

Machine Learning Reading Notes

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1 Definitions

Deep Neural Networks (DNNs) are engineered systems inspired by the biological brain [1].

Mahalanobis Distance

Neighbourhood Components Analysis (NCA) is a method of learning a Mahalanobis distance metric, and can also be used in linear dimensionality reduction [2].

The **PCKh** metric, used by the MPII Human Pose Dataset, defines a joint estimate as matching the ground truth if the estimate lies within 50% of the head segment length [3]. The head segment length is defined as the diagonal across the annotated head rectangle in the MPII data, multiplied by a factor of 0.6. Details can be found by examining the MATLAB evaluation script provided with the MPII dataset.

2 Paper Summaries

2.1 DeepPose: Human Pose Estimation via Deep Neural Networks [4]

This paper uses DNNs as a method for human pose estimation, based on the success of [5] and [6] for object detection using DNNs.

This is in contrast to the existing work in human pose estimation at the time, which focused on explicitly designed pose models. Papers about these methods can be found in the “Related Work” section of [4].

The input to the 7-layered convolutional DNN (based on AlexNet [7]) is the full image.

2.2 Dropout: A Simple Way to Prevent Neural Networks from Overfitting [8]

Dropout is a technique used to overcome the problem of overfitting in deep neural nets with large numbers of parameters. The idea is to train using many “thinned” networks, chosen by randomly removing subsets of units and their connections. The predictions from the thinned networks are approximately averaged at test time by using a single, unthinned, network with reduced weights.

- Existing regularization methods: stopping training as soon as validation error stops improving, L1 and L2 regularization, and weight sharing [9].

References

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