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(57) Abstract :
ABSTRACT [0013] Sleep apnea is a prevalent and potentially serious sleep disorder characterized by repeated interruptions in breathing during sleep, often associated with cardiovascular complications. Early detection is crucial for effective treatment and management. This work proposes a deep learning-based approach for automated sleep apnea detection using electrocardiogram (ECG) signals. A hybrid model combining Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks is developed to effectively extract both spatial and temporal features from long-duration ECG recordings. The CNN layers automatically learn and detect local morphological patterns in the ECG waveform, while the LSTM layers capture long-range temporal dependencies that reflect apnea-related physiological changes. The model is trained and evaluated using publicly available annotated datasets, and classification is performed to determine whether an apnea event is present or not. The proposed approach demonstrates promising results in terms of detection accuracy, indicating its potential as a non-invasive, efficient, and scalable method for assisting in the early diagnosis of sleep apnea. Future enhancements may involve training on larger, more diverse datasets and integrating multi-modal physiological data for improved generalization and clinical applicability.

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