Causal Inference

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1. 导读
    1. 因果经济学导论
2. 必备知识
    1. 因果推论分类
    2. 统计模型分类
    3. 流行病学的基本定义与测量
    4. 辛普森悖论
    5. 干扰因子
    6. 分层分析与模型
3. 因果推论
    1. Introduction of causal inference 1
    2. Introduction of causal inference 2
    3. Framework of causal inference
    4. Causal structure: DAGs
    5. Variable in causal inference
    6. Causal structure: D-separation rule
    7. Causal structure: NPSEM
    8. Causal structure: NPSEM for d-separation 1
    9. Causal structure: NPSEM for d-separation 2
    10. Counterfactual outcome model
    11. Identification: exchangeability and RCT
    12. Estimation: g-formula, IPW, and MSM
    13. Estimation: g-estimation and SNM
    14. Estimation: doubly robust estimator
    15. Efficiency theorem: Why EIF
    16. Efficiency theorem: What is EIF
    17. Efficiency theorem: How to derive EIF 1
    18. Efficiency theorem: How to derive EIF 2,3
4. 因果推论架构与概念
    1. 常见名词
    2. 绪论
    3. Causal Diagram
    4. Counterfactual model
    5. 常见 causal effects
    6. Positivity and consistency
    7. Exchangeability
    8. 其它两种 assumptions
    9. 因果研究中 assumption 的重点
    10. Sensitivity analysis
    11. Identification
    12. Statistical Inference

5. Data analysis DEMO
    1. Demo 1
    2. Demo 2
    3. Demo 3
6. NDE and NIE
    1. Introduction of causal mediation analysis
    2. Definition for causal mediation analysis (NDE and NIE)
    3. Identification for NDE and NIE 1
    4. Identification for NDE and NIE 2
    5. Identification for NDE and NIE 3: recanting witness and NPSEM
    6. Review framework
    7. Identification for NDE and NIE 4: when M is continuous
    8. Estimation for NDE and NIE 1
    9. Estimation for NDE and NIE 2
    10. Estimation for NDE and NIE 3
    11. Estimation for NDE and NIE 4
    12. Estimation for NDE and NIE 5: regression with interaction term
    13. Estimation for NDE and NIE 6: Monte-Carlo simulation and software (mediation.R)
    14. Estimation for NDE and NIE 7: IPW
7. Binary outcome
    1. Causal mediation analysis with binary outcome 1
    2. Causal mediation analysis with binary outcome 2: Counterfactual OR and PM
    3. Causal mediation analysis with binary outcome 3: Estimation A
    4. Causal mediation analysis with binary outcome 4: Estimation B
8. Alternative definition
    1. 3 diff. def. for causal mediation analysis
    2. CDE 1
    3. CDE 2
    4. Interventional approach 1: Introduction

5. Interventional approach 2: Definition
6. Interventional approach 3: Identification

9. 中介效应分析
    1. Mediation analysis 基本概念常见的错误解读
    2. 传统 Mediation analysis 的做法以及 causal mediation
    3. Mediation analysis 三种常见的定义及 interpretation
    4. Mediation analysis 三种常见的定义在辨识中需要的假设及意义
    5. Mediation analysis identification and estimation

10. 交互作用分析
    1. Introduction
    2. 三种 interaction
    3. Additive vs multiplcative interaction
    4. RERI 1
    5. RERI 2
    6. Effect modification

11. 多重中介效应
    1. DAGs
    2. Counterfactual 1
    3. Counterfactual 2
    4. Difficulty of identification
    5. Introduction of different strategy

12. 时变系统的因果推论
    1. Introduction of time-varying system
    2. DAGs of time-varying system
    3. Why regression fail and g-formula in simple case
    4. g-formula 1
    5. g-formula 2: definition and notation
    6. g-formula 3: assumptions
    7. g-formula 4: identification 1
    8. g-formula 5: identification 2
    9. g-formula 6: identification 3
    10. g-formula 7: identification (Y's pdf)
    11. gf joint density of outcome and confounder

Supplemental Materials

1. 课程简介
2. 辛普森悖论 1
3. 辛普森悖论 2
4. 概率统计基本工具 1
5. 概率统计基本工具 2
6. 图模型
7. 结构因果模型
8. Intransitive Case
9. 链状结构
10. 叉状结构
11. 对撞结构
12. D-分隔
13. 模型检验和等价类
14. 乘积分解法则
15. 混淆变量
16. 习题 1.3.2 和 1.4.1
17. 观测数据和试验数据 1
18. 观测数据和试验数据 2
19. 干预
20. do 算子
21. 调整公式
22. 支线任务: 调整公式实例
23. 支线任务: 干预和调整公式
24. 结果模型

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