2024 SUPPLEMENTAL HEALTH, DI & LTC CONFERENCE

The Winning Trifecta

Bias and Fairness in DI Underwriting

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Munich RE

Dae Won Kim

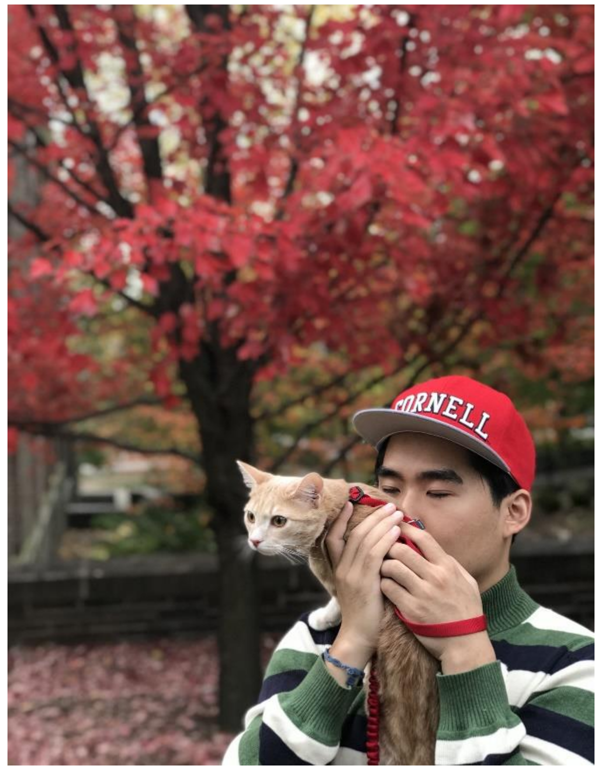
Data Science Manager

Munich Re

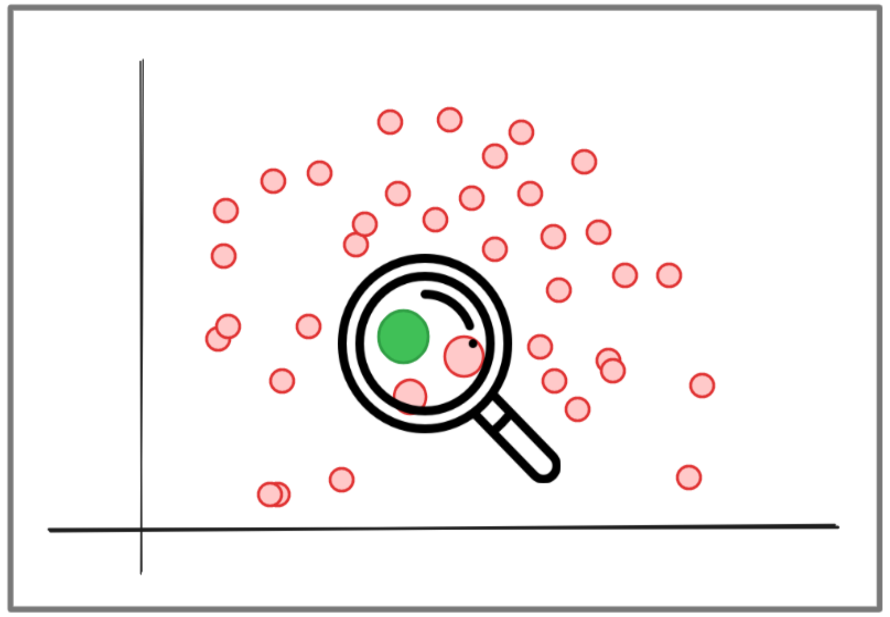
Who Am I: Me As A Data Point

On paper:

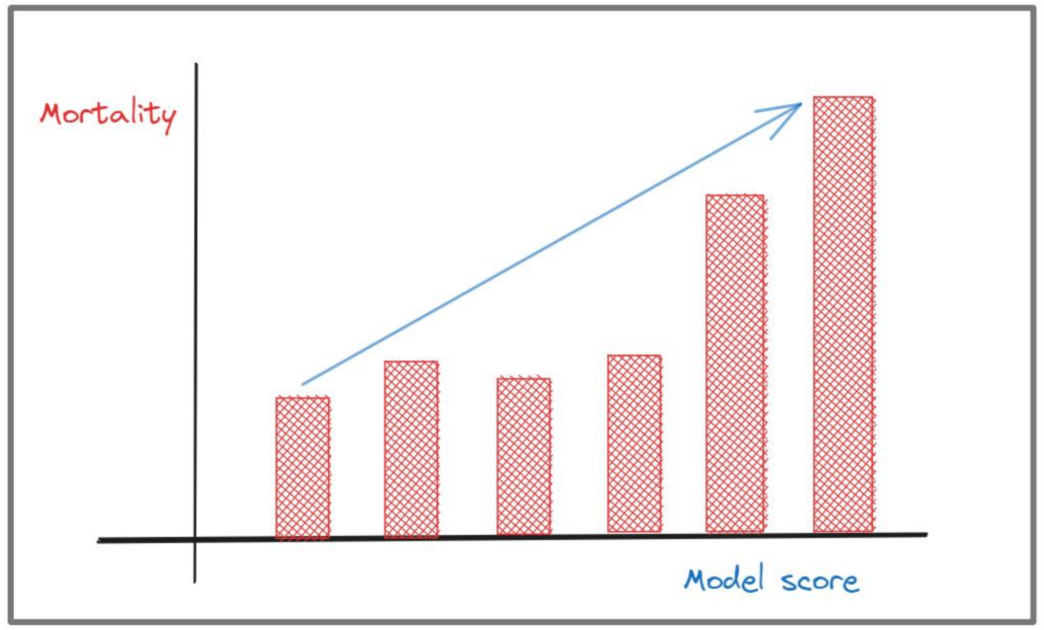
- Data Science Manager at Munich RE
- UW AI, unstructured data specialist



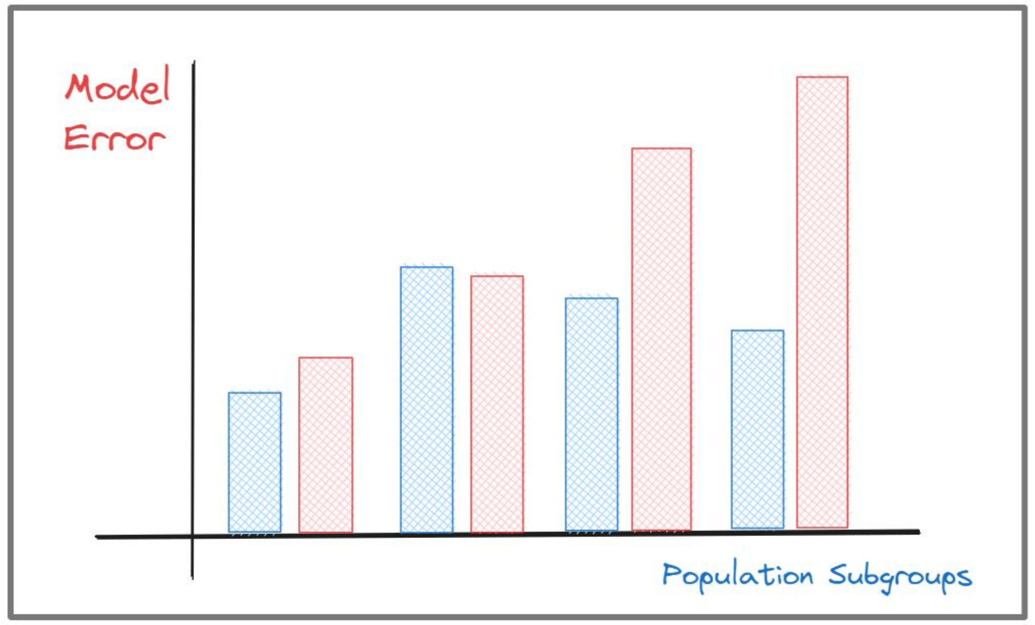
Potential And Dangers Of AI In UW



Individualized Risk Assessment



Better Risk Segmentation



Perpetuate / Automate bias

Rapidly Evolving Regulatory Landscape

2019

NY DFS Circular Letter No. 1 (2019)
Use of External Consumer Data and Information Sources in Underwriting for Life Insurance

2020

NAIC Guiding Principles on Artificial Intelligence

2021

CO Governor Polis signs Senate Bill 21-169 into law

EU AI Act proposed

2022

NIST creates Draft AI Risk Management Framework

NAIC AI Model Bulletin Draft

2023

CO Governance Reg Adopted, draft of Quantitative Testing Reg

EU AI Act Passed, NIST AI Risk Management Framework adopted

Biden **Executive Order** on AI

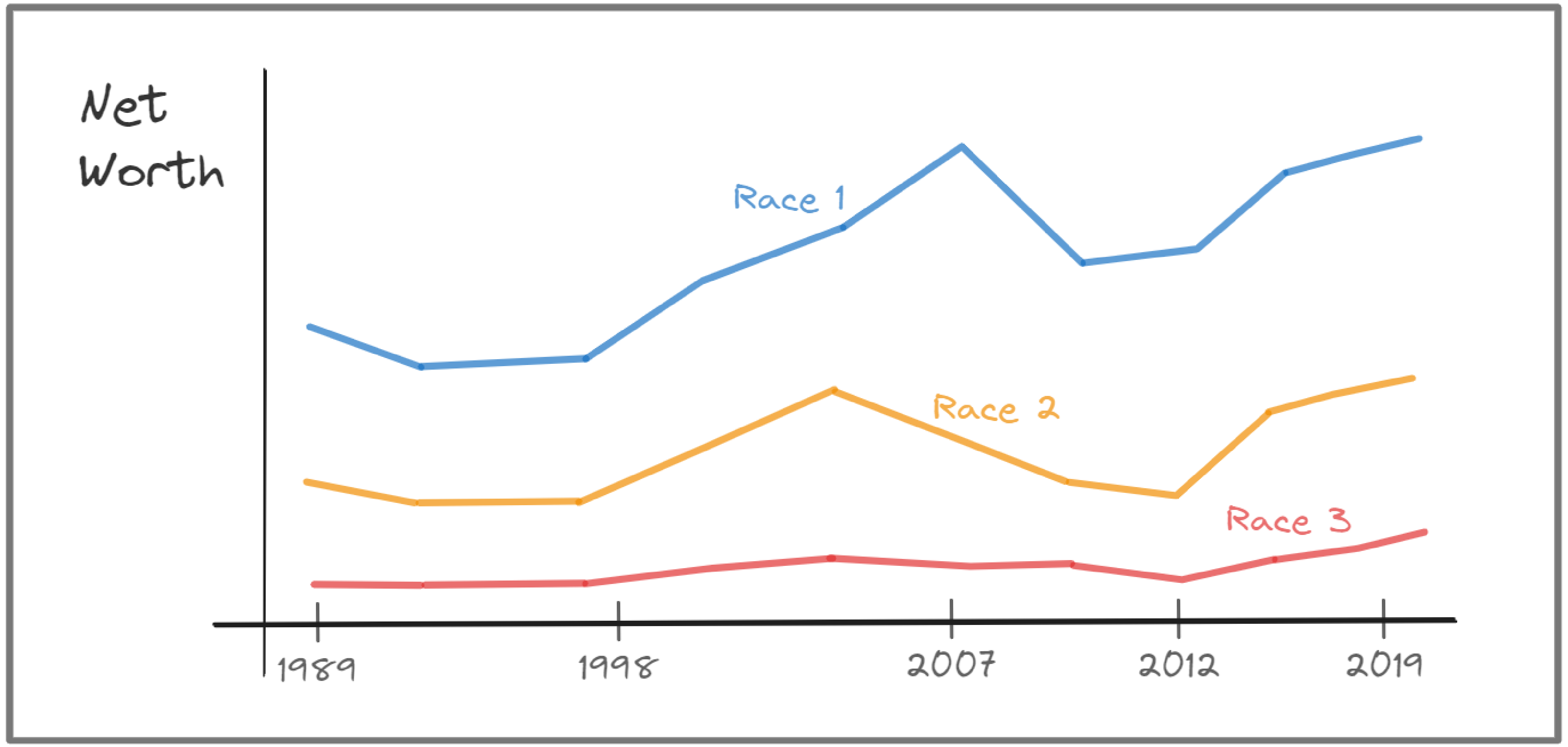
2024

NY Circular Letter No 7 released

Is Disparity In Outcome A Sign Of Bias?

Insufficient evidence of bias in model

- Modeling likely results in racial disparity
- Does this mean it's wrong to use wealth..?
- **Sources** of disparity must be **identified**

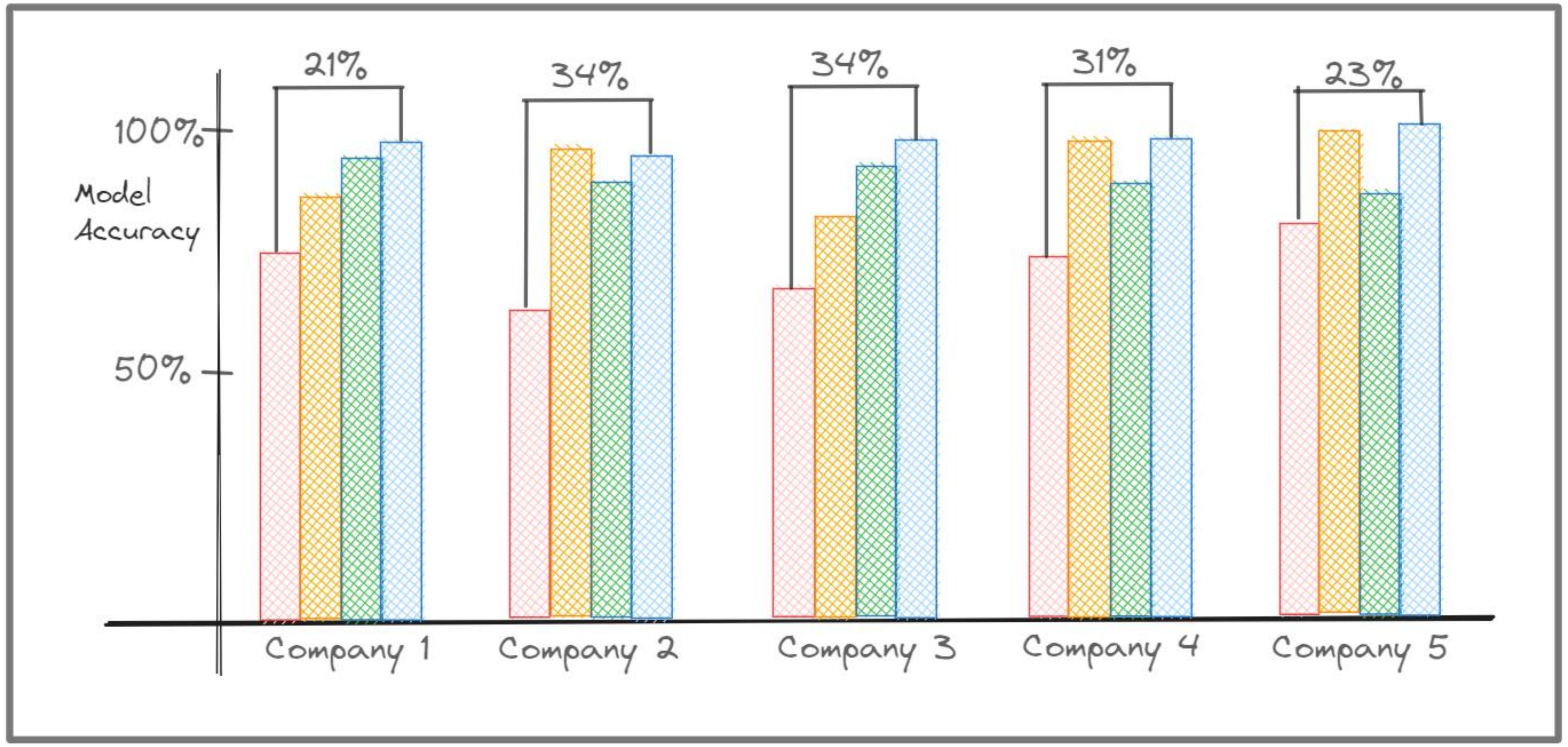


Race vs Net Worth over time

Is Disparity In Error Rates A Sign Of Bias?

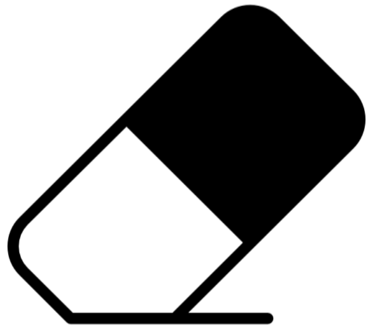
Clearer evidence of bias

- Indicative of skew in training data or increased errors in labels for some groups
- Models will **penalize** a certain subgroup more than **expected or warranted**



Skin Color vs Facial recognition software

Closer Look: Proxy Discrimination



Difficult to remove

Cannot easily decide
“Good” vs “Bad” proxy

Costs in performance
and profit

Impractical

Case Study: Gender Disparity In Referral Rates

1. Identify

- Monitoring picked up **refer gap between genders**
- Females +8% higher for extended periods
- Persistent YTD gap of 3+%

2. Investigate

- Identifying the cause:
- Are there disparities in input data? (disclosures, third party)
- Are final outcomes different between male vs females? (inherent risk)
- Are there differences in identified risk factors for each gender?
- At which stage does the disparity increase / decrease?

3. Report

- Females have more claims
- Referral per claim same for both
- Program actually lessens gap
- Multiple data sources help

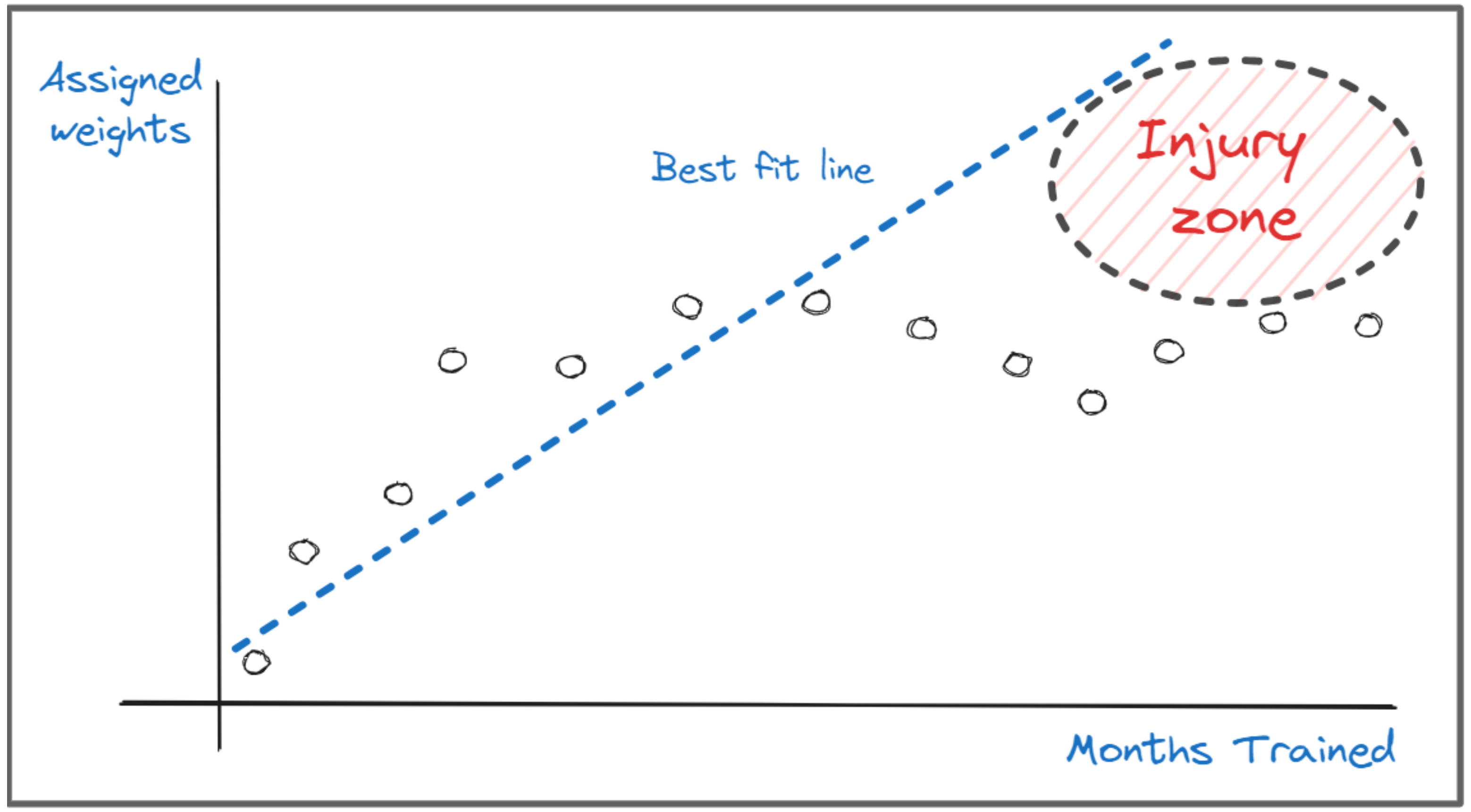
4. Takeaways

- Monitoring & reporting **infrastructure** is highly important
- Disparity in outcome **does not** signify bias in program
- **Varied sources** of data is crucial for mitigation
- Strong need for **uncertainty** modeling

How AI Processes Become Biased

Toy example #1: model bias

- Optimal lifting weight vs Time
- Linear model on non-linear truth
- Produces harm + suboptimal program



Toy example #2: data bias

- High prevalence Asians in 20s pre-covid in Long Island City
- Data has race, age, citizenship for rent credit in LIC apartments
- If not retrained, model continues to favor Asians in their 20s
- Significant demographic changes post-covid, produces disparity of error

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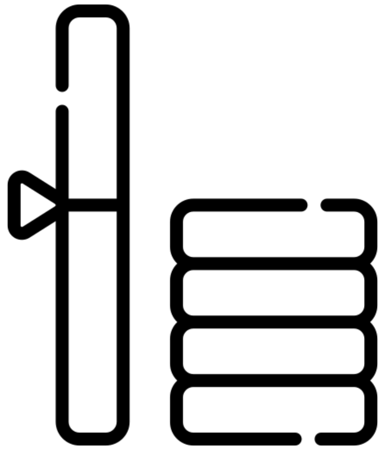
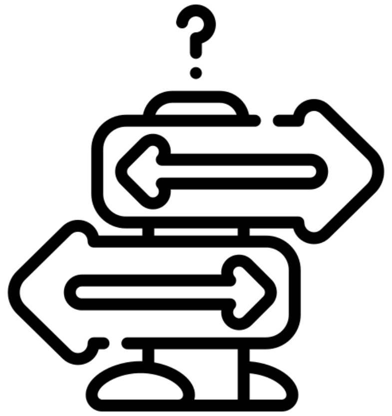
How AI Processes Become Biased

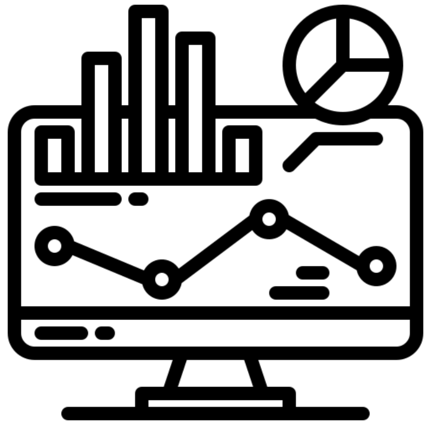
Imbalanced data &
Lack of retraining



Models with
severe limitations



No uncertainty
considerations / modeling



Lack of monitoring /
reporting infrastructure

Building Governance In Data Science Development

1. Build a rich dataset

- Data represents target population
- Models contextualize an individual
- Replenish, update, and prune training data

2. Implement robust data science practices

- Model uncertainty
- Use flexible ML models
- Monitor fairness metrics
- Easy-to-understand visuals & analysis

3. Build & optimize governance

- Transparency in bias considerations
- Sign-off on methods, monitors & reports
- Clear division of mitigation duties
- Automating governance to minimize bureaucracy

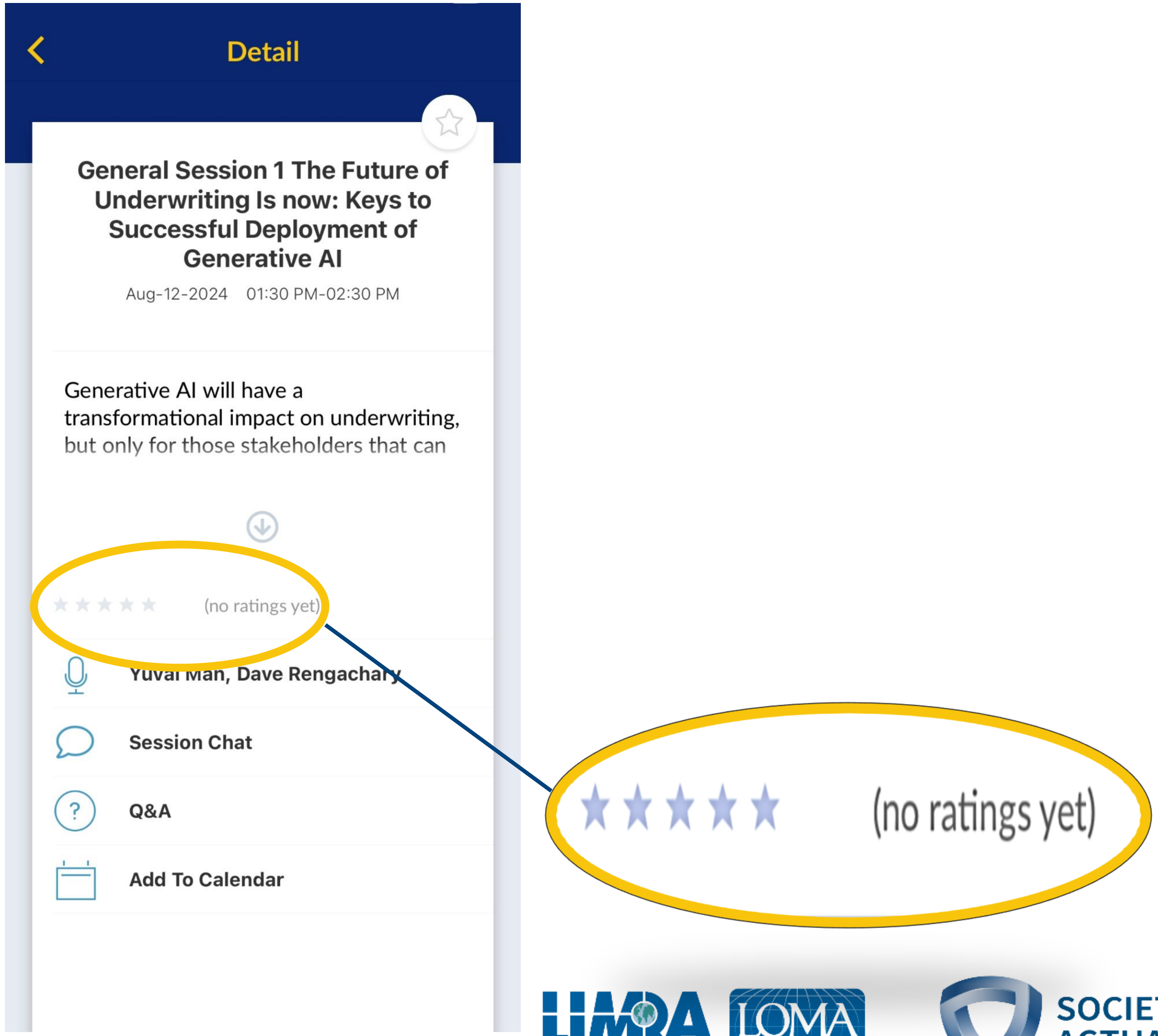
4. Minimize impact of bias

- **Place intervention** where the penalties occur
- Conduct end-to-end analysis of program, not just models
- Use models to triage rather than fully automate

We Want to Hear From You. Leave a Rating & Review.

Module Option

Agenda Option



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Thank You

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