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Machine Learning Models for Predicting, Understanding, and Influencing Health Perception

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Abstract

Lay perceptions of medical conditions and treatments determine people's health behaviors, guide biomedical research funding, and have important consequences for both individual and societal wellbeing. Yet it has been nearly impossible to quantitatively predict lay health perceptions for hundreds of everyday diseases due to the myriad psychological forces governing health-related attitudes and beliefs. Here we present a data-driven approach that uses text explanations on healthcare websites, combined with large-scale survey data, to train a machine learning model capable of predicting lay health perception. We use our model to analyze how language influences health perceptions, interpret the psychological underpinnings of health judgment, and quantify differences between different descriptions of disease states. Our model is accurate, cost-effective, and scalable, and offers researchers and practitioners a new tool for studying health-related attitudes and beliefs.