Auditing for Racial Discrimination in the Delivery of Education Ads

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Harms of AI Adoption in Social-media Algorithms

Shape **access** to information and **economic opportunities** for **billions** of users

Social-media algorithms

Facebook Algorithm Shows Gender Bias in Job Ads, Study Finds
Researchers found the platform’s algorithms promoted roles to certain users; company pledges to continue work in removing bias from recommendations

Can the EU’s Digital Services Act Inspire US Tech Regulation?
Ad Delivery Algorithms Can be Biased

• Evidence of discrimination by legally protected demographic attributes
  • Not due to targeting choices by advertiser
  • Platform-induced bias: optimization for “relevance”
  • For economic opportunities such as housing and employment

• Meta sued by DOJ for discriminatory ad delivery
  • Deployed Variance Reduction System for housing, employment and credit ads

Prior audits and solutions limited to only housing, employment, and credit!
Our Contributions: Auditing Education Ad Delivery for Racial Bias

• A method for testing racial discrimination in education ad delivery
  • We use a black-box approach

• We find racially biased delivery of education ads caused by platform-driven choices
  • We apply the method to Meta
  • Racially balanced audience (in), but skewed delivery audience (out)
Why Study Education: Concerns of Discrimination

• 30+ for-profit schools investigated for predatory marketing
  • Over-promised job prospects, lead to high debt, ...

• Historically targeted racial minorities [Body ‘19]
  • Legal protections against discrimination

• Education is one of the largest advertising verticals [Wernerfelt et al. ‘22]

Do ad delivery algorithms propagate the historical racial bias among for-profit universities?
Challenge of Extending Prior Audits to Education

• No method that controls for legitimate sources of skew for education

• We extend a prior auditing method: paired ads
  • Tied to underlying de-facto skew in society
  • Run at the same time, audience, budget, ... [Ali and Sapiezynski et al. ’19, Imana et al. ‘21]
  • Look at relative difference in delivery

How to identify such a pair of opportunities for education?
Methodology: Isolating the Role of Ad Delivery Algorithm for Education

- Similar opportunities but one is of inferior quality (for-profit)
- Pick schools with de-facto racial skew in enrollment

Hypothesis: the for-profit school ad will be shown to relatively more Black individuals
Experiment: Racially Biased Delivery

Pair #1: Strayer U. vs. Colorado State U. (Similar results for 2 other pairs)

$\Rightarrow$ Meta’s algorithms \textit{racially} discriminate in education ad delivery

$\Rightarrow$ Meta may be in violation of education anti-discrimination law

$\Rightarrow$ Not limited to housing, employment, and credit
Compare Neutral and Realistic Ad Creatives

Neutral ad creative

(Built by us)

Fairer: avoid potential text- or image-based skew

Realistic ad creative

(From school’s Ad Library page)

Realer: captures additional effects of real-world ads
Experiment: Larger Bias with Realistic Ad Creatives

Pair #1: Strayer U. vs. Colorado State U.
(Similar results for 2 other pairs)

⇒ Platforms amplify implicit cues in ad creatives used by schools
⇒ Bias in ad delivery is larger with real ads

D_1 = 0.07

D_2 = 0.11

D_2 - D_1 = 0.04 => larger bias with real ad
Evaluate Delivery Using Predatory Schools

- Modify our method: use for-profit schools sued for predatory marketing practices

Does Meta’s ad delivery algorithm promote opportunities at such schools disproportionately by race?

- Identify three schools (using Department of Education data)
  - For-profit: DeVry University, Grand Canyon University, Keiser University
  - Same public schools as before
Experiments: Biased Delivery of Ads for Predatory Schools

Pair #4: DeVry U. vs. Colorado State U. (Similar result for 2 other pairs)

⇒ Racially disproportionate delivery of low-quality opportunities
⇒ Meta can perpetuate skew even if schools improve marketing practices

Skew is statistically significant for both repetitions
Conclusion

- Platforms need to conduct impact assessment of education ad delivery algorithms
- Broader auditing/regulation needed beyond housing, employment, credit ads
- Researchers can apply our method to new domains

- Paper: https://doi.org/10.1145/3630106.3659041
- Data: https://ant.isi.edu/datasets/addelivery-education/
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