Week 1 paper summary

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Summary

In this paper, Lecun et al. [1] reviews deep learning methods. Deep learning methods are considered as representation learning. In representation learning, representations of data with multiple abstraction levels are learned from data automatically, instead of designing hand-crafted features like in traditional machine learning (ML) approaches. The raw data, i.e., image or text are fed into a deep learning algorithm and the target classes are given to the algorithm in a supervised learning manner. The algorithm is trained by back-propagation and can adjust its internal parameters to reach the desired target vector. There are non-linear operators such as ReLU activation in deep neural networks that can result in learning complex patterns. With the advent of GPU and improvements in the hardware, the popularity of deep neural nets increased, especially after its astounding performance in ImageNet competition. Convolutional neural networks (CNN) have spectacular performance in computer vision applications. They are consisted of several convolution layers and pooling layers. The other important deep learning architectures are recurrent neural networks (RNN) which have great performance in sequential inputs such as language. Long short-term memory (LSTM) networks can find long term dependencies better than RNNs. Human learning is mostly unsupervised and it is expected to see breakthroughs in the future of unsupervised deep learning.

References

[1] Yann LeCun, Yoshua Bengio, and Geoffrey Hinton. Deep learning. *nature*, 521(7553):436–444, 2015.