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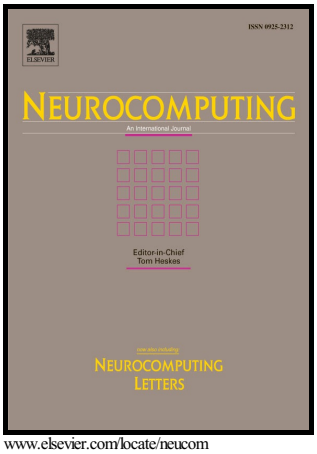

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Abstract

This paper develops cost-sensitive margin distribution learning and proposes Large Cost-Sensitive margin Distribution Machine (LCSDM) to get balanced detection rate on imbalanced training data. Recently, margin theory revealed that compared with a single margin, margin distribution is more critical to the generalization performance. Large margin Distribution Machine (LDM) is designed to get superior classification performance and strong generalization performance. However, LDM generally has imbalanced margin distribution between two classes on imbalanced training data. This generally leads to the lower detection rate of the minority class, which contradicts to the needs of high detection rate of the minority class in many real applications. Therefore, cost-sensitive margin distribution learning is brought forward to obtain balanced margin distribution and detection rate between two classes. What's more, this research deduces the relation between cost-sensitive parameter and in-class detection rate, and designs LCSDM to obtain balanced detection rate. Experimental results show that LCSDM can gradually increase the margin distribution of the minority class to obtain a more balanced detection rate. As a general learning method, LCSDM is especially applicable to imbalanced data classification.

Keywords: `margin distribution`, cost-sensitive learning, imbalanced training

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