

# Class 22

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## Deep Learning

Neural Networks are not new. The idea has existed since 1940s. Deep learning is not much different from the idea of Neural Networks.

### History

- ImageNet
  - Classification with Deep CNNs (Alex Krizhevsky, Ilya Sutskever, Geoffrey E. Hinton)
    - \* AlexNet, etc.

### The Convolutional Layer

**Dense connection:** Every neuron is connected to every neuron in the previous layer.

$$Y = W^T X$$

$W$  matrix which connects the weights (for the dense connection).

1. We'll reduce the number of connections between the two layers. We will sort of make the connections local. *Locality* is important.
2. Same/shared set of weights called filters. Filters are also known as kernels (not to be mistaken with the kernel in SVMs).