



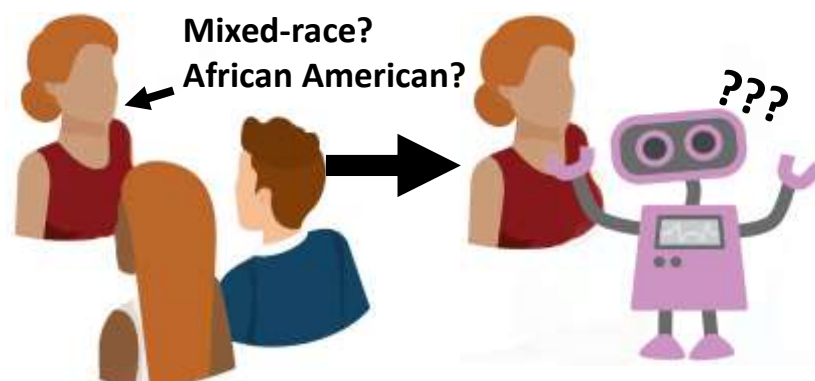
Hypodescent in Face Recognition Algorithms: Evidence and Effects of Training Dataset Racial Composition

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Introduction

AI techniques tend to exhibit similar biases in race perception as found in humans. A particularly prevalent type of perceptual bias among humans is hypodescent, in which mixed-race individuals are classified by their minority racial status.



Do AI techniques also show evidence of hypodescent?

Hypotheses

H1) Hypodescent is likely to be produced by the AI techniques when recognizing racially ambiguous faces

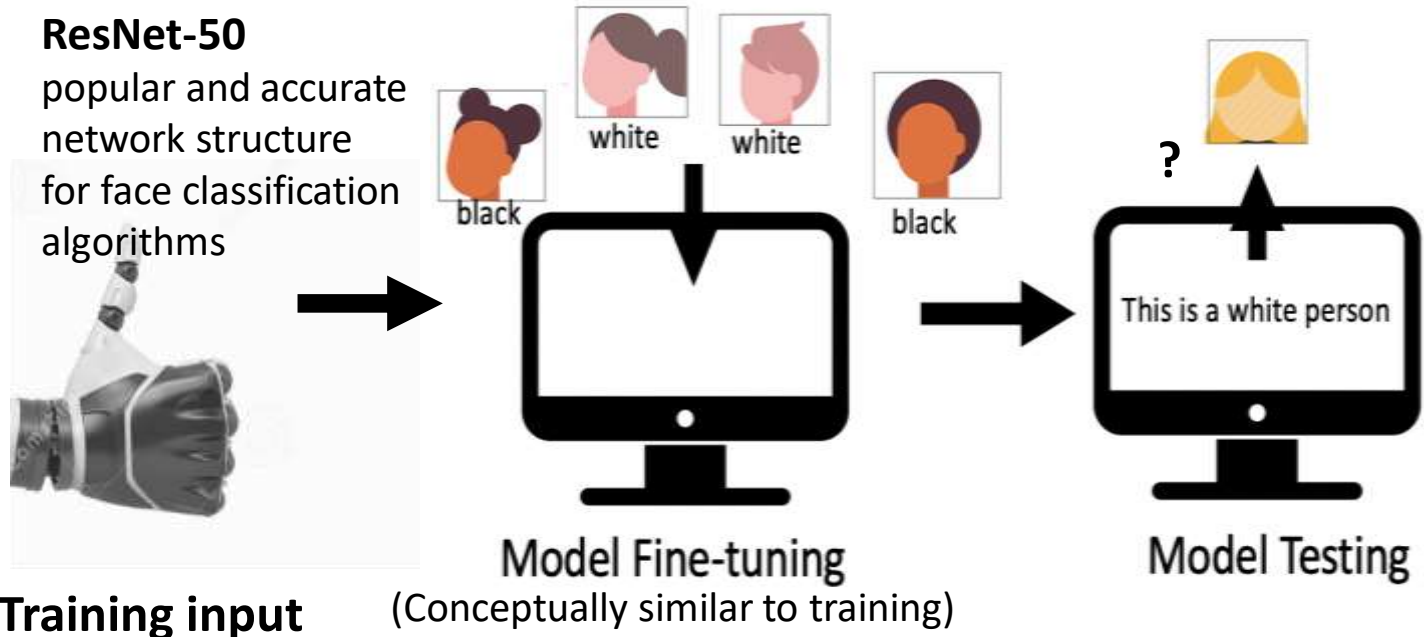
H2) The amount of hypodescent will depend on the racial composition of the training dataset

Methods

Race Recognition Process

ResNet-50

popular and accurate network structure for face classification algorithms



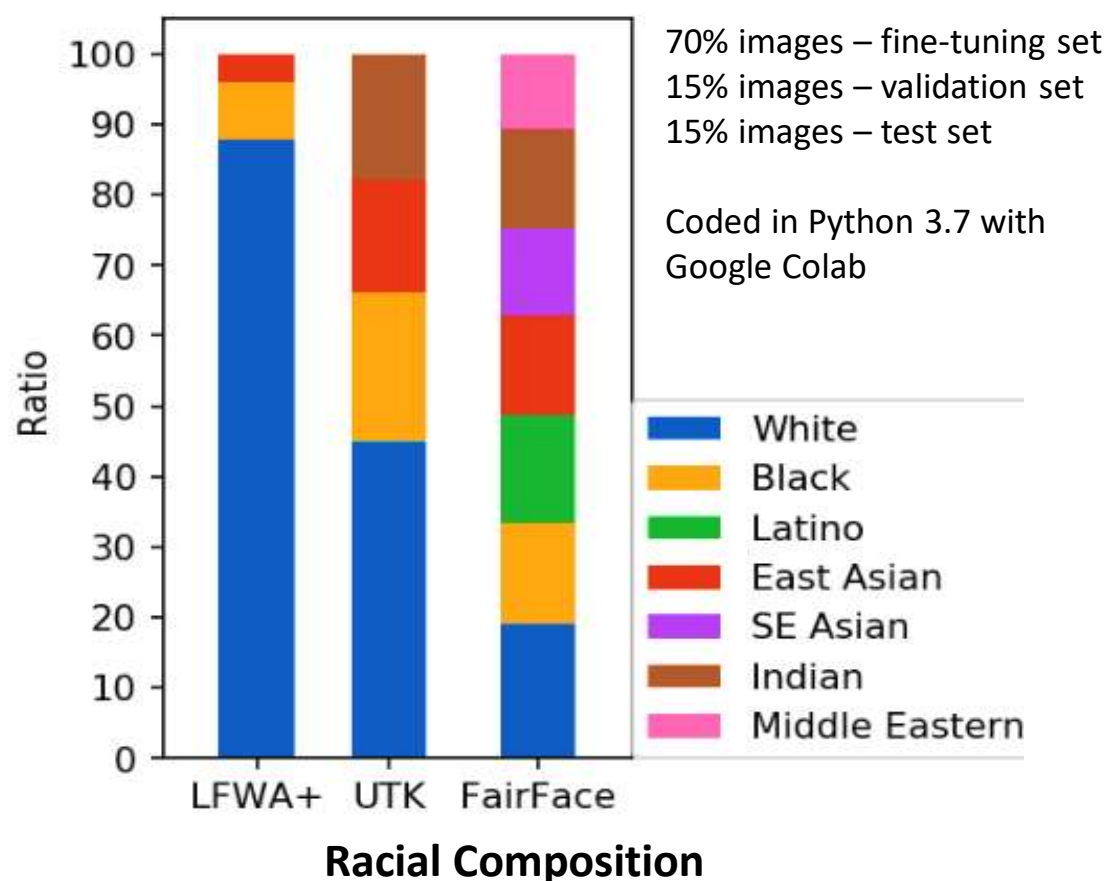
LWFA+



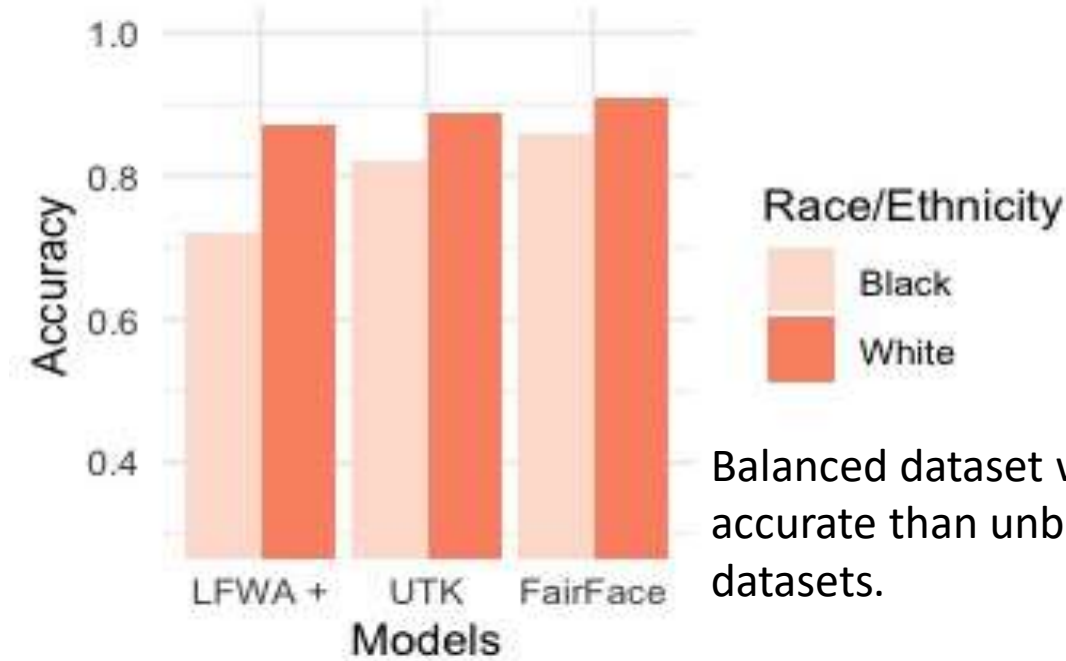
UTK



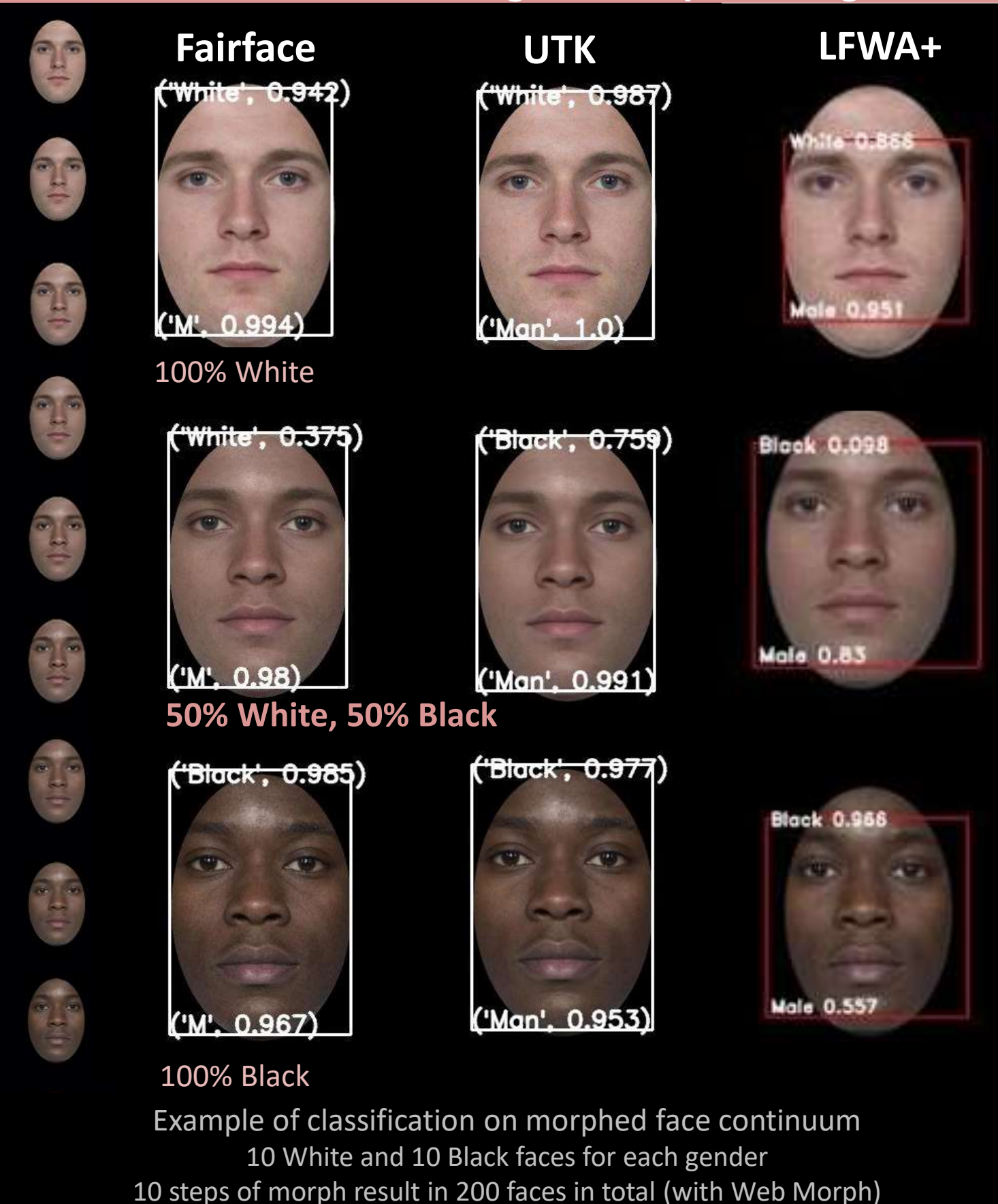
Fairface



Accuracy was influenced by the racial composition of each training set

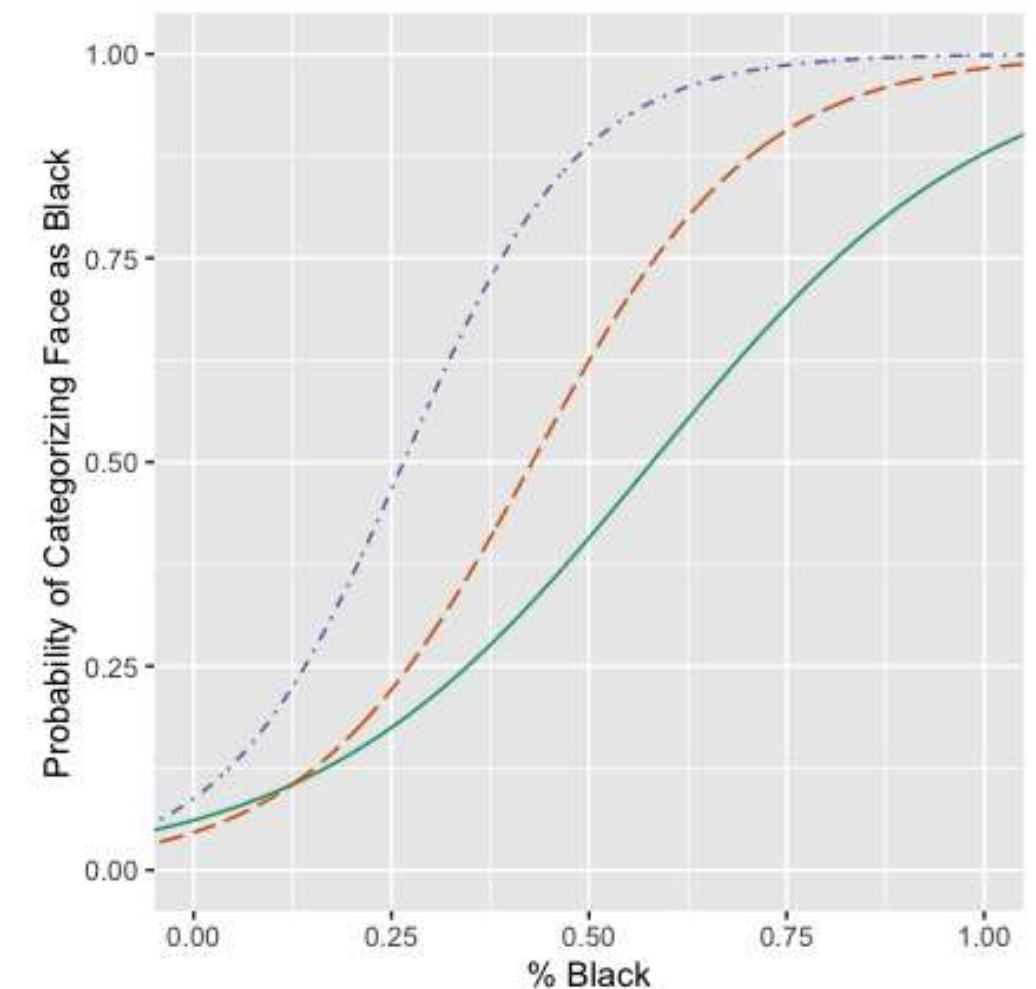


Perception biases against racially ambiguous faces were found when testing with morphed images



The amount of hypodescent will depend on the balance of the training dataset (predicted)

Point of subjective equality (PSE): the point at which a face was equally likely to be categorized as Black or White (ranging from 0 to 1).



Conclusion

Potential perception bias in AI techniques such as deep learning neural networks ✓

Hypodescent caused by racial composition of the training data. ✓

Future Direction

Existing public pre-labeled datasets served as the training input for deep learning techniques do not provide much annotators' information. This introduced a new question:

- What if the annotators are prejudiced?
- Will their perception towards a certain race significantly impact their annotation results and eventually jeopardize the overall performance of a facial recognition model?
- Will the model display even greater bias than its original annotators?

Future research will be focused on the annotators' sides and investigate to what extent the bias in AI would be perpetuated or even magnified by human prejudice.