The Report of Kernel Combination Techniques in Machine Learning

Chengzhang Zhu

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Introduction

Kernel learning is one of the most important branch in machine learning field. Lots of famous machine learning methods are based on kernel, such as SVM [4], Gaussian Process [3], and ELM [2]. One kernel is always used in kernel machine, but it is neither sufficient for capturing different kinds of distribution lying under data nor trackable for capturing heterogeneous information. In contrary, multiple kernel can fill these gaps yet full of challenge, which comes from the hardness of multiple kernel combination. Thus, I want to review state-of-the-art kernel combination techniques in machine learning. I summarize several interesting paper.

Literature Review

The first paper is Structure Discovery in Nonparametric Regression through Compositional Kernel Search [1]. I will add the detail of this paper in the next stage.

References

[1] David Duvenaud, James Robert Lloyd, Roger Grosse, Joshua B Tenenbaum, and Zoubin Ghahramani. Structure discovery in nonparametric regression through compositional kernel search. *arXiv preprint arXiv:1302.4922*, 2013.

[2] Guang-Bin Huang, Hongming Zhou, Xiaojian Ding, and Rui Zhang. Extreme learning machine for regression and multiclass classification. *IEEE Transactions on Systems, Man, and Cybernetics, Part B: Cybernetics*, 42(2):513–529, 2012.

[3] C. E. Rasmussen and C. K. I. Williams. *Gaussian Processes for Machine Learning*. MIT Press, 2006.

[4] Vladimir N. Vapnik. *Statistical Learning Theory*. Wiley-Interscience, 1998.