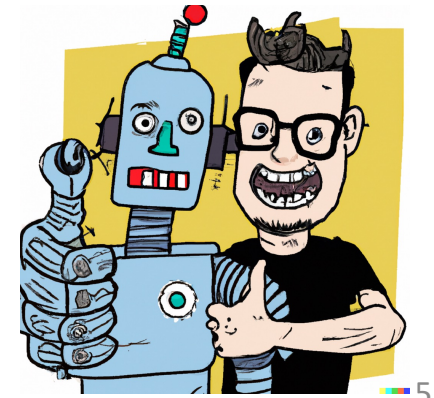
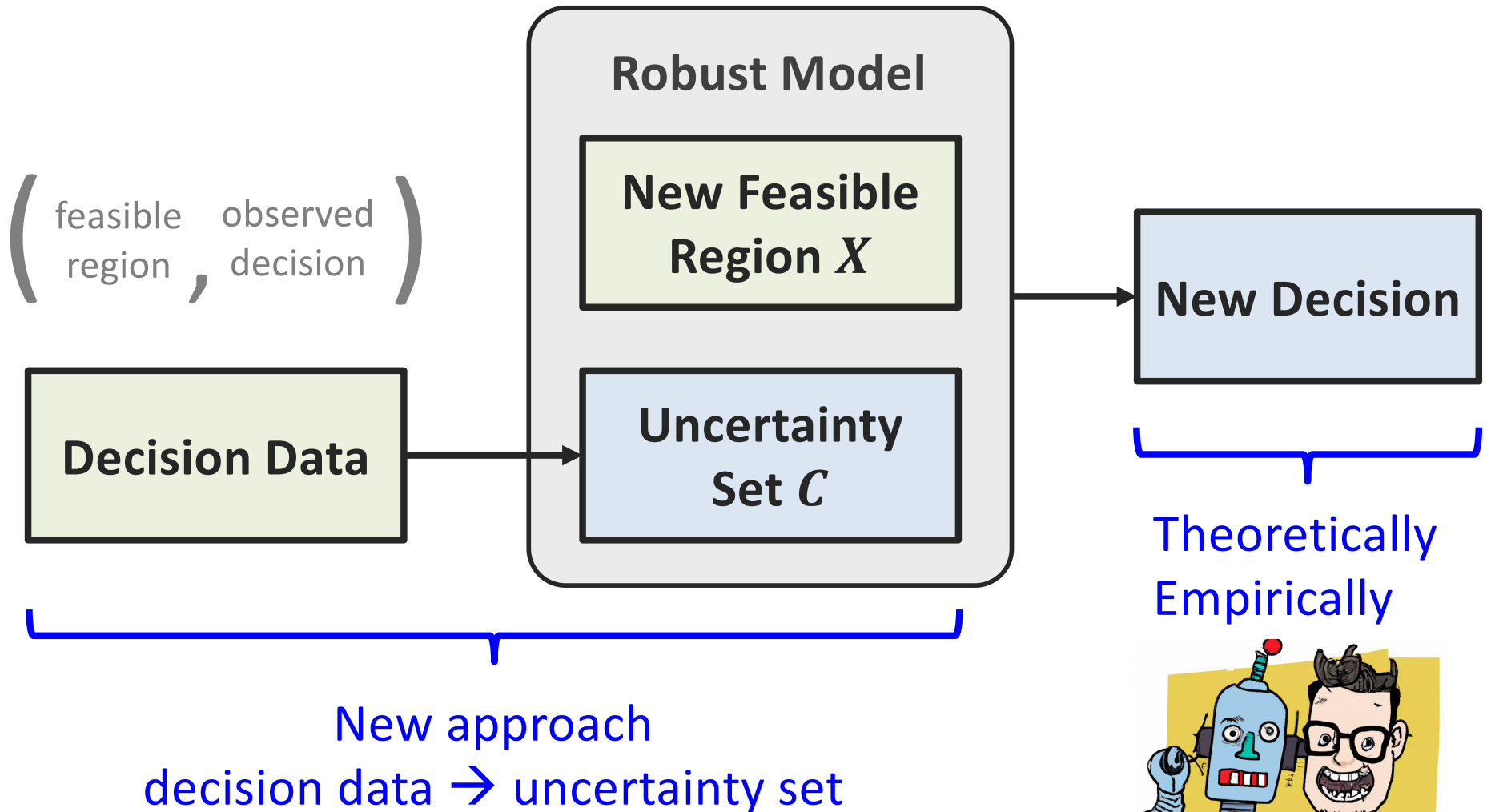
- How to generate **high-quality** and **intuitive** decisions?
- Challenge: Quantify human perception

Tell me about your intuition?

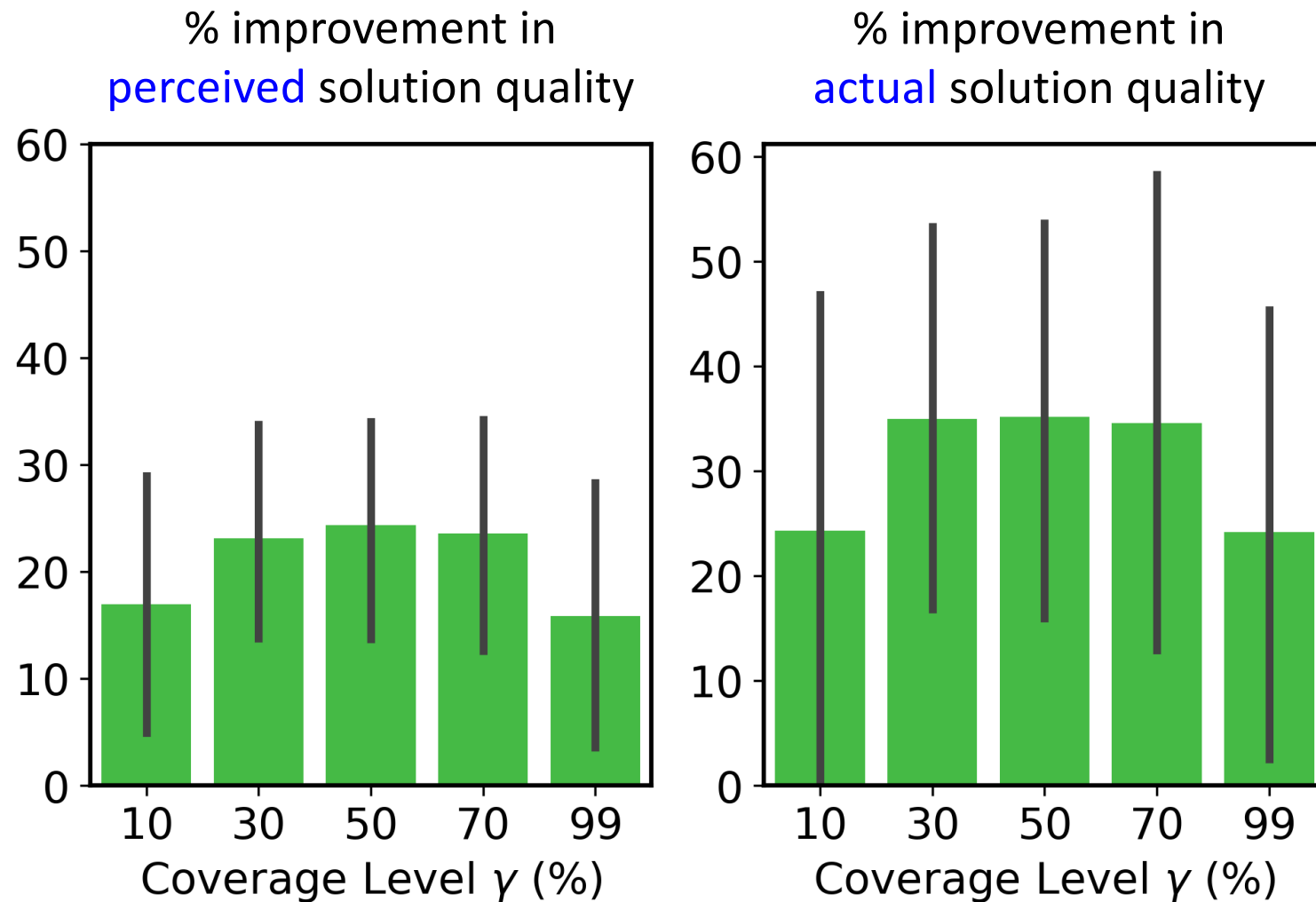


I don't know...  
Look at my  
past decisions?

# Our Method & Contributions



# Solution Quality – Shortest Path



Higher = Better

# Takeaways

- New IO pipeline to address algorithm aversion
- Theoretical results on
  - Uncertainty set validity
  - Bounded AOG and POG
- Numerical studies
  - Strong performance
- Didn't cover
  - Computational efficiency
- It's important to consider human behaviors when making algorithmic recommendations

