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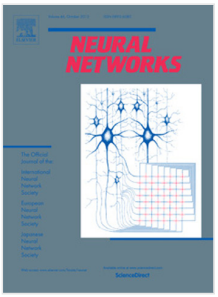

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Ordinal Regression based on Learning Vector Quantization

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Abstract

Recently, ordinal regression, which predicts categories of ordinal scale, has received considerable attention. In this paper, we propose a new approach to solve ordinal regression problems within the learning vector quantization framework. It extends the previous approach termed ordinal generalized matrix learning vector quantization with a more suitable and natural cost function, leading to more intuitive parameter update rules. Moreover, in our approach the bandwidth of the prototype weights is automatically adapted. Empirical investigation on a number of datasets reveals that overall the proposed approach tends to have superior out-of-sample performance, when compared to alternative ordinal regression methods.

Keywords: Ordinal regression, Learning vector quantization, Generalized matrix learning vector quantization

1. Introduction

Recently a new learning setting that predicts categories of ordinal scale, referred to as ordinal regression or ranking learning, has received considerable attention [1, 2, 3, 4, 5]. In this setting, the training examples are labeled by categories (ranks) exhibiting a natural order. Consequently, ordinal regression bears resemblance to both regression and classification. However, in contrast to regression, the ranks are of discrete and finite

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