Multi-dimensional feature and data mining

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Propositions

pertaining to the thesis
"Multi-domensional feature and data mining"
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1. Although, in theory higher dimensional models have larger learning capacity, in practice reducing the data dimensionality and utilizing lower dimensional models results in similar and sometimes better performance for a variety of applications [Chapter 2].

2. Convolutional neural networks are able to accurately represent flow fields [Chapters 3&4].

3. A common argument is that deep learning approaches require a vast amount of data in order to be effective. Our experimentation shows that they manage to maintain their performance better than feature engineering approaches on smaller training sets [Chapter 4].

4. Regularizing each filter of a CNN independently increases the overall training performance [Chapter 6].

5. Computer vision approaches can be generalized to be applicable to any data source that exhibit spatial or temporal relationships.

6. Adding structural constraints on a model architecture limits a model's capacity to learn but potentially it also limits the amount of information needed for learning.

7. Arguably, computer vision has managed to outperform humans in many visual tasks that depend on spatial realtionships, e.g. still images. When processing the time dimension, e.g. processing videos, computer vision has not yet managed to reach that level.

8. Computer vision is increasingly able to solve many tasks. Nonetheless, understanding the limits and behavior of deep learning systems is still an open question.

9. Sheer computational power and modeling might not be sufficient to replicate the sense of self and purpose in biological intelligence.