

工程与应用

基于分层采样的集成k近邻说话人识别算法

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摘要 k近邻学习器将复杂的全局非线性关系映射为大量局部线性关系的组合, 具有易解释、易扩展、抗噪能力强等优点, 被广泛应用于说话人识别领域并取得了良好的效果。而集成学习算法因其强泛化能力和易于应用的特性得到了许多领域研究者的关注, 但是研究表明通过重采样产生训练集差异的集成算法并不能有效地提高k近邻学习器系统的泛化能力。提出了一种新的BagWithProb采样算法产生训练集。实验表明, 该算法可以有效地扩展训练集差异, 提高集成系统性能。此外, 还提出了基于环域分层采样的算法以加快k近邻识别算法在识别阶段的运算速度。

关键词 [最近邻识别器](#) [集成学习](#) [说话人识别](#) [分层采样](#)

分类号

New method of optimizing k nearest neighbor ensemble for text-independent speaker recognition

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Abstract

K-Nearest Neighbor is one of the instance-based learning algorithm, it can be very competitive with the state-of-the-art classification methods. Besides simplicity, KNN has better generalization ability and is robust for noisy training data and quite effective when there is sufficiently large set of training data. So it has been widely used in speaker recognition field. Since the generalization ability of an ensemble could be significantly better than that of a single learner, ensemble learning has been a hot topic during the past years. In our paper, we intend to improve the recognition speed and accurate rate by introducing a novel method combining optimizing annular region stratified sampling k nearest neighbor with proposed BagWithProb ensemble learning algorithm. A large empirical study reported in this paper shows that the proposed algorithm can effectively improve the performance of speaker recognition system.

Key words [nearest neighbor learner](#) [ensemble learning](#) [speaker recognition](#) [stratified sampling](#)

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