# Monitoring Stress Using Electrocardiogram Signal

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This paper presents a deep learning-based approach to detect mental stress from electrocardiogram (ECG) signals. The proposed method employs data augmentation and a shallow deep learning architecture combined with convolutional neural networks (CNNs) and long short-term memory (LSTM) networks. The model was trained and validated using 132 records collected from 22 healthy subjects. The proposed approach achieves an accuracy of 75%, sensitivity of 70.37%, specificity of 84.62%, precision of 90.48%, and f1-score of 79.17% in detecting mental stress from ECG signals. This study highlights the significance of using a combination of CNN and LSTM networks to achieve ECG-based stress classification. The proposed method has potential applications in the field of mental stress monitoring and management.
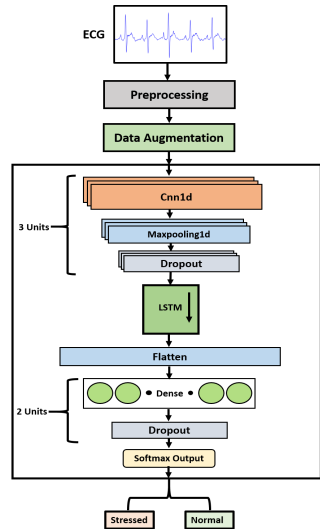
An illustration of the proposed method for stress classification using ECG signal.

The performance evaluations of the proposed model before and after data augmentation using specificity, precision, accuracy, sensitivity, F1-score.

Augmentation	Specificity	Precision	Accuracy	Sensitivity	F1-score
No	7.69%	69.23%	70%	100%	81.81%
Yes	84.62%	90.48%	75%	70.37%	79.17%