Relieff Matching Feature Selection for Emotion Recognition Based on EEG Signal

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Research

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Abstract

ReliefF Matching Feature Selection (RMFS) is proposed in the paper, which can solve the problem of individual specificity and global threshold mismatch of emotion recognition. Firstly, EEG was decomposed into six emotion-related bands by wavelet packet, then EMD was employed for extracting the 10 categories of features of wavelet coefficient and IMF component of the reconstructed signal; Secondly, the optimization formula of the feature group weight was proposed based on feature sets selected by ReliefF, and it can get the weights of different test features, which were the global optimal matching feature group and the corresponding matching channel, so it can eliminate the redundant information and solve the problem of individual specificity. Finally, SVM was employed to identify the test feature group data to obtain emotional recognition results. The experimental results show that the average correct rates of RMFS for two-category of the valence and the arousal are 93.28% and 93.32%, and the four-categories are higher than 83%. The efficiency of the single subject using RMFS is improved by 42.65%, which is better than the traditional ReliefF algorithm.

Full Text

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Figures

Figure 1

The flow chart of RMFS

Figure 2

s25 potency two classification channel selection result

Figure 3

s25 wake-up two classification channel selection results

Figure 4

Composition of 32-bit subject titer two-category matching feature group and its weight

Figure 5

Composition of 32-bit subjects' arousal degree binary classification matching feature group and its weight

Figure 6

Statistical results of sentiment classification

Figure 7