

Case Studies

Scenario 6: AI-Assisted Diagnosis of Skin Cancer Using Dermoscopy Images

Background: AI tool is being developed to assist dermatologists in diagnosing skin cancer from dermoscopy images. Skin cancer is a serious condition that can be effectively treated if caught early. The tool aims to classify images as either malignant (cancerous) or benign (non-cancerous).

Development and Training: The dataset used for training the AI tool includes images from patients of various ethnic backgrounds. However, there are significant demographic disparities in the dataset. Caucasian patients, who have a higher prevalence of certain types of skin cancer, are overrepresented compared to patients who are more likely to have darker skin tones, such as those of African, Asian, or Hispanic descent. To help mitigate bias, skin tone information will be recorded in the training data using the Fitzpatrick skin tone scale, which categorizes skin types from Type I (light skin) to Type VI (dark skin) based on their response to UV light.

Questions to consider:

- What dangers/risks of the use of AI for this problem can you identify at this stage?
- How would you go about addressing these?
- What fairness metric(s) do you think might be appropriate when assessing the AI tool for potential bias?

REMINDER - DEFINITIONS OF FAIRNESS

- *False Negative Rate (FNR): the rate at which positive cases are missed by the classifier*
- *Demographic parity - equal chance of being classified positive for each protected group*
- *Equalised odds - equal true positive rate (TPR) & false positive rate (FPR) for each protected group*
- *Equal opportunity - only equalise either FPR or FNR, not both*

