

ML model for Shared Decision-Making Tool for CRC Screening

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Colorectal cancer remains a significant public health concern, and effective screening is fundamental in early detection. In response to the complexity of screening decisions and the need to tailor screening approaches to individual patients, our project focuses on developing a shared decision-making tool to guide healthcare providers and patients, principally from vulnerable population in choosing the most appropriate screening method.

Utilizing the PLCO dataset, we constructed a LGBM model. This model supplemented with SHAP enables us to not only calculate probabilities but also gain valuable insights into a patient's individual risk of developing colorectal cancer.

Given the sensitive nature of the vulnerable population we serve, we meticulously designed our feature set to be straightforward and easily answerable by patients, prioritizing accessibility and effectiveness for those with limited health literacy and to fit in with the current practices of healthcare professionals.

Our feature set includes essentially non-exam-based variables such as age, sex, weight, height, BMI, alcohol intake (current and during ages 40-54), smoking history, smoking quantity, diabetes, hypertension, and heart problems. These variables not only simplify the decision-making process but also align with our commitment to cost-effective and timely decision-making.

In assessing the performance our model achieved an AUROC score of 0.716, signifying its ability to discriminate between patients at different levels of colorectal cancer risk. This outcome underscores the potential of our tool to provide valuable insights into the personalized screening decision-making process.

In summary, our project seeks to bridge the gap in colorectal cancer screening by offering a user-friendly shared decision-making tool with its simplicity, robust performance, and focus on accessibility for a vulnerable population, this tool holds promise in enhancing patient engagement and promoting informed decision-making for more effective colorectal cancer screening strategies.