Deep Learning

6.2 Rectifiers and Dropout

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Rectifiers

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2. Since the derivative of ReLU does not vanish for the positive activations (also the encodings become sparse)

Variants of ReLU

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4. ELU (Exponential Linear Unit)

Dropout

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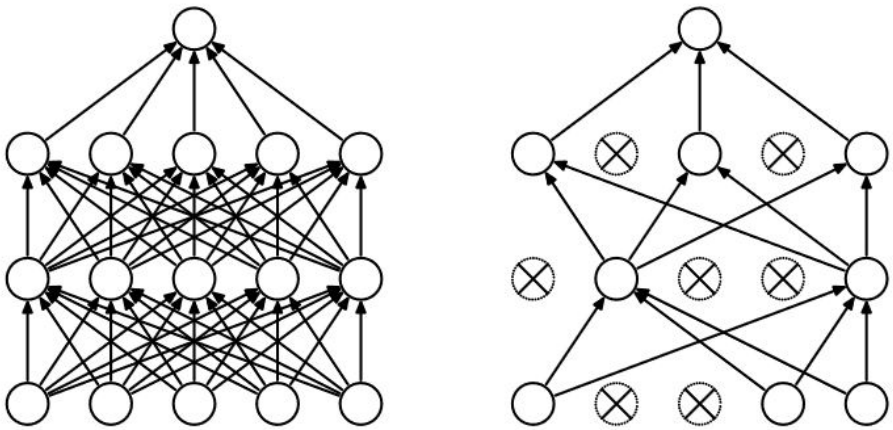
2. Dropout is one such ('deep') regularization technique (Srivastava et al. 2014)

Dropout

1. During the forward pass, some of the units are randomly 'zeroed' out (activations are removed)



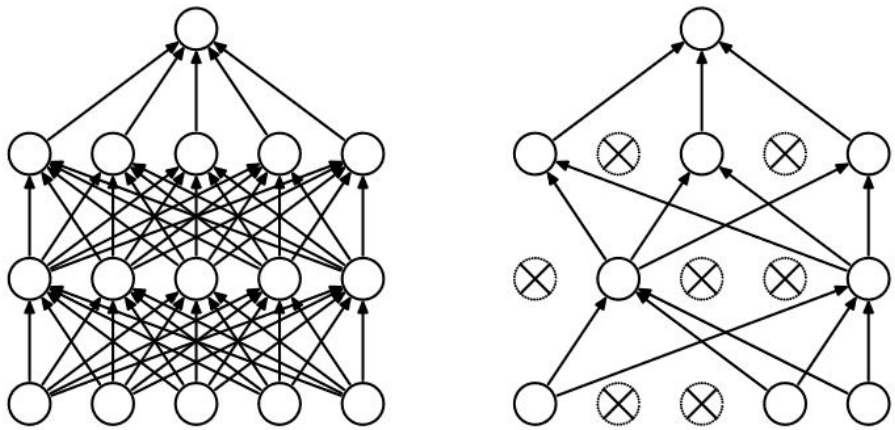
(a) Standard Neural Net (b) After applying dropout.

Figure 1: Dropout Neural Net Model. **Left**: A standard neural net with 2 hidden layers. **Right**: An example of a thinned net produced by applying dropout to the network on the left. Crossed units have been dropped.

Figure from Srivastava et al. 2014

Dropout

1. During the forward pass, some of the units are randomly 'zeroed' out (activations are removed)
2. Dropped units are randomly selected in each layer independent of others



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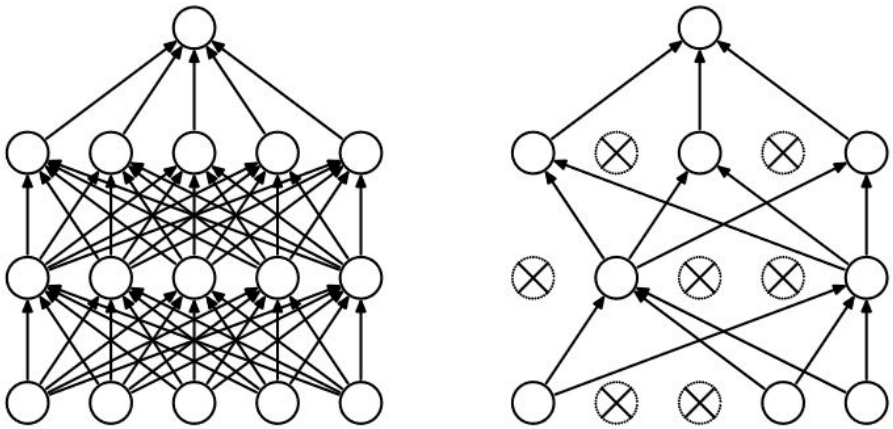
Dropout

1. During the forward pass, some of the units are randomly 'zeroed' out (activations are removed)
2. Dropped units are randomly selected in each layer independent of others
3. Backpropagation happens through the remaining activations



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2. Distributes the representation among all the units
3. Avoids co-adaptation of the units in the architecture

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2. For each sample, as many Bernoulli variables as units are sampled independently for dropping the units.

Dropout

1. The standard variant uses the 'inverted dropout'. It multiplies activations by $\frac{1}{(1-p)}$ during train and keeps the network untouched during test.