
Addressing Bias in Chest Radiography Deep Learning Foundation Models



According to a new study, a chest radiography foundation model reveals racial and gender-related biases, potentially resulting in varying performance across patient groups.

Ben Glocker, Ph.D., lead researcher, professor of machine learning for imaging, and his research team compared the performance of a recently published chest X-ray foundation model and a reference model built by the team. They conducted this analysis using 127,118 chest X-rays from 42,884 patients representing diverse racial backgrounds, including Asian, Black, and white patients.

The researchers conducted a disease detection analysis to assess the models' effectiveness within distinct subgroups. The analysis revealed significant variations in disease detection-related features when considering factors such as biological sex and race.

Dr. Glocker said, "Our bias analysis showed that the foundation model consistently underperformed compared to the reference model".

"We observed a decline in disease classification performance and specific disparities in protected subgroups".

Significant differences were observed in disease detection-related features between male and female patients, as well as between Asian and Black patients. Compared with average model performance across all subgroups, classification performance on the 'no finding' label decreased by 6.8% to 7.8% for female patients. Additionally, the ability to detect 'pleural effusion' decreased between 10.7% to 11.6% for Black patients.

The chest radiography foundation model exhibited bias related to race and sex, resulting in varying performance across patient subgroups, which raises concerns about its safety for clinical applications.

Dr Glocker said, "To mitigate the risk of bias associated with the use of foundation models in clinical decision-making, it is crucial for these models to be fully accessible and transparent".

Source: [Radiological Society of North America](#)

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