COMP9444 Neural Networks and Deep Learning

Quiz 3 (Hidden Units and Convolution)

This is an optional quiz to test your understanding of the material from Week 3.

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1. Sketch the following activation functions, and write their formula: Sigmoid, Tanh, ReLU.
2. Explain how Dropout is used for neural networks, in both the training and testing phase.
3. Explain what is meant by Overfitting in neural networks, and list four different methods for avoiding it.
4. Write the formula for the Softmax loss function.
5. Write the formula for activation $Z^i_{j,k}$ of the node at location (j,k) in the i^{th} filter of a Convolutional neural network which is connected by weights $K^i_{l,m,n}$ to all nodes in an $M \times N$ window from the L channels in the previous layer, assuming bias weights are included and the activation function is $g()$. How many free parameters would there be in this layer?
6. If the previous layer has size $J \times K$, and a filter of size $M \times N$ is applied with stride s and zero-padding of width P, what will be the size of the resulting convolutional layer?
7. If max pooling with filter size F and stride s is applied to a layer of size $J \times K$, what will be the size of the resulting (downsampled) layer?

Make sure you try answering the Questions yourself, before checking the Sample Answers