Why and When Can Deep-but Not Shallow-networks Avoid the Curse of Dimensionality: A Review

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Abstract

The paper reviews and extends an emerging body of theoretical results on deep learning including the conditions under which it can be exponentially better than shallow learning. A class of deep convolutional networks represent an important special case of these conditions, though weight sharing is not the main reason for their exponential advantage. Implications of a few key theorems are discussed, together with new results, open problems and conjectures.
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1 A theory of deep learning

1.1 Introduction

Face detection serves as an important component in computer vision systems which aim to extract information from face images. Practical applications, such as face recognition and face animation, all need to quickly and accurately detect faces on input images in advance. Same as many other vision tasks, the performance of face detection has been substantially improved by Convolutional Neural Network(CNN) [1]

$$f(x) \approx P_k^* = \sum_{i=1}^{r} p_i(< \varpi_i, x >)$$

Algorithm						
performance	50	0	100	200	300	300
	100	100	0	100	200	200
	150	200	100	0	100	200
	200	300	200	100	0	300

2 picture

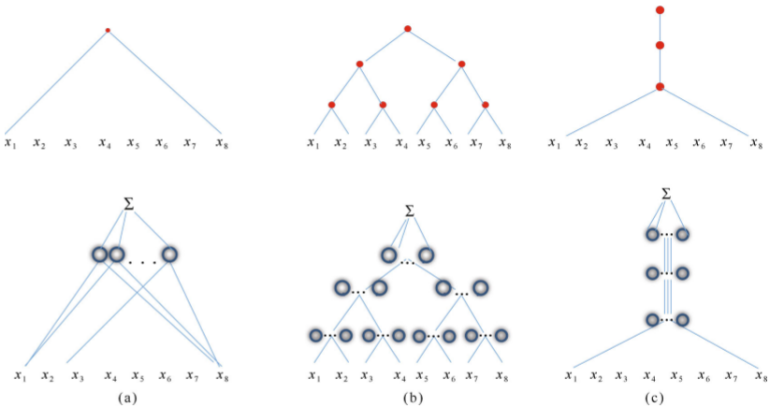

Figure 1: picture

References

[1] John Wright, Allen Y. Yang, Arvind Ganesh, S. Shankar Sastry, and Yi Ma. Robust face recognition via sparse representation. *IEEE Transactions on Pattern Analysis Machine Intelligence*, 31(2):210–227, 2009.