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Support tensor machine for classification based on tensor-kernel. (Chinese. English summary)

Summary: Represented by Rank-one Support Tensor Machine (R1-STM), tensor learning has become a hotspot in the field of pattern recognition, and it has been widely used. R1-STM is a non-convex optimization problem, it is very time-consuming and suffers from local optimal. Support Tensor Machine based on Tensor-Kernel (TK-STM) can solve nonlinear classification problem, and it not only inherits the merits of Support Vector Machine (SVM), but also keeps more structure information, and can get the global optimal solution through one-step iteration. In the numerical experiment, five vector-type datasets and seven tensor-type datasets were used. Based on two aspects of classification accuracy and training time, we compared TK-STM with the classical methods of SVM and R1-STM. The results show that TK-STM has obvious advantages in both classifying effect and training time, especially in the high dimensional and small sample size datasets.

MSC:
68T10 Pattern recognition, speech recognition

Keywords:
classification problem; support tensor machine; tensor representation; tensor-kernel; pattern recognition