ROSA

DATA DE-BIASING SOLUTION

illumr

Myth: Data is Neutral

Data is biased - humans shape how data is collected, and what is collected.
This means that all data is subjected to human bias.

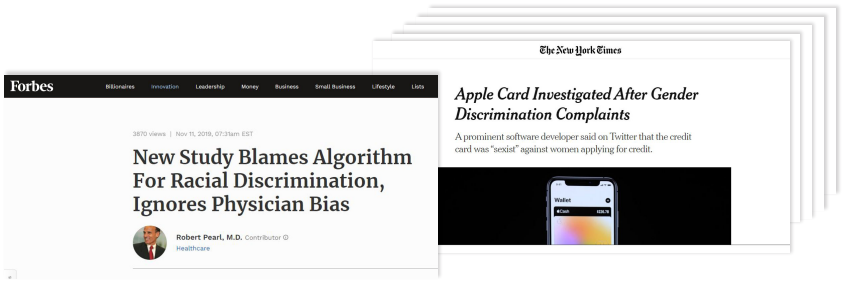
The Consequence

Machine Learning algorithms trained on this data replicate the human bias.

Why is this a problem?

Using biased data in Automated Decision Making Systems replicates the bias. This actively works against diversity and fairness - for example, a company may always hire the same demographic of people.

e.g. sexist Apple Credit card, racially biased risk scores for criminals



Discrimination based on certain characteristics is a criminal offense. Automated Decision Making Systems are not exempt.

e.g. Equality Act 2010 (UK), GDPR (Europe), Disparate Impact (US Labor Law)

What can you do?

Removing information about a characteristic from the data e.g. age, is not enough.
Proxy Variables are variables with a high degree of correlation with another variable.

How does ROSA help?

Rosa harnesses state-of-the-art machine learning techniques to make tiny adjustments to a dataset so that it becomes impossible to infer a given characteristic from the rest of the data.
Proxy variables are no longer proxies.

The Result

The output of a machine learning model trained on the data will be free of bias with respect to the characteristic.

If an algorithm cannot infer a characteristic, then it cannot discriminate by it.

No Bias

This data contains plenty of information about age through the Proxy Variables. This means that an algorithm trained on the data can still infer age, and therefore discriminate by it.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	First Name	Last Name	Address	Transportation Expense	Disciplinary Failures	Education	Age	Social Drinker	Social Smoker	Pet	Dietary	Height	BMI
2	Oscar	Robinson	Croydon	289	0	Postgraduate	n/a	0	0	0	Vegetarian	164	24
3	Betsy	Sofer	Richmond	118	0	Highschool	n/a	1	1	1	None	168	36

- (A) First names have changed dramatically over time
- (C) Demographics of different areas vary
- (F) Commonality of university education has changed
- (H) Drinking and smoking less popular with young people
- (J) Older people more likely to own pet
- (K) Vegetarianism is gaining popularity
- (L) Mean height is increasing
- (M) Older people tend to have higher BMI

Why ROSA is different

Stand alone

Unlike other de-biasing solutions, Rosa is a stand-alone pre-processing step that does not affect the rest of the data processing pipeline.

Unrivalled ease-of-use

Easy to use interface means that any data analyst can prepare the data, without requiring knowledge of the downstream processing steps.

Fit and forget

Unlike other solutions such as that offered by IBM, ROSA needs no adjustment when a change is made to the data analysis pipeline, or when the data itself changes.

Analysis Pipeline