

# Week3 - Neural Network

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## Notation

Structure of Neural network with one hidden layer

Mathematical representation of a node

Forward Propagation

Vectorization

Activation Function

How to implement NN

Random Initialization

Take out from the programming assignment:

The general guidance to build a NN:

1. Define the neural network structure ( # of input units, # of hidden units, etc).
2. Initialize the model's parameters
3. Loop:
  - Implement forward propagation
  - Compute cost
  - Implement backward propagation to get the gradients
  - Update parameters (gradient descent)

After all these, the model can be used to predict.

Usually build helper functions to compute and then merge them into one function / `nn_model()`. Once you've built `nn_model()` and learnt the right parameters, you can make predictions on new data calling the `nn_model()`.

During the implementation, i personally think paying attention to the dimensions of each matrix is extremely helpful.

Last but not least, the design of hidden layer size was observed with different numbers of units in the hidden layer: 1,2,3,4,5,20,50. The result shows that more than 5 units in hidden layer doesnt helps to increase the accuracy, because the model is overfitted to the training set, which wont perform well on the other datasets.