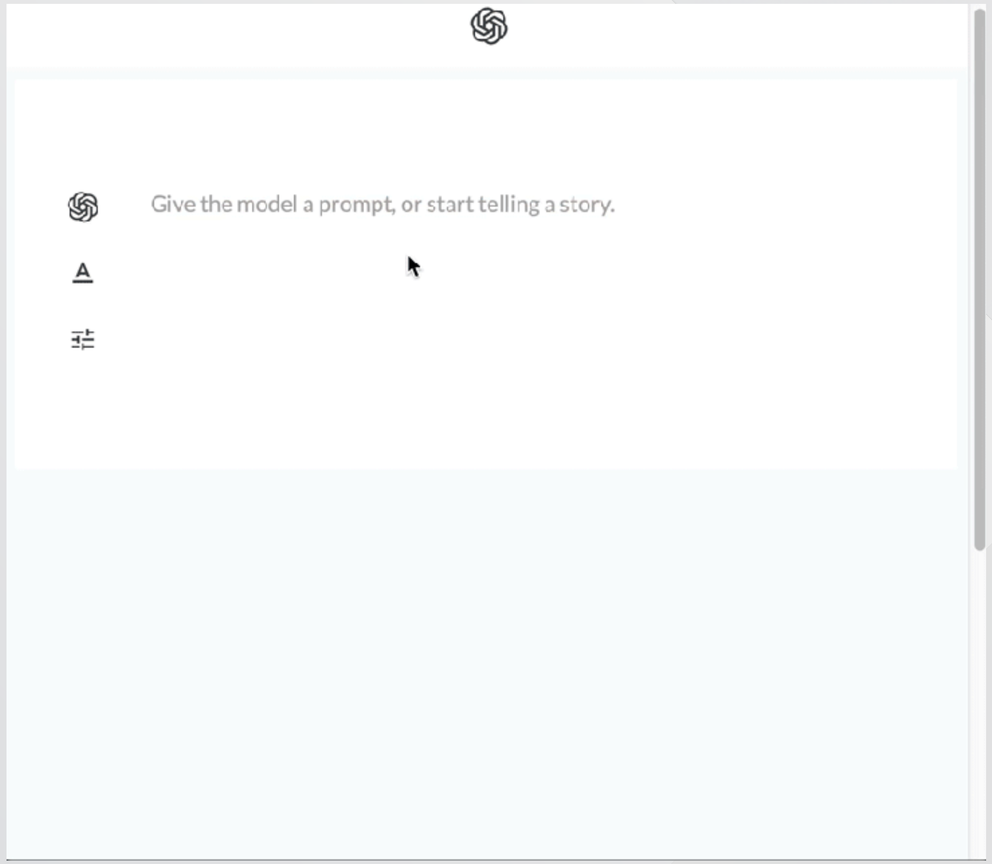
Algorithmic Responsibility & Biases in Recruiting

Maryam Jahanshahi Ph.D.
Research Scientist

tapRecruit.co

The Brave New World enabled by Big Data Algorithms

New algorithms are blurring the lines of what's "real"



https://bit.ly/2LMpM9d

https://bit.ly/2LNemlI

With Big Data comes Big Responsibility

The scale of automated decision-making are significant

Facebook Settles Civil Rights Cases by Making Sweeping Changes to Its Online Ad Platform


Galen Sherwin, Senior Staff Attorney, ACLU Women's Rights Project
& Esha Bhandari, Staff Attorney, ACLU Speech, Privacy, and Technology Project

MARCH 19, 2019 | 2:00 PM

TAGS: Women's Rights in the Workplace, Women's Rights

https://bit.ly/3gcrezB

"Advertisers will no longer be able to exclude users from learning about **opportunities for housing, employment, or credit** based on gender, age, or other protected characteristics."

tapRecruit.co

Automated decision-making varies in complexity

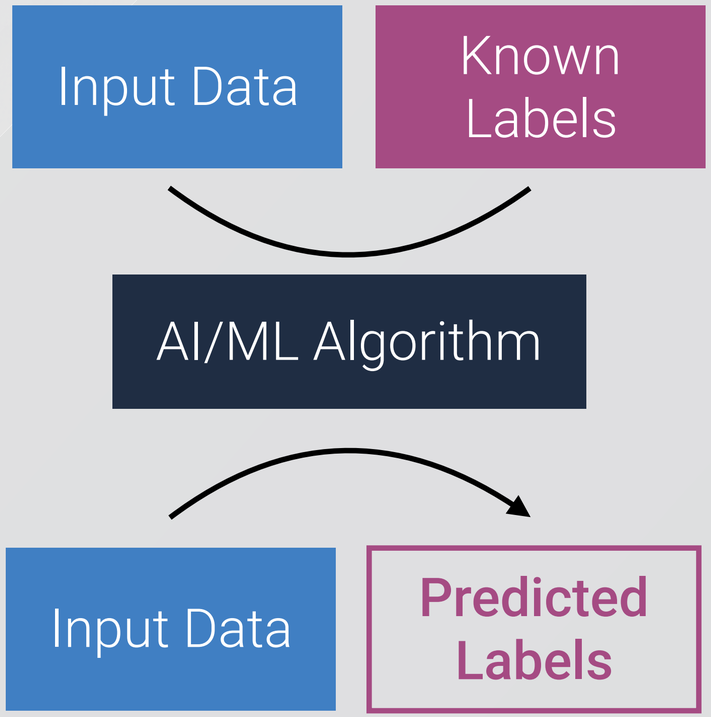
Algorithms are taught rules vs AI “learns” rules from data

Algorithms: As simple as an IF statement

C2 | =IF(A2 > 5, TRUE, FALSE)

	A	B	C
1	PerfReview_Q1		Bonus
2	3		FALSE
3	5		FALSE
4	8		TRUE
5	9		TRUE
6	1		FALSE

AI/ML: Training through data and labels



Automated decision-making varies in complexity

Accuracy vs Interpretability is a key tension

White Box Models	Black Box Models
Transparent Approximate Model Simpler computation	Opaque Model can be exact Complex computation
e.g. Decision Trees / Regression Models	e.g. Neural Networks / Gradient Boosting / Ensemble Models

Model Interpretability Algorithms

Attempt to extract relevant features
May enable “interpretability” of black box algorithms

e.g. LIME / SHAP

Algorithms and AI in Recruiting

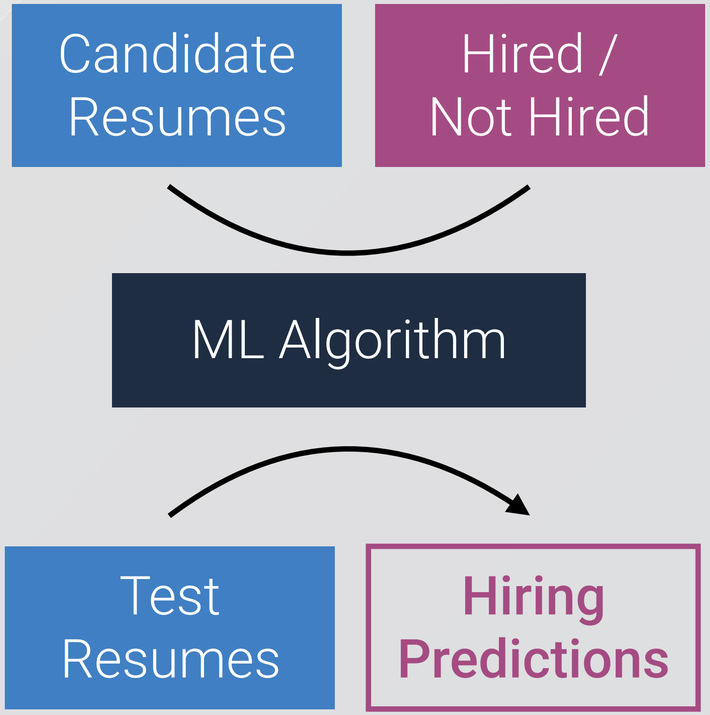
Amazon inadvertently brings a focus on resume screening

Amazon scraps secret AI recruiting tool that showed bias against women

Jeffrey Dastin

8 MIN READ

SAN FRANCISCO (Reuters) - Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.



https://reut.rs/3bMwcjf

tapRecruit.co

Algorithms and AI in Recruiting

Resume screening is manual, bias-prone and expensive.

Resumes from male candidates receive 50% more interview invitations than women.[1]

'Whitened' resumes are twice as likely to receive interview calls.[2]

Screening

Hiring managers rate hypothetical male applicants as more competent and hireable than identical female candidates.[3]

Assessment

Lone minority candidates in finalist pools have almost no statistical chance of receiving an offer.[4]

Offer

Average Cost:
$4k - $50k

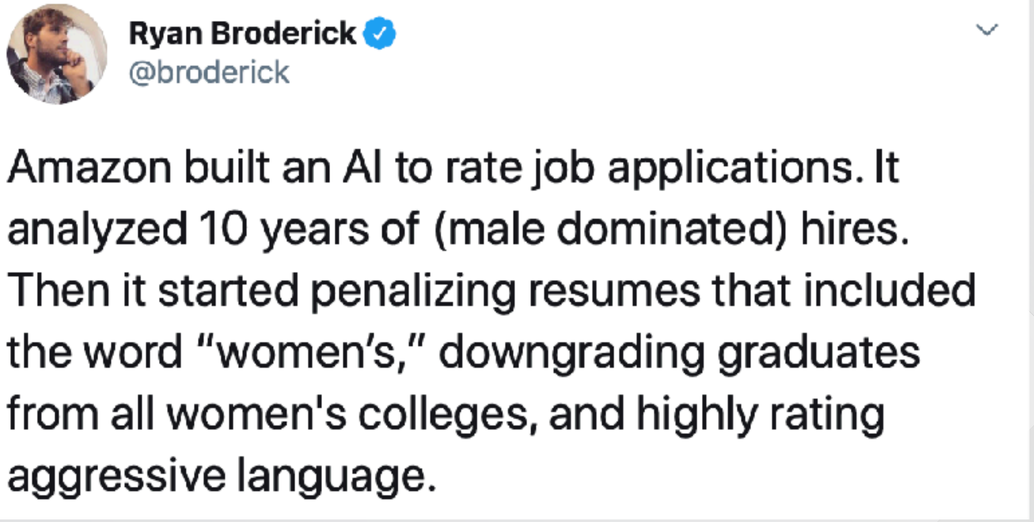
Average Time to Fill:
58 days

[1] Reviewed in Koch et al., *J. Appl. Psychol.* 2015.
[2] Kang et al., *Adm. Sci. Q.* 2016.
[3] Moss-Racusin et al., *PNAS*, 2012.
[4] Johnston et al., *HBR* 2016.

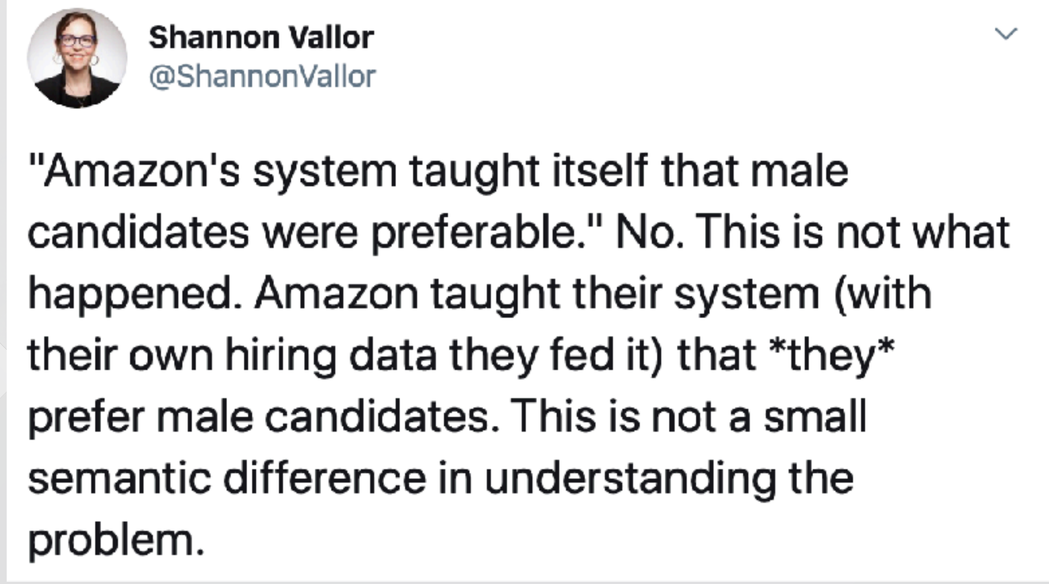
tapRecruit.co

Algorithms and AI in Recruiting

Amazon’s experiment uncovered both algorithmic and human biases

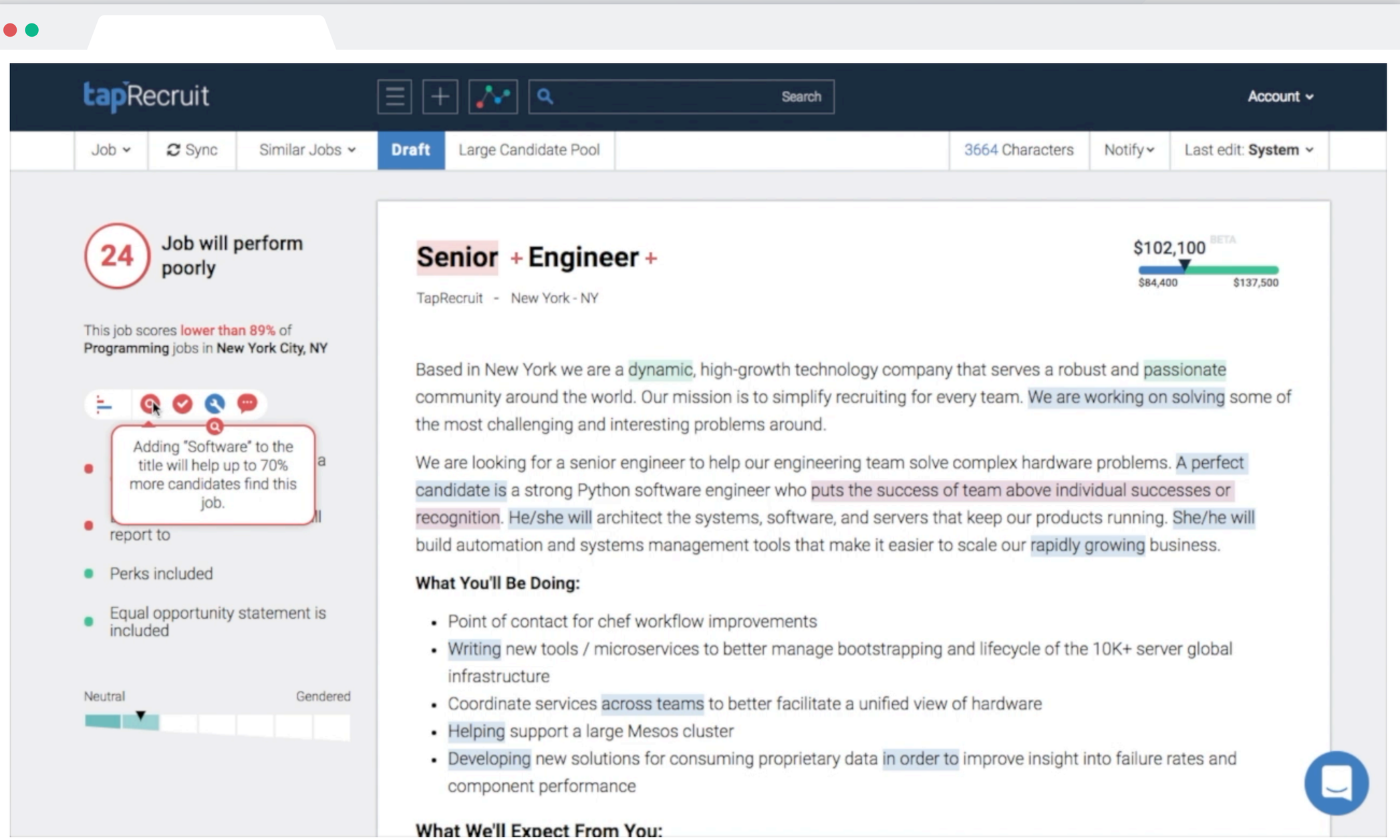


https://bit.ly/3dWVQDw



https://bit.ly/3bLZUoJ

How can we responsibly use algorithms in recruiting?


tapRecruit
Search
Account
Job
Sync
Similar Jobs
Draft
Large Candidate Pool
3664 Characters
Notify
Last edit: System
24
Job will perform poorly
This job scores lower than 89% of Programming jobs in New York City, NY
Adding "Software" to the title will help up to 70% more candidates find this job.
report to
Perks included
Equal opportunity statement is included
Neutral
Gendered
Senior + Engineer +
TapRecruit - New York - NY
$102,100
BETA
$84,400
$137,500
Based in New York we are a dynamic, high-growth technology company that serves a robust and passionate community around the world. Our mission is to simplify recruiting for every team. We are working on solving some of the most challenging and interesting problems around.
We are looking for a senior engineer to help our engineering team solve complex hardware problems. A perfect candidate is a strong Python software engineer who puts the success of team above individual successes or recognition. He/she will architect the systems, software, and servers that keep our products running. She/he will build automation and systems management tools that make it easier to scale our rapidly growing business.
What You'll Be Doing:
Point of contact for chef workflow improvements
Writing new tools / microservices to better manage bootstrapping and lifecycle of the 10K+ server global infrastructure
Coordinate services across teams to better facilitate a unified view of hardware
Helping support a large Mesos cluster
Developing new solutions for consuming proprietary data in order to improve insight into failure rates and component performance
What We'll Expect From You:

Research at TapRecruit

Helping companies make fairer and more efficient recruiting decisions

Data Science:

- What are distinguishing characteristics of successful career documents?
- What skills are increasingly important for different industries?

Decision Science:

- How do candidates make decisions about which jobs to apply to?
- How do hiring teams make decisions about candidate qualifications?

How can we responsibly use algorithms in recruiting?

- The importance of defining the “right” metrics.
- Going beyond “interpretability” to increase robustness.
- Decision-making context can (further) bias data.

You are what you measure:
Defining Appropriate Metrics

tapRecruit.co

You are what you measure

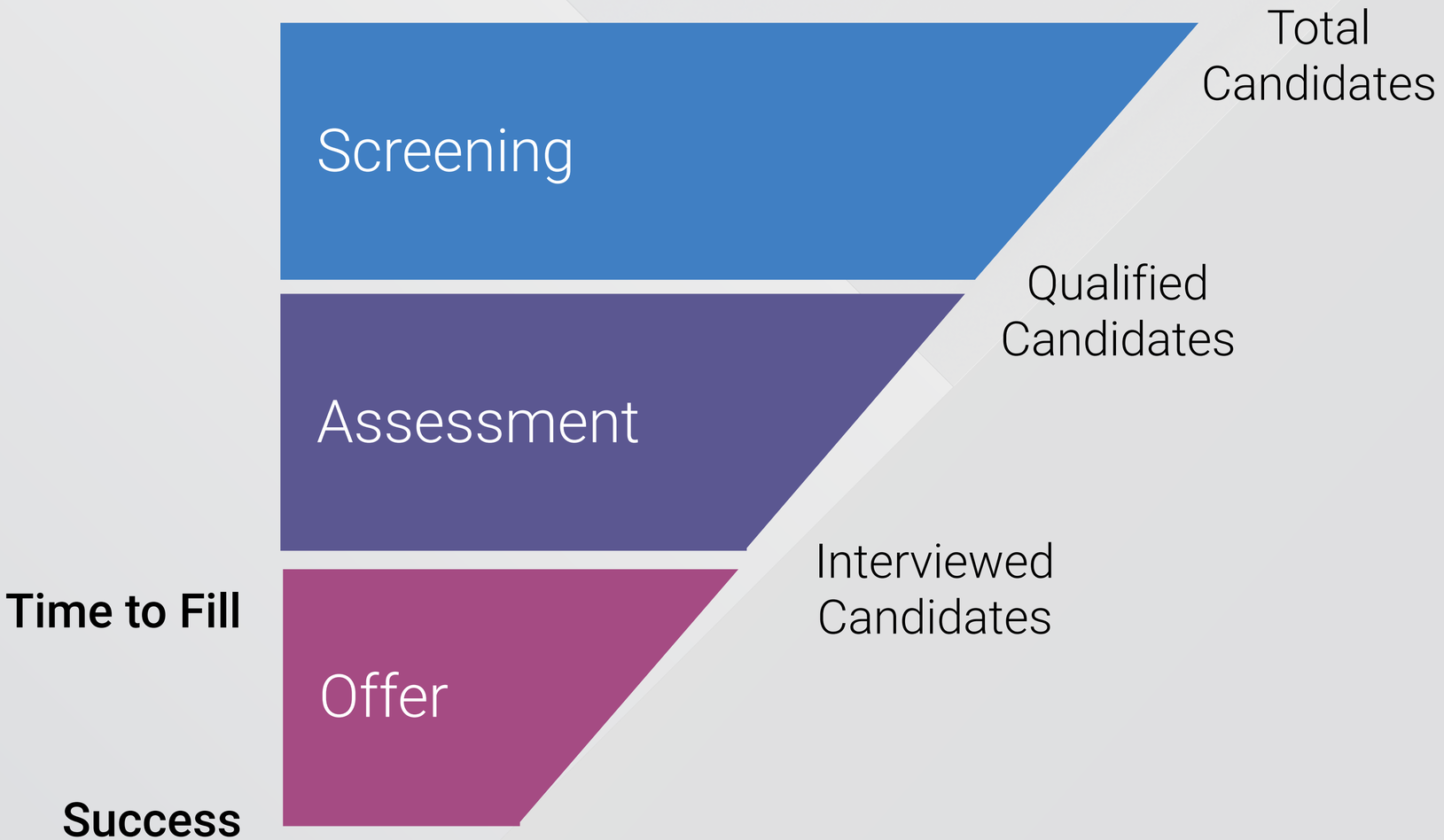
North Star metrics are strategic, signpost metrics are tactical

	Signpost	North Star
E-commerce	Add to Cart	Purchases
Ad Tech	Ad Views	Ad Clicks
Netflix	Content Views	Retention
	Lower-level and specific	Indirect and longer-term

Steven Kerr: https://www.ou.edu/russell/UGcomp/Kerr.pdf
Carl Anderson: http://bit.ly/northstar_signpost
Nirmal Govind: http://bit.ly/ab_testing_beyond

Which metric is the best?

Recruiting processes can be represented by many different metrics



Testing Metrics: Success

There is no standard endpoint for Time to Fill

Junior Tech
Job Descriptions

What features predict a job's Time to Fill?

The Company

What features predict the success of a job?

Job Title

The Impact of Job Titles

Hypothesis: Inflated titles amplify signal and reduce noise

Data Scientist roles
3 years of experience (max)

Large Applicant Pool

Few Qualified Candidates

Senior Data Scientist roles
3 years of experience (max)

Smaller Applicant Pool

More Qualified Candidates

tapRecruit.co

Title inflation fails to deliver

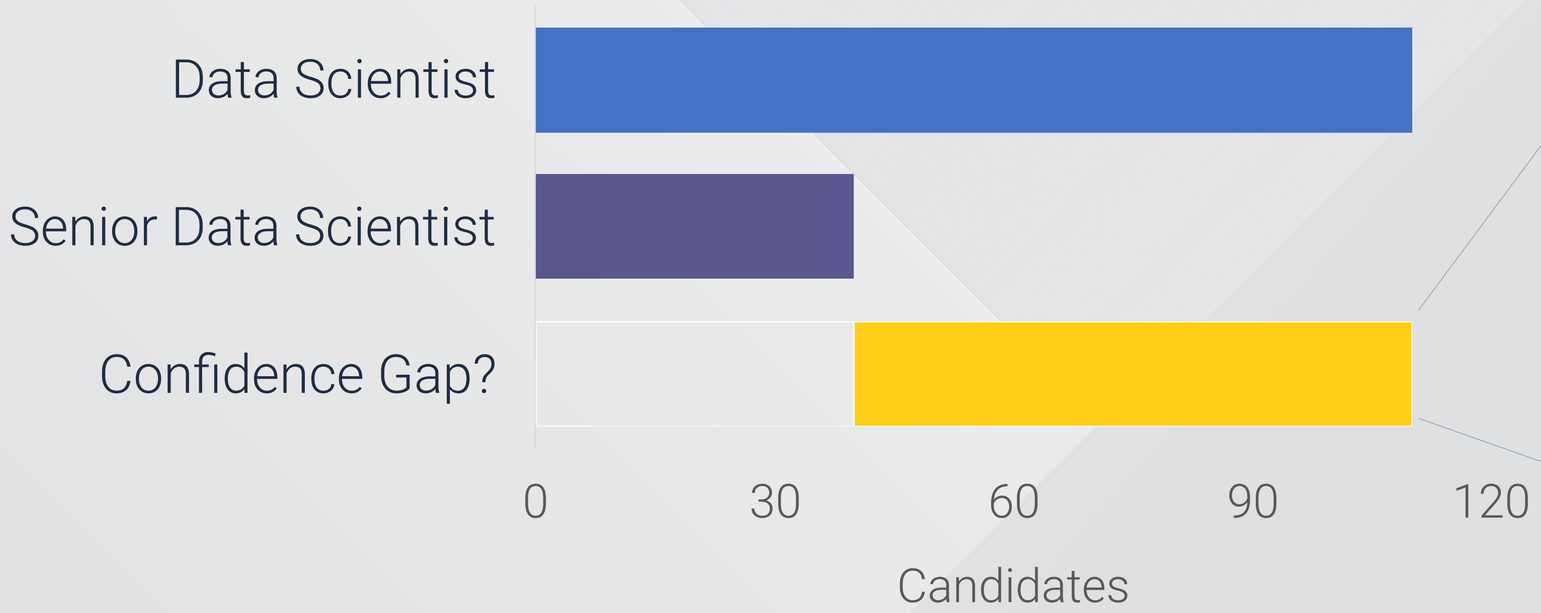
Fewer qualified applicants, lower chance of success

	Data Scientist	**Senior** Data Scientist
Total Applicants	110	40
Qualified Candidates	8	4
Chance of Success	**58%**	**29%**

tapRecruit.co

The impact of one word

What accounts for the difference in candidate pool size?



"A review of personnel records found that **women** working at HP applied for a promotion only when they believed they met **100 percent of the qualifications** listed for the job. **Men** were happy to apply when they thought they could meet **60 percent of the job requirements**."

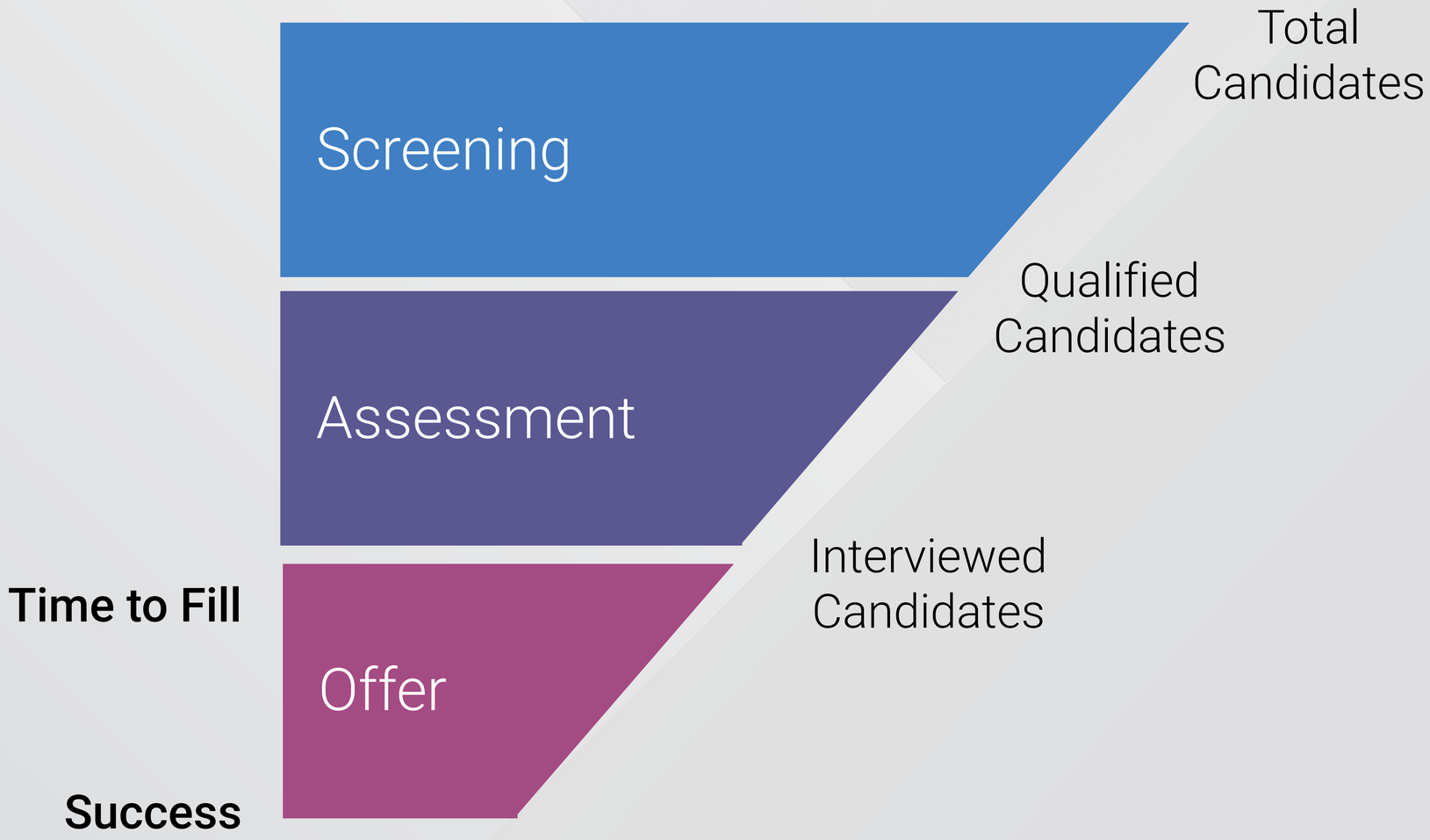
tapRecruit.co

There’s a reason we associate Black Boxes with Crashes:

Going Beyond Interpretability

Context is queen

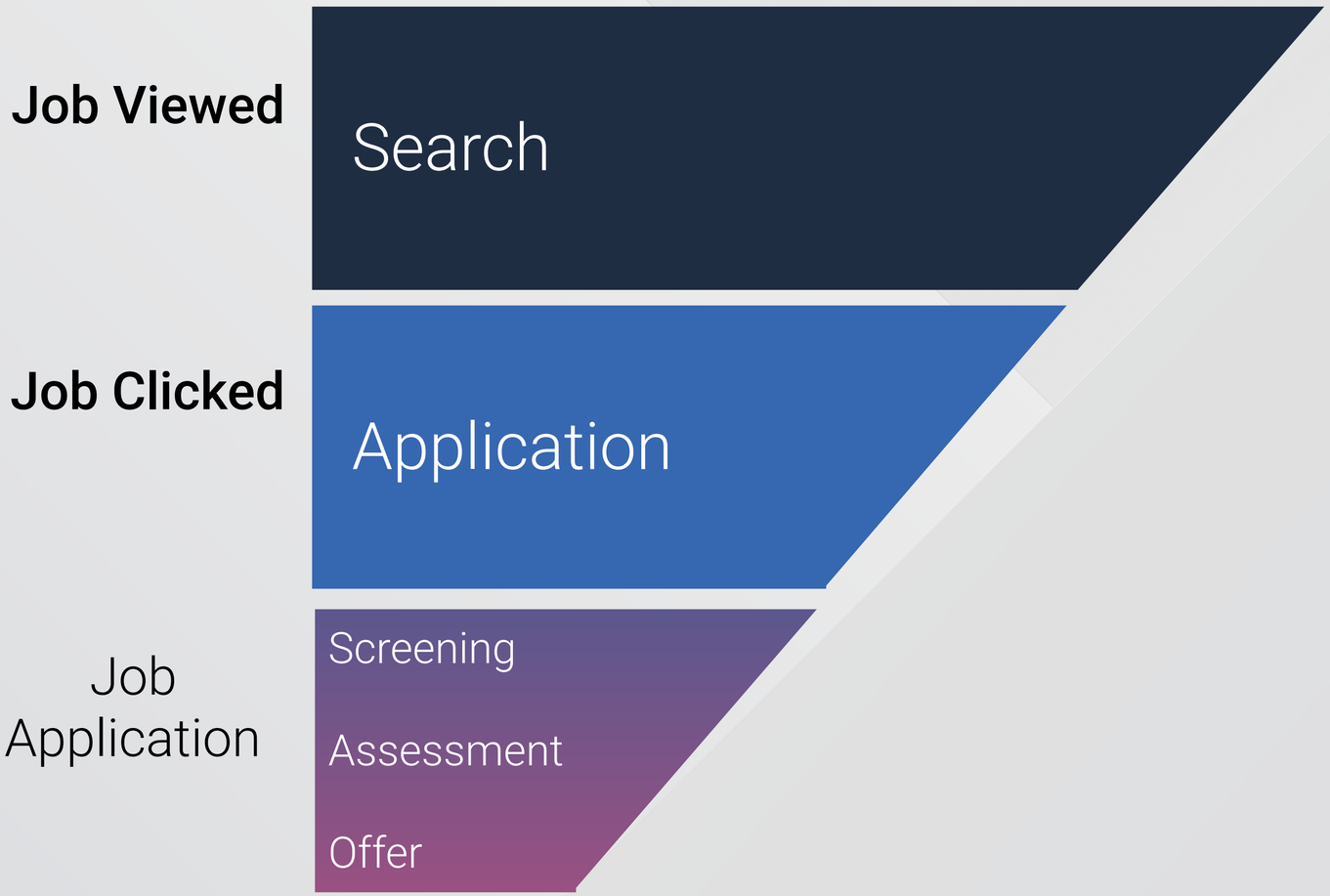
Understanding candidate behavior is critical



tapRecruit.co

Context is queen

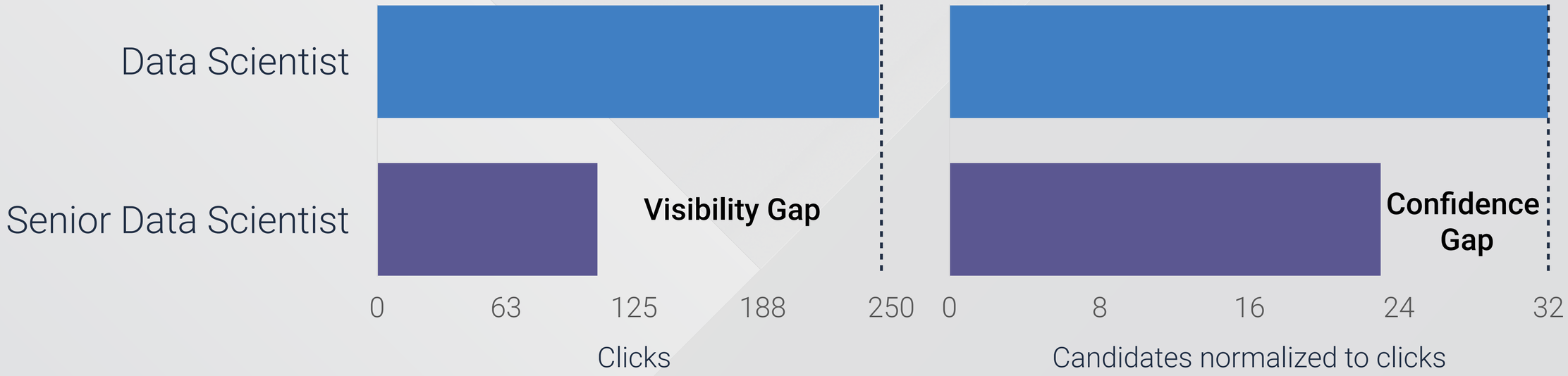
Understanding candidate behavior is critical



tapRecruit.co

The double-whammy of senior titles

Inflated titles drive fewer job views and fewer applications



tapRecruit.co

Inflated titles attract fewer women

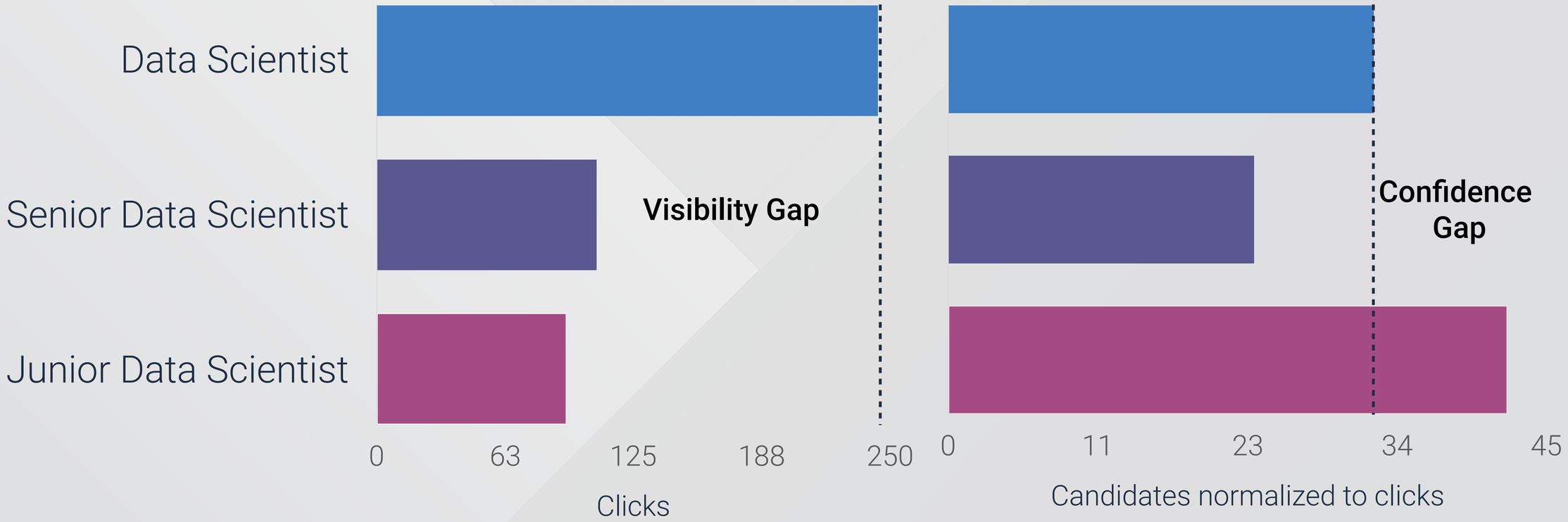
Fewer female candidates and a lower chance of a female hire

	Data Scientist	**Senior** Data Scientist
Female Applicants	39 (36%)	8 (23%)
Qualified Female Apps	2 (32%)	1 (26%)
Chance of Female Hire	**39%**	**15%**

tapRecruit.co

Jobs with deflated titles are hit once

Junior titles have lower job views but higher application rates



tapRecruit.co

Recruiting is a Conversation, not a Filibuster:

How Contexts Influence Data

tapRecruit.co

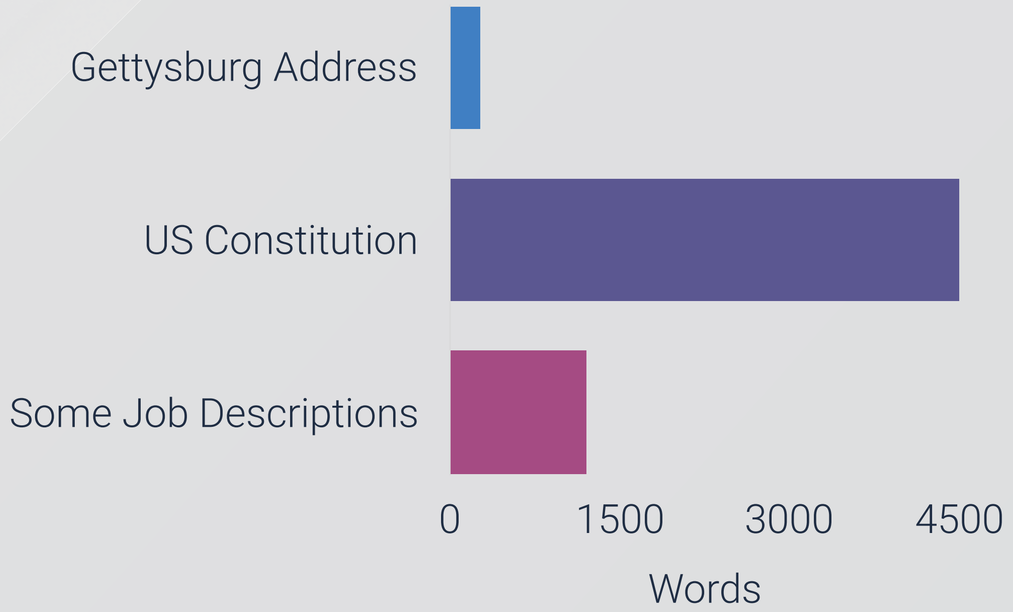
Job descriptions communicate more than you think

The things you say (and don't say!) speak volumes

Project – Strategy Manager

Hooli – Palo Alto, CA

Hooli's vision and mission: Our vision is to make Palo Alto the global model for inclusive innovation and economic growth, fueled by the City's diverse people and businesses. Our mission is to make investments in strengthening neighborhoods and spurring the creation of good jobs.
Hooli's Strategy Department: The Strategy department is a ten-member team that takes an objective, collaborative, and hypothesis-driven approach to solving problems and facilitating decision-making for senior leaders at Hooli and in City government. Our projects fall into five key categories:
Strategic and operational advisory: working with senior leaders at Hooli and in City government to shape and direct existing initiatives to target policy and financial outcomes (e.g., developing tenanting strategies for Hooli real estate assets,)
Project management: supporting Hooli and City Hall with project management of large-scale projects, often cutting across agencies (e.g., coordinating the City's 2017 Jobs Plan)
New initiative ideation and diligence: assessing the need for a new policy or program and building the case for investment with senior leadership (e.g., analyzing Hooli actions for technologies such as cybersecurity, blockchain, artificial intelligence and autonomous vehicles)
Procurement: managing the procurement process of a set of economic development consulting firms for Hooli teams and other City agencies (e.g., helping the Mayor's Office of the Chief Technology Officer with the scope and RFP selection for a citywide broadband implementation plan)
Capacity building: creating tools and resources that improve processes and outcomes at Hooli (e.g., pitch deck training delivered to Hooli employees, project management of interdepartmental planning)



tapRecruit.co

Job descriptions have sweet spots

Longer job descriptions don't attract more qualified candidates

Fewer Applications: Long JDs receive 20% fewer applications.

Fewer Qualified Apps: Of the candidates that do apply, fewer are qualified enough to make it through screening and interview processes.

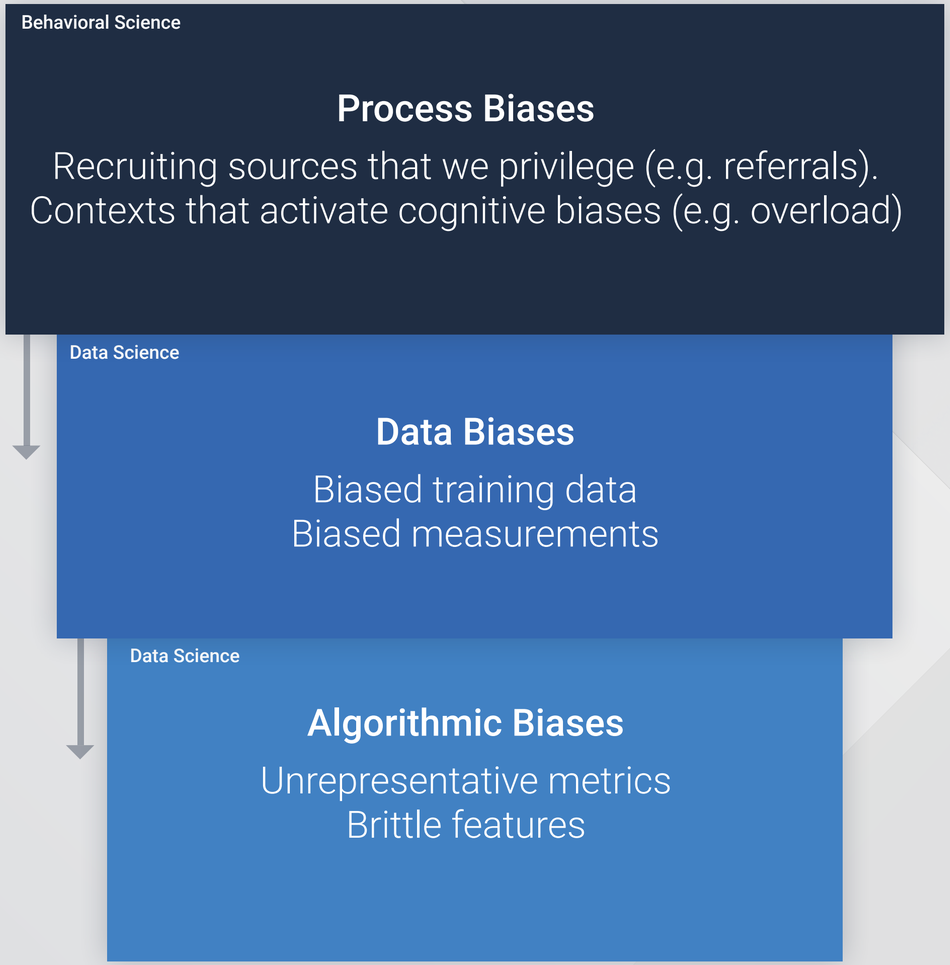
Less Successful Job Searches: Long JDs are less likely to result in a hire.

Responsibly using Algorithms in Recruiting (& Beyond)

1. **You are what you measure:**
   - Not all metrics are created equally: the case of TTF vs Success
   - Title inflation decreases signal with no change to noise

2. **There's a reason we associate black boxes with crashes:**
   - Going beyond explainable algorithms to testing hypotheses
   - The double-whammy of the visibility and confidence gaps

3. **Recruiting is a conversation, not a filibuster:**
   - Poor internal processes can (unintentionally) create adverse outcomes



Science at TapRecruit

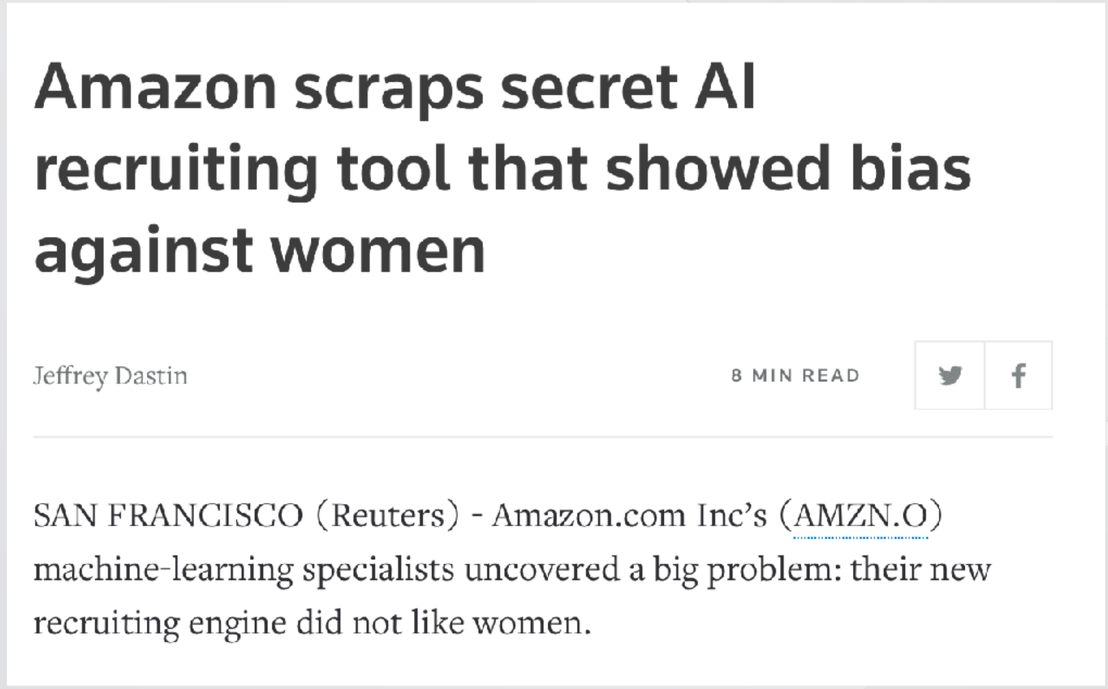
Challenging the Recruiting Bias Stack

Understanding bias and its compounding impacts requires a two-pronged approach. We use both **data science** and **behavioral science** to understand and address recruiting's unique bias stack.

tapRecruit.co

AI in Recruiting

Algorithms in Talent Acquisition are part of our world now



Amazon scraps secret AI recruiting tool that showed bias against women

Jeffrey Dastin

8 MIN READ

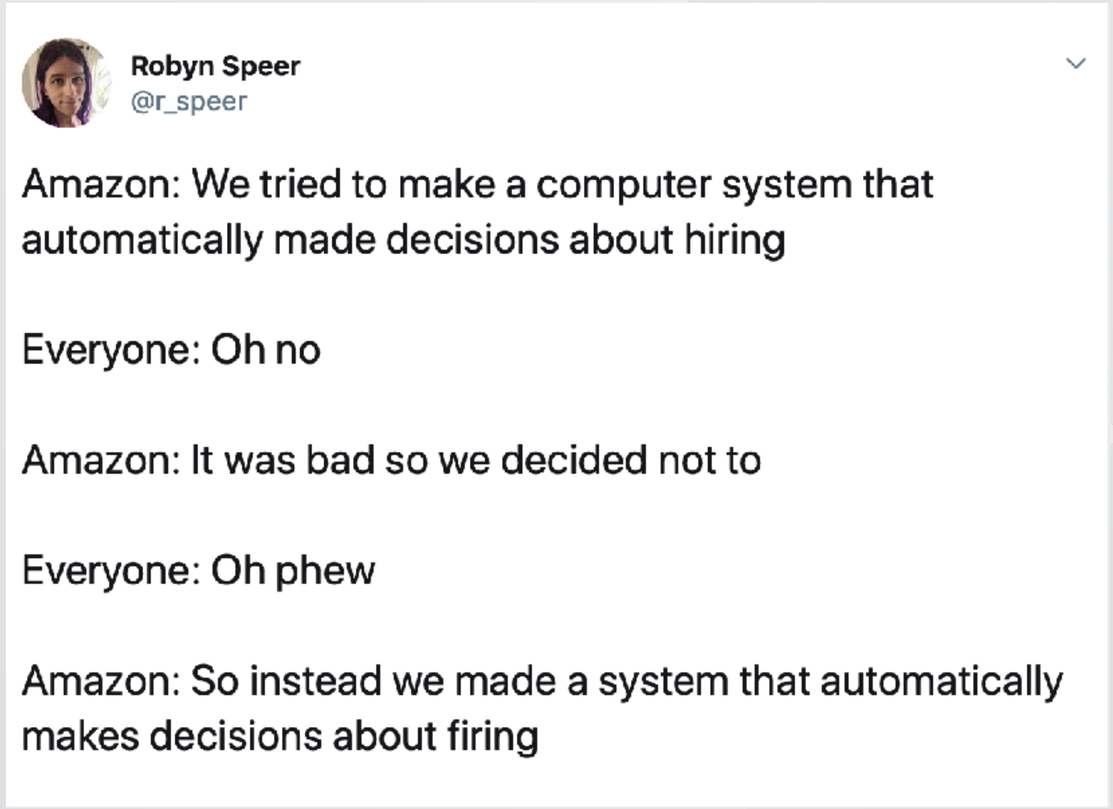
SAN FRANCISCO (Reuters) - Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.

https://reut.rs/3bMwcjf

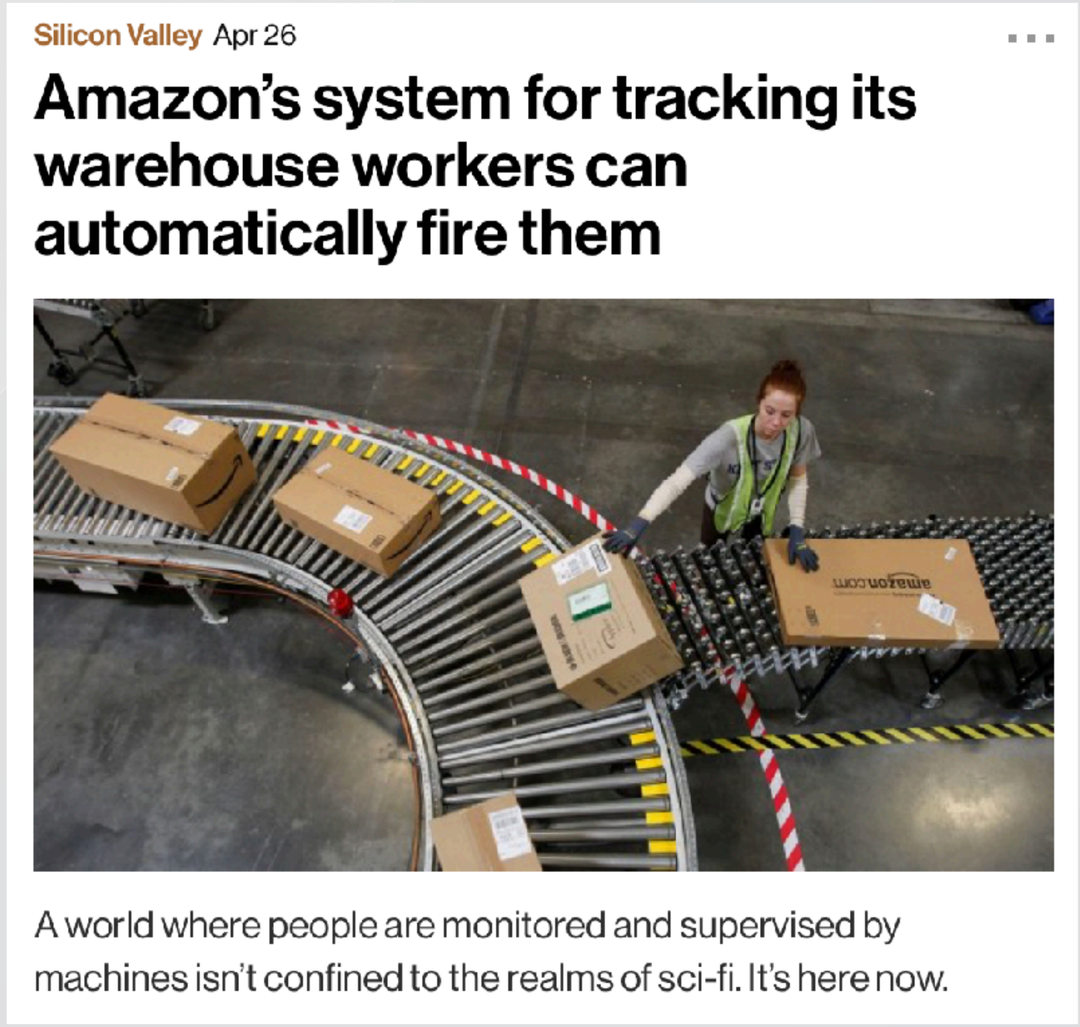
tapRecruit.co

AI in Talent Decision-Making

Algorithms in Talent Acquisition and Management are here to stay



https://bit.ly/2ypo4HW

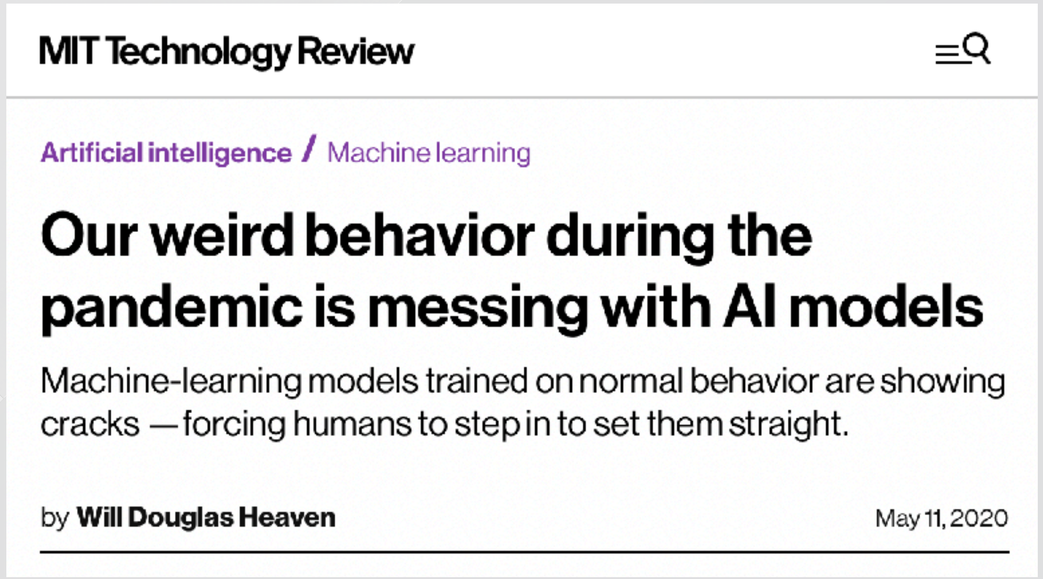


https://bit.ly/3cTQqcf

COVID, AI and Talent Decision-Making

Beware of increased noise in predictive models

https://nyti.ms/3dZnqA2



https://bit.ly/2XjPU0y

tapRecruit.co

Resources in Algorithms and Bias

Books

- Cathy O'Neill: "Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy"
- Virginia Eubanks: "Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor"
- Caroline Criado Perez: "Invisible Women: Data Bias in a World Designed for Men"
- Shoshana Zuboff: "The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power"

Reports

- AI Now Institute: "US Report: New Challenges to Government Use of Algorithmic Decision Systems"
- AI Now Institute: "Discriminating Systems: Gender, Race and Power in AI."
- Data & Society: "Advancing Racial Literacy in Tech: Why Ethics, Diversity in Hiring & Implicit Bias Trainings Aren't Enough"
- Brookings Institute: "Algorithmic bias detection and mitigation: Best practices and policies to reduce consumer harms"

Thank you ReframeWork & NYU School of Professional Studies!

Maryam Jahanshahi Ph.D.
Research Scientist
@mjahanshahi
maryam-j

tapRecruit.co