

Codelab-mxnet Week 1

Chuck Tan

Machine Learning Researcher/Engineer

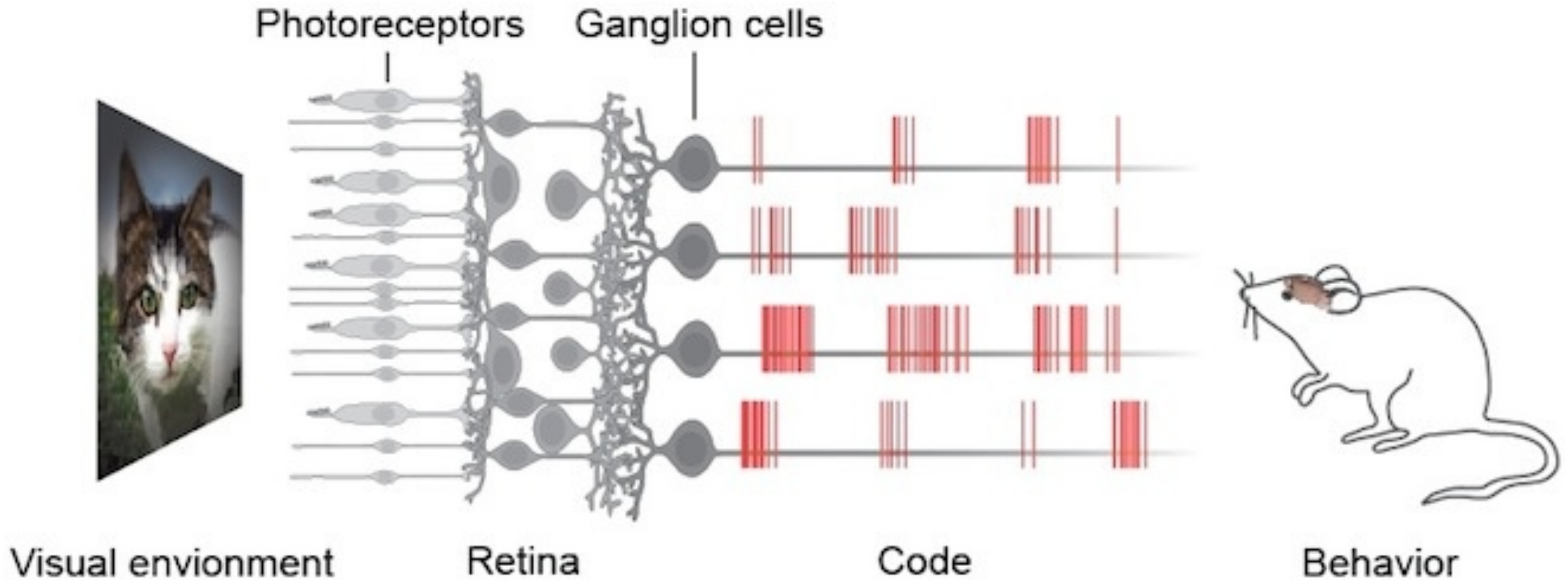
Goal of Codelab

- Coding, Coding, **Coding**
- Learning Machine/Deep Learning from practical point of view.
 - What kind of machine learning expert do you want to be
 - Scientist? Math expert?
 - Data analyst?
 - Engineer?
 - Business/investment
 - What part of machine learning are you REALLY interested in
 - Which tool/framework is best for you
 - Caffe/Caffe2/Tensorflow/Mxnet/Theano/Torch/pytorch/Keras
- Topics which are not covered in this codelab
 - Pure theory/math equation derivation

Review

All the images source are from internet

What is a real world problem



What is a Machine Learning Problem

- Speech Recognition

$$f\left(\text{[audio waveform]}\right) = \text{"How are you"}$$

- Image Recognition

$$f\left(\text{[cat image]}\right) = \text{"Cat"}$$

- Playing Go

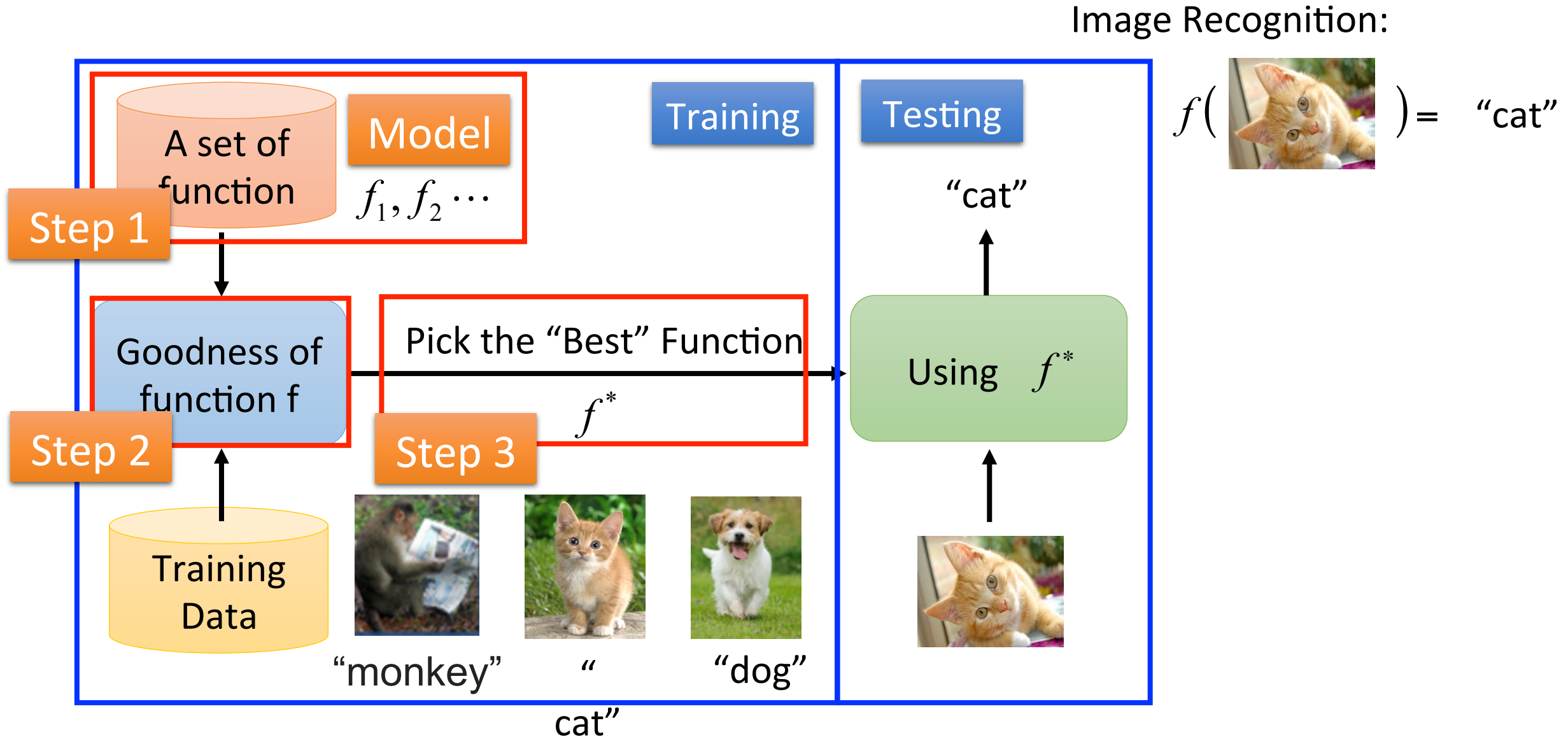
$$f\left(\text{[Go board state]}\right) = \text{"5-5" (next move)}$$

- Dialogue System

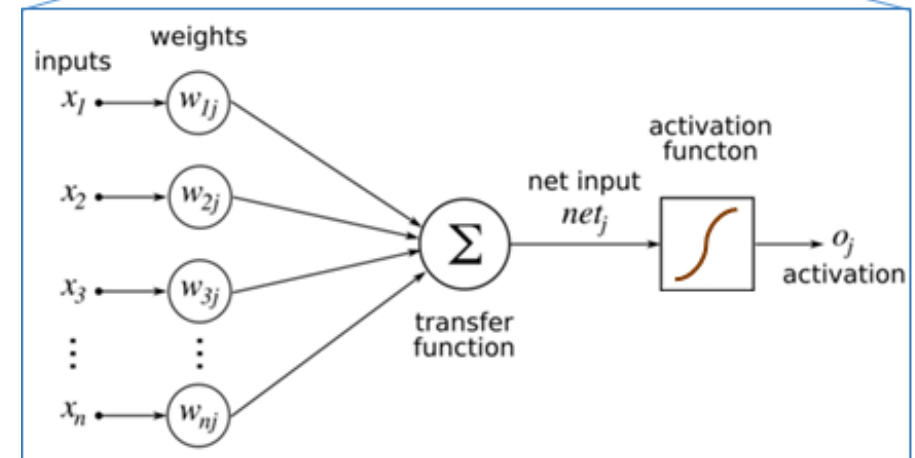
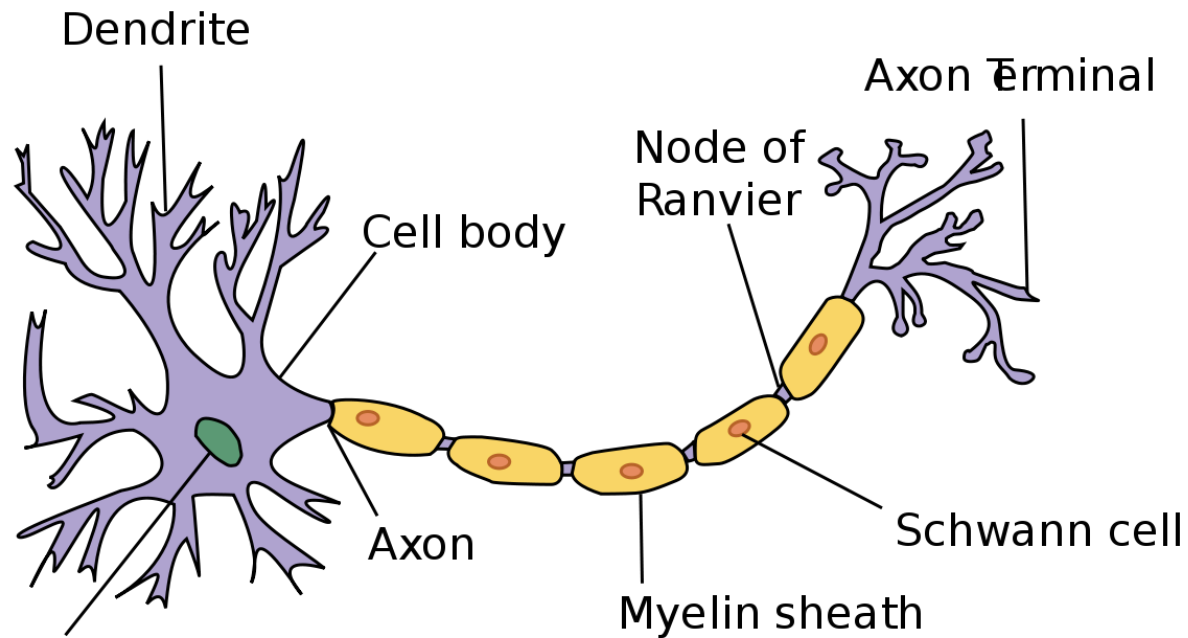
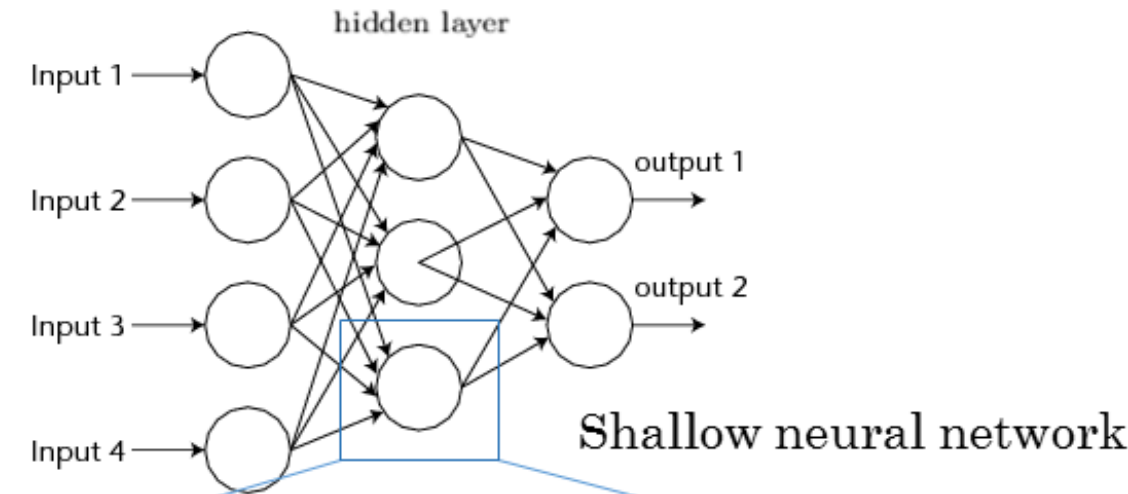
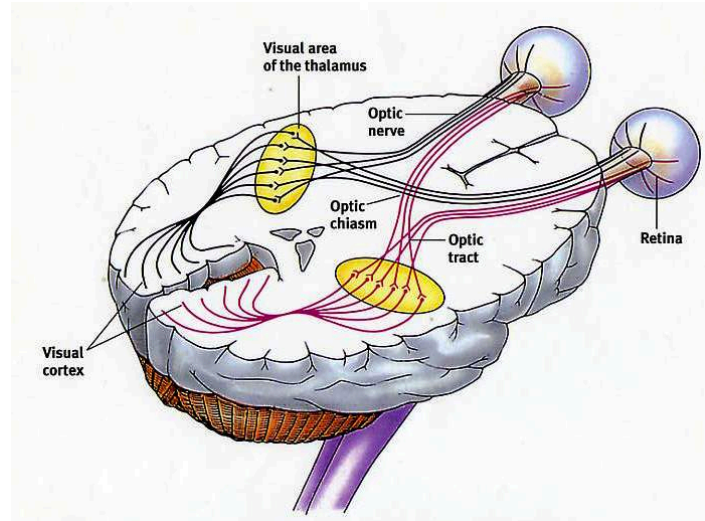
$$f\left(\begin{array}{c} \text{"Hi"} \\ \text{(what the user said)} \end{array}\right) = \begin{array}{c} \text{"Hello"} \\ \text{(system response)} \end{array}$$

Machine Learning \approx Looking for a Function

What is Machine Learning

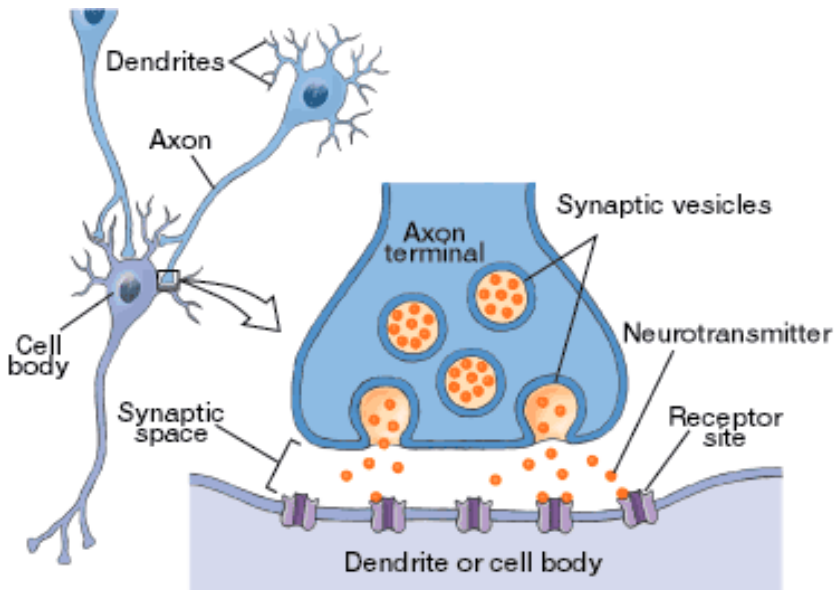


Where is Neural Network from

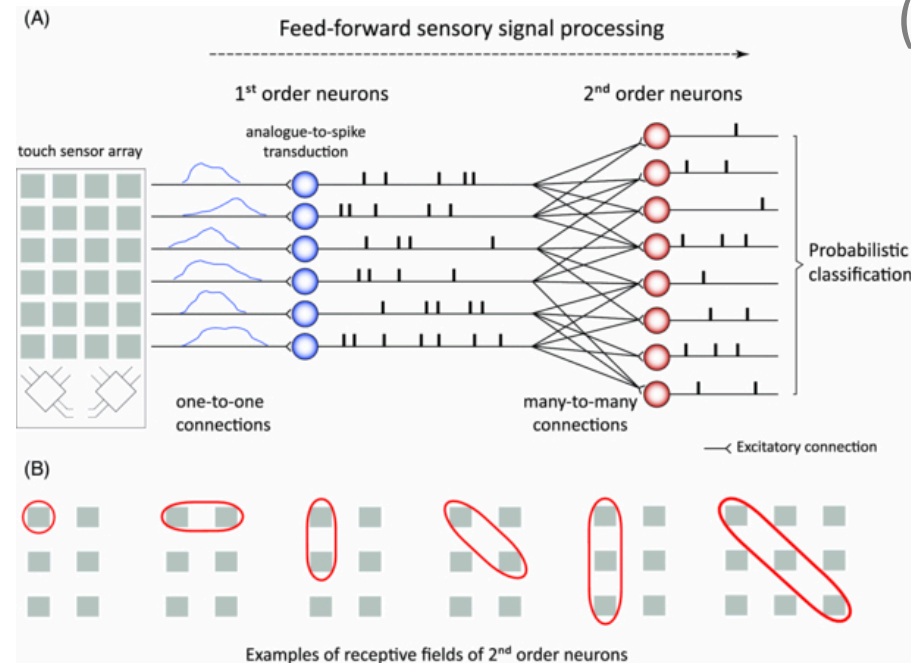


Reality vs. Mathematical Model

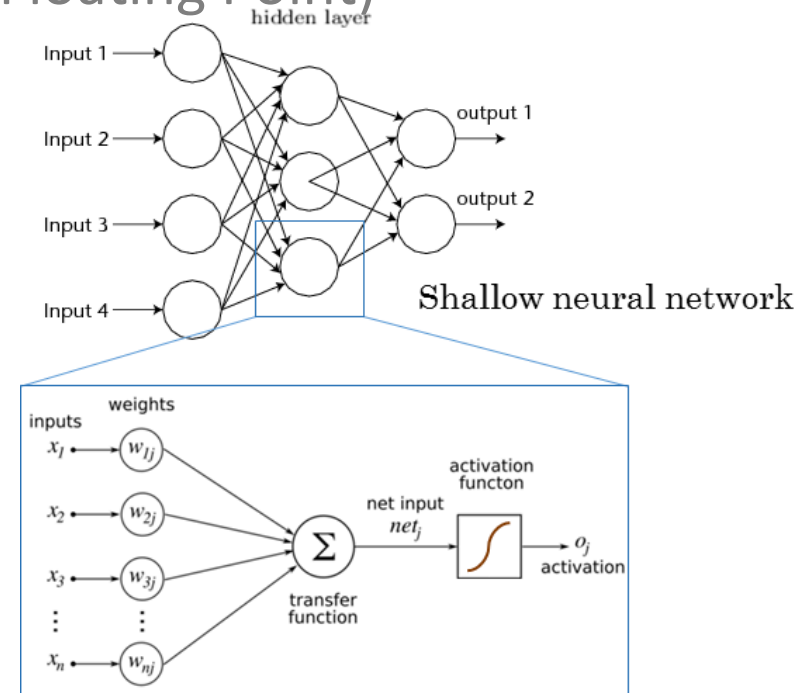
What is Real(analog)



Simple Model (spikes)

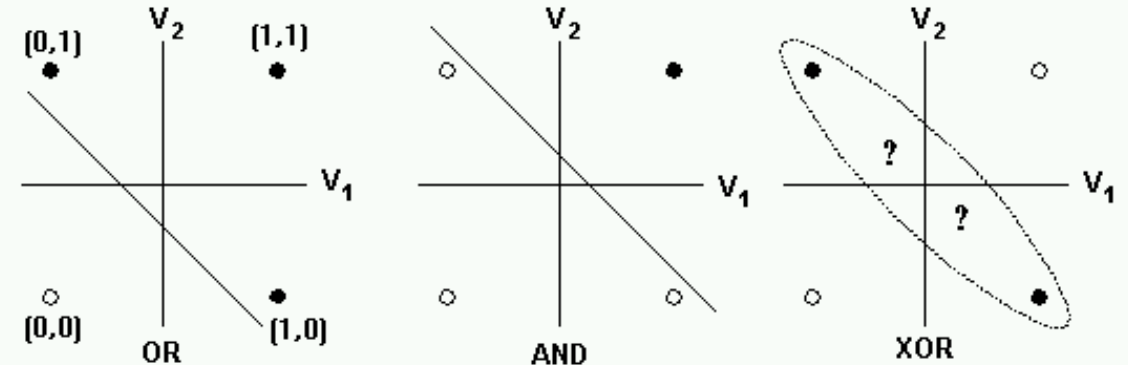


Simpler Math Model
(Floating Point)



Things to go from Neuroscience

- Today's Deep Learning/Neural Network in industry is
 - Not a nervous system, not even close, but a new type of computing system.
 - Non-linear system (reason why it can solve many ML problem)
 - Multi-layer architecture like nervous system does but not quite similar(vision system only has 5-8 layers)



Where is Deep Learning at

