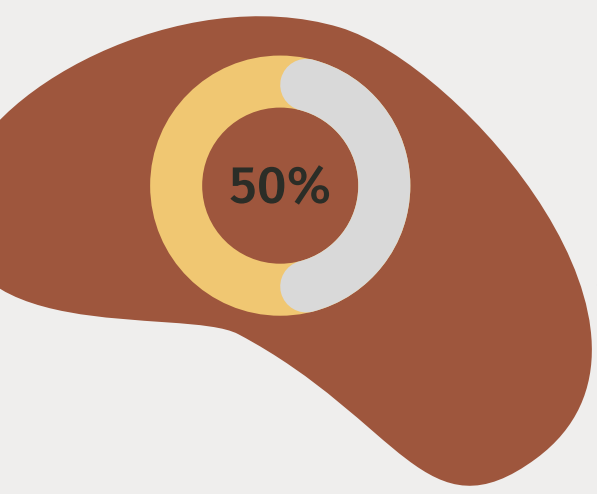
It's all about the **Group Fairness** In Machine Learning

Machine learning algorithms have the potential to unfairly impact certain demographic groups based on attributes like race, gender, or age. To ensure equal outcomes across protected groups, group fairness in machine learning aims to assess and address biases. This fairness is characterized by three key statistical conditions: independence, sufficiency, and separation.

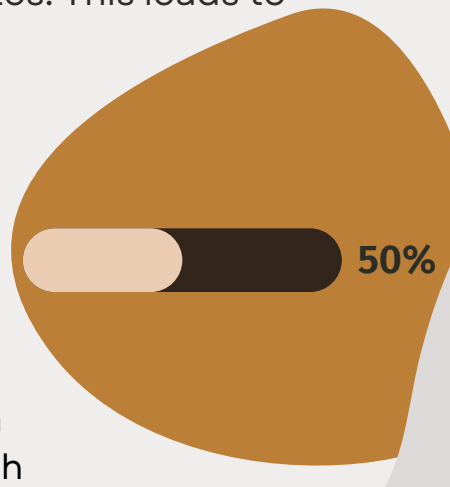
Independence

Independence is a crucial concept in group fairness in machine learning. It means that sensitive attributes, such as race or gender, should not influence the predictions made by the algorithm. This ensures that individuals with different attributes are treated equally and prevents any discrimination. By maintaining independence, algorithms promote fairness and avoid making decisions based on factors that are irrelevant to the task at hand.

Sufficiency



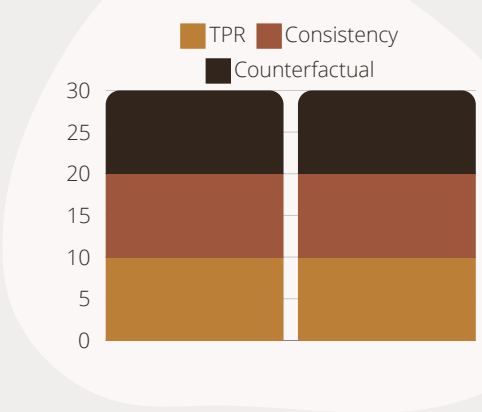
Sufficiency is a condition where the sensitive attribute is not related to the true output. It means that all individuals and groups are treated equally, regardless of their attributes or predictions. Machine learning models maintain sufficiency to ensure that the outcomes are unbiased and fair across different demographic groups, without being influenced by sensitive attributes. This leads to accurate and impartial results.



Separation

Separation is a crucial component of ensuring fairness in machine learning algorithms. It refers to the condition where the sensitive attribute is independent of the predicted outcome, meaning that correct predictions are made based on relevant factors alone, rather than influenced by attributes such as race, gender, or age. By maintaining separation, algorithms can make predictions equally for all groups and individuals, ultimately achieving equitable outcomes and avoiding biases in decision-making processes.

Supporting exemples with real life impact



In today's world, healthcare delivery algorithms play an increasingly important role in determining the quality of healthcare services received by patients. However, there are concerns that these algorithms may not always be fair, potentially leading to disparities in service delivery and access to treatment options for different demographic groups. To address this issue, it is crucial to ensure that healthcare algorithms are designed and implemented with fairness in mind, so that all individuals can receive the care they need without discrimination or bias.

References

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