Analysis of 12-Lead Electrocardiogram Signal Based on Deep Learning

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**Introduction** : In this work, a deep learning method is proposed to identify the types of arrhythmia.

**Methods** : The 12-lead electrocardiogram signal is first denoised by filters to eliminate the baseline drift and the myoelectric interference. Then, the filtered signal is sliced into beats and sent to a deep neural network, which contains four convolutional layers, two gated recurrent unit layers, and one full-connected layer. Features in both the spatial domain and the time-frequency domain can be extracted implicitly by the deep neural network, instead of being extracted manually.

**Result** : On the test split of the dataset, our neural network model achieves an accuracy of 98.15%. Among the accuracies for the four types of arrhythmia, respectively, the lowest one is 96% and the highest is 99%. Our model is must better than a baseline support vector machines classifier, with a test accuracy of 73.54%.

**Conclusion** : The results give a supportive evidence to make our model clinically applicable to assist physicians in diagnosing certain arrhythmias.