Smiles in Profiles

Improving Fairness and Efficiency Using Estimates of User Preferences in Online Marketplaces

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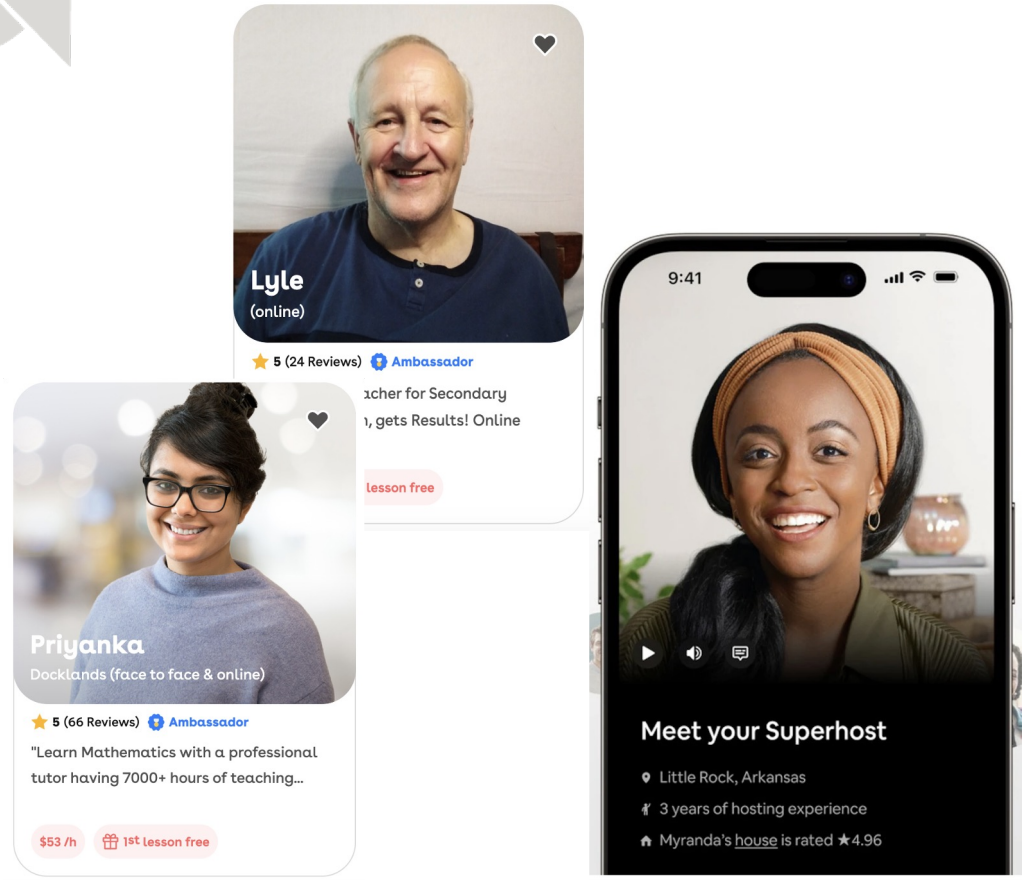
The Digital Future: Fintech, AI, and the Path to Financial Inclusion
12/11/2023 Berkeley

Online platforms face an efficiency - fairness tradeoff in the use of personal images



Personal images:

- create a sense of trust,
- facilitate transactions *(Ert et al. 2016)*, and
- allow users to differentiate *(Pham & Septianto, 2019)*

But information on race, ethnicity, or gender enables discrimination *(Edelman & Luca, 2014; Lambin & Palikot, 2021)*

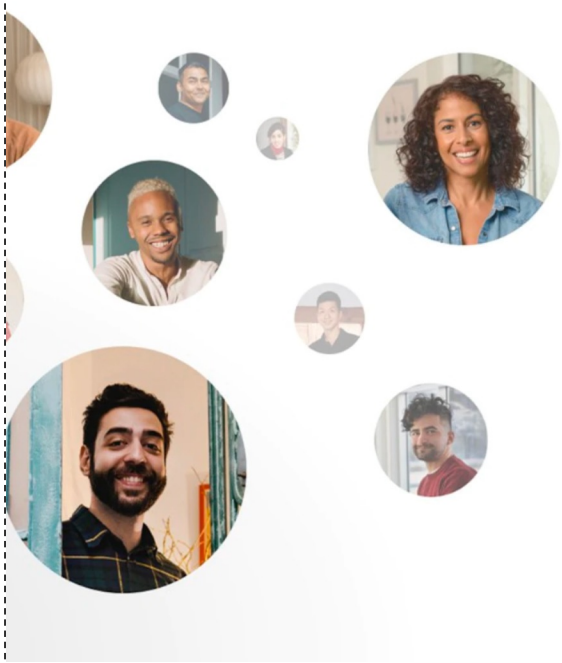
Image content:
Type *(*inherent) & ***Style*** *(*manipulable)

Research questions:

1. Are there systematic differences in ***style*** across ***types?***

2. Do they ***contribute to or mitigate*** disparities between types?

3. Can *style*-based policies increase ***fairness*** and ***efficiency***?



kiva

- Microfinance P2P platform
- High prominence of images in borrowers' profiles

$15,000 to Grace helps me transform my camper into a mobile boutique that I can take to other states.

Retail | Woman-Owned Business

Observational study

- 420K Kiva campaigns:
  - outcomes - daily funding rate, repayment
  - images, loan details, time, location, sector, competition
- Use off-the-shelf computer vision algorithms to extract image features and divide them into style or type
  - style e.g., facial expression, objects in the image, apparel, image composition
- Style impacts lending outcomes not repayment

Observational study

- Style impacts lending outcomes; not repayment
- Style and type are correlated

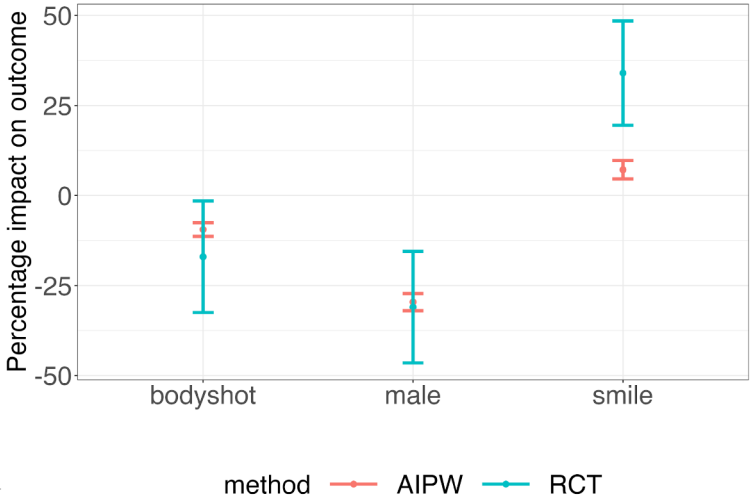
77% of *female* borrowers and 33% of *male* borrowers *smile*
Gelbach decomposition – 1/3 of gender gap is due to ***style choices***

Recruited RCT

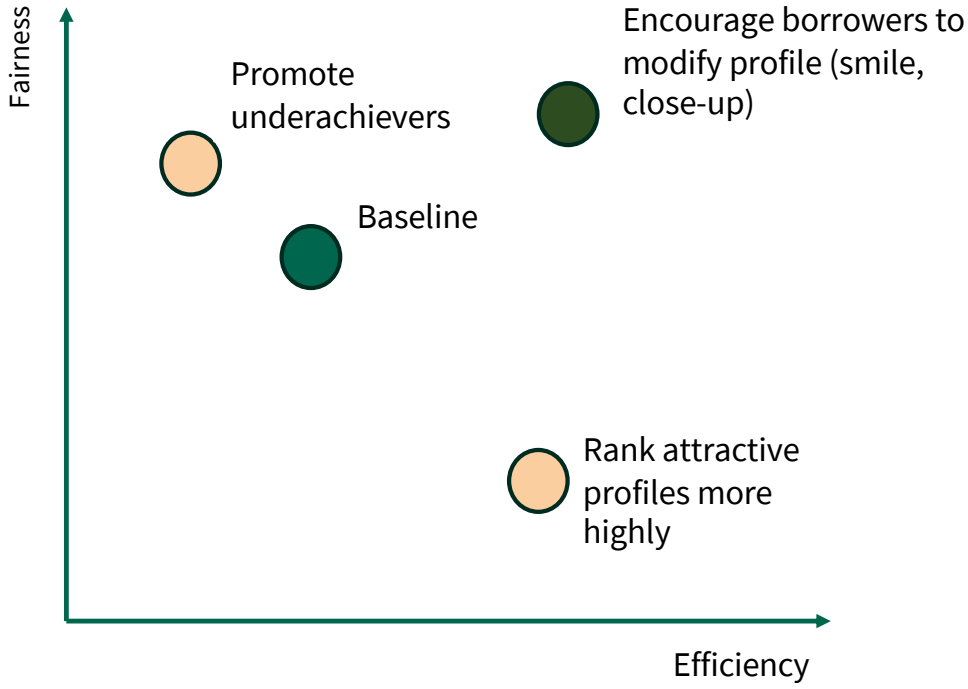
Even with state-of-the-art feature detection algorithms, there is a risk of confounding

Recruited RCT

- Confounding in an observational study
- GANs isolate the change in one feature
- RCT – internal validity, recruited



Counterfactual simulations



- A simple structural model calibrated with estimates from the RCT
- **Type** – gender; **style** – smile & body-shot
- **Efficiency** – the number of transactions
- **Fairness** – distribution of funds across types or overall inequality
- Counterfactual platform policies

1. Re-ranking policies trade off efficiency and fairness
2. Targeted style interventions increase both efficiency and fairness

Conclusion

1. Personal images create an efficiency-fairness tradeoff
2. Platform policies focused on changeable aspects of images can help relax this tradeoff
3. Framework when on-platform RCTs are hard to run