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Stress Detection Using Machine Learning with Physiological Sensor Data

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Abstract: *Early diagnosis of stress can assist avert severe physiological and psychological repercussions, making it a vital component in mental health monitoring. This study presents a stress detection system that uses machine learning to analyze data from physiological sensors. The sensors collect information about the user's breathing, temperature, blood oxygen levels, snoring range, eye movement rate, and respiratory rate, as well as their sleep habits. Before using XGBoost, AdaBoost, and a Majority Voting ensemble to categorize stress levels, the system preprocesses the multidimensional data to improve the quality of the features. With its extensive set of physiological and behavioral markers, the SaYoPillow dataset from Kaggle is used as the main data source. In order to find the best algorithm for stress prediction, we compare the models using accuracy metrics. The Majority Voting ensemble outperforms all other methods by getting the best classification accuracy, which is a sign of how well it can incorporate predictions from different base models. The method demonstrates that ensemble learning works well for stress categorization and shows how physiological data can be used to create smart health monitoring systems.*

Keywords: Stress Detection, XGBoost, AdaBoost, Majority Voting, Ensemble, Physiological Sensor Data

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