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### 摘要

This study proposed the ellipse-space probabilistic neural network (EPNN), which includes three kinds of network parameters that can be adjusted through training: the variable weight representing the importance of each input variable of each pattern, the core-width-reciprocal representing the effective range of each pattern, and the data weight representing the reliability of each pattern. These network parameters can improve the accuracy of model, and calculate the variable importance index to offer the ability to appraise importance of each input variable. To prove the performance of EPNN, three artificial classification problems as well as seven actual classification problems were employed to test it and compare it with back-propagation network (BPN) and probabilistic neural network (PNN). The results proved that (1) the accuracy of EPNN is slightly lower than BPN, while strongly higher to PNN in the artificial classification problems; the accuracy of EPNN is obviously higher than BPN and PNN in the actual classification problems, and (2) the variable importance index really expressed the importance of each input variable to the output variable, which makes model have the explanation ability.

**關鍵字** : artificial neural network, probabilistic neural network, variable importance, classification.