Improving the Fairness of Artificially Intelligent Skin Disease Detectors Using Stable Diffusion

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This study addresses the ethical implications of using artificially intelligent neural networks for medical diagnosis, with a focus on skin diseases. While such networks have demonstrated high accuracy in diagnostic applications, they have been found to misdiagnose minority populations at a disproportionately high rate due to imbalanced training datasets. To prevent this perpetuation of inequities, our study artificially balances a skin disease training dataset by adding stable diffusion-generated synthetic images depicting skin diseases on underrepresented skin tones. Additionally, prompt engineering and fine-tuning are utilized to optimize the photorealism and diversity of these synthetic images. Notably, our study is the first to achieve a statistically significant increase in the fairness of a skin disease detector. Specifically, we improve fairness by over 50%, as quantified by the average odds difference metric, thereby helping to foster more equitable healthcare outcomes.

Awards Won: