**Week 4:** Neural Networks: Representation

Non-linear Hypotheses

* Logistic regression features: number^2 over 2

Neurons and the Brain

* The “one learning algorithm”
  + Can rewire brain (Make hands see or eyes hear)
* AI mimics how the brain works (sort of)

Model Representation I

* Model a neuron as a logistic unit
* Multiple inputs and one output (hθ(x)) = 1/(1+e^[(-θT)x])
* When drawing a neural network, there might be an extra node (x0), which is a bias unit
* Sigmoid (logistic) activation function
  + g(z) = 1/(1+e-z)
  + weights are parameters
* Neural Networks have different layers
  + First layer is input layer (layer 1)
  + Last layer is output layer (layer 3)
    - θj = matrix of weights controlling function mapping from layer j to j + 1
  + Middle layer is hidden layer (layer 2)
    - ai(j) = “activation” of unit i in layer j
  + If network has sj units in layer j, sj + 1 units in layer j + 1, then θ(j) will be of dimension sj+1 x (sj + 1)