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50 Years of Test (Un)fairness: Lessons for Machine Learning

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THE AUTHORS



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- Natural Language Processing

Advancing AI for everyone

Hutchinson, Ben, and Margaret Mitchell. "50 Years of Test (Un) fairness: Lessons for Machine Learning." *Proceedings of the Conference on Fairness, Accountability, and Transparency*. ACM, 2019.



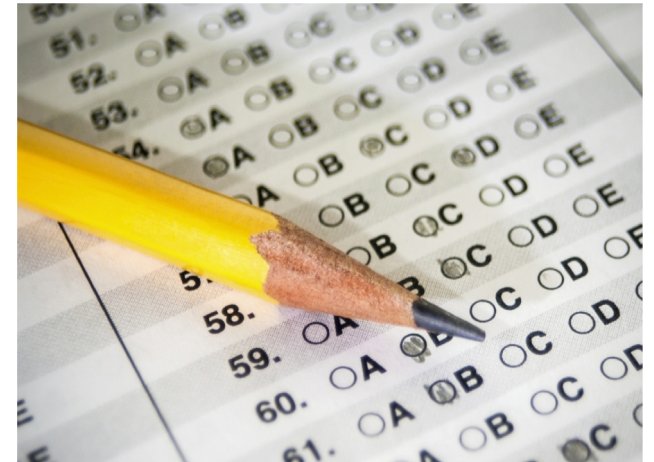


BRIEF OVERVIEW

- ✓ The paper provides a survey on the history of fairness research from different fields
- ✓ It shows that some ‘new’ results may have been discovered 50 years ago
- ✓ To know what was done in the past can better direct the future course of fairness research

MOTIVATION

- ✓ Standardized testing (SAT, GRE, GPA, etc.)
- ✓ Question: are these tests fair?
- ✓ ... and what does it mean to be fair?



Source: <https://tinyurl.com/tss3x7n>

A LANDMARK HISTORICAL MOMENT



The **Civil Rights Act of 1964** (Pub.L. 88–352, 78 Stat. 241, enacted July 2, 1964) is a landmark **civil rights** and labor law in the United States that outlaws discrimination based on race, color, religion, sex, or national origin.

The Act shaped the public's understanding of what it meant to be *unfair*

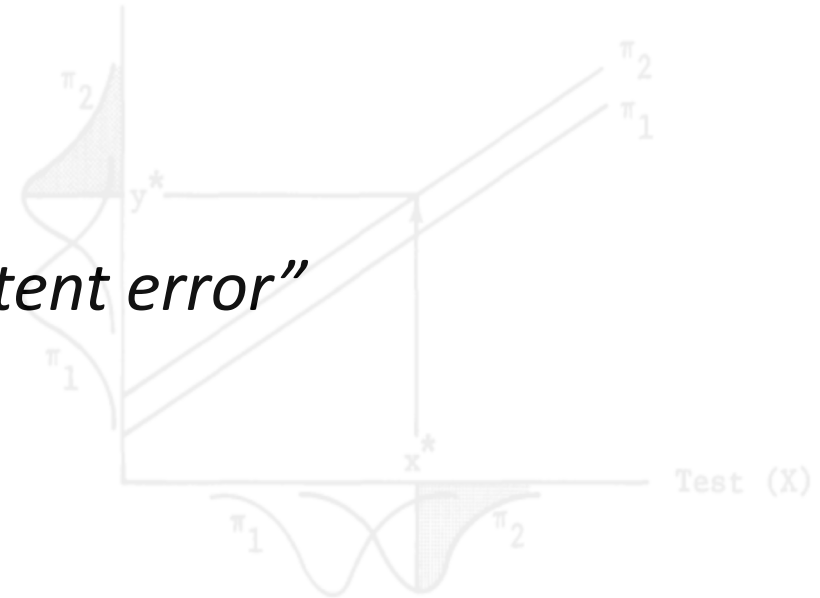
Source: britannica.com

✓ Clearly (1966):

“a subgroup does not have consistent error”

✓ Guion (1966):

“people with equal probability of success should have equal probability of being hired”



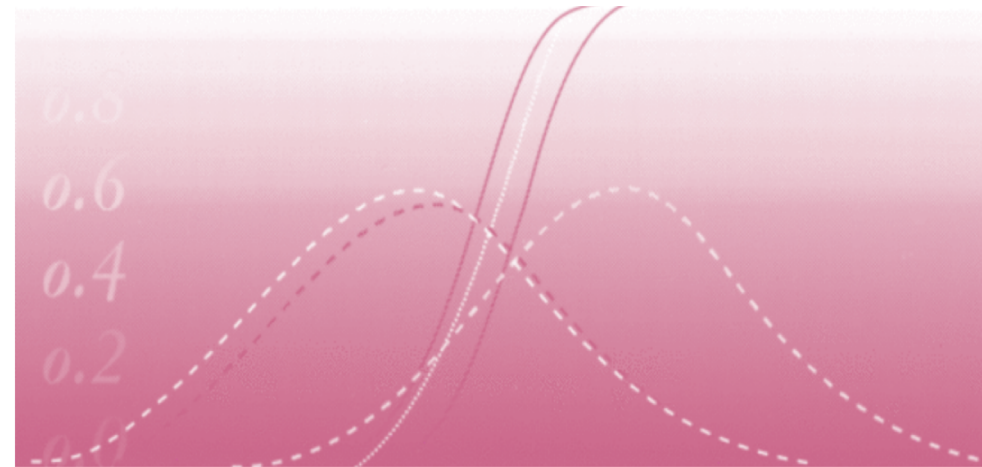
✓ Thorndike (1971):

- Equalize: *# of predicted +ve / # of true +ve*, for $A=1,-1$

✓ Darlington (1971):

- Unifies Cleary and Thorndike definitions in a common formalism

- ✓ 1976: Special edition of *Journal of Education Measurement*
- ✓ Peterson & Novick: parallels to ML fairness “equalized odds”, “sufficiency,” and “conditional procedure accuracy”
- ✓ Progress stopped after this special edition

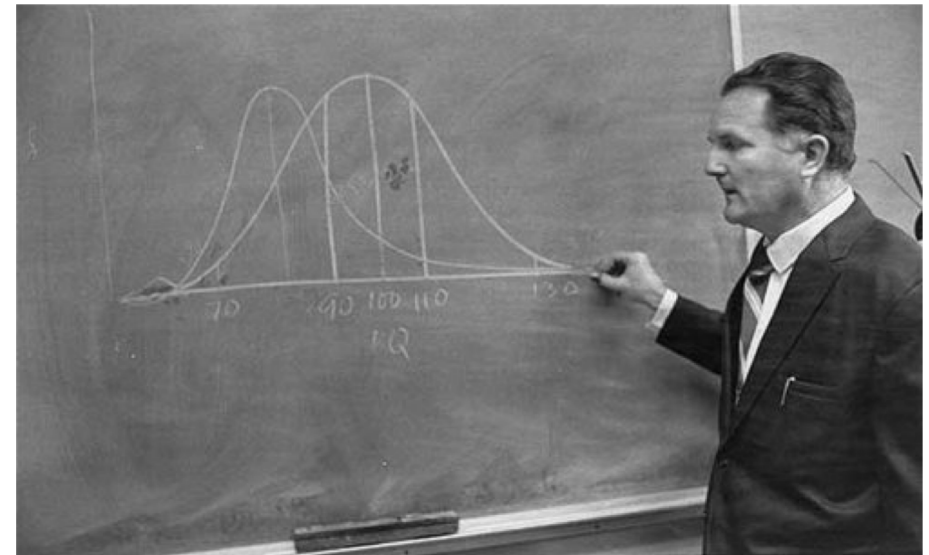


JEM

JOURNAL of EDUCATIONAL MEASUREMENT

Source: <https://onlinelibrary.wiley.com/journal/17453984>

- ✓ Renewed public debate about fair testing
- ✓ Courts were asked to rule on many cases indicating (un)fairness in educational testing violating Civil Rights Act
- ✓ Practices such as “race norming” of test scores on employment examinations



Source: tiny.cc/n7ohhz

PRESENT TIMES

- ✓ The rise of interest today corresponds with the public interest in the use of machine learning in criminal sentencing and predictive policing
- ✓ The experiences of the test fairness field suggest that in coming years, courts may start ruling on the fairness of ML models

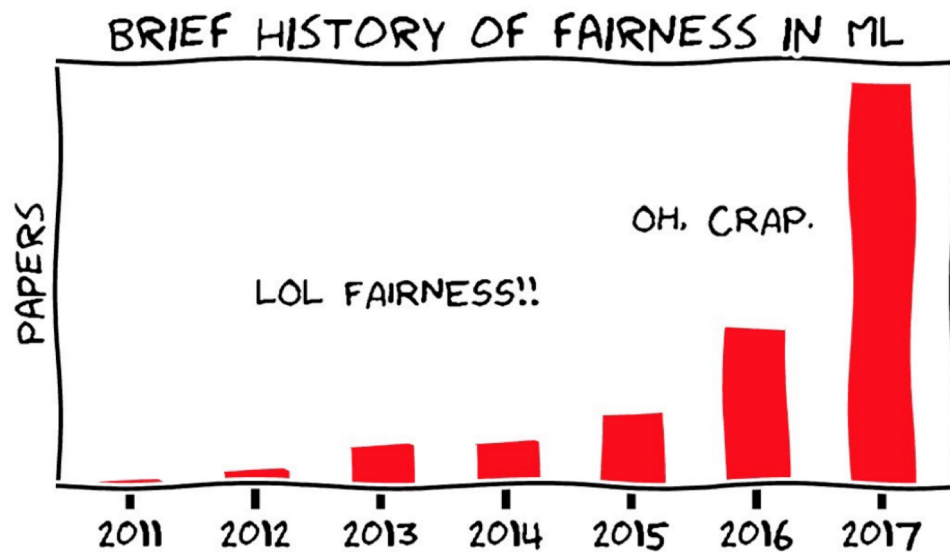


Source: tiny.cc/j4ohhz

(UN) FAIRNESS IN ML (PRESENTER'S ADDITION)



Google Photos, 2015



Source: <https://tinyurl.com/talgo6c>

Microsoft's twitter-based AI chatbot, 2016



SOME DISCUSSION POINTERS

- ✓ How can we tackle the problem of bias, e.g., content bias and selection system bias, in labelling datasets?
- ✓ Can ML models be judged as fair or unfair independent of a specific use?
- ✓ The switch from measuring unfairness to measuring fairness caused the field to wither away. How / should we return to studying unfairness?

THANK YOU
FOR *YOUR*
ATTENTION !