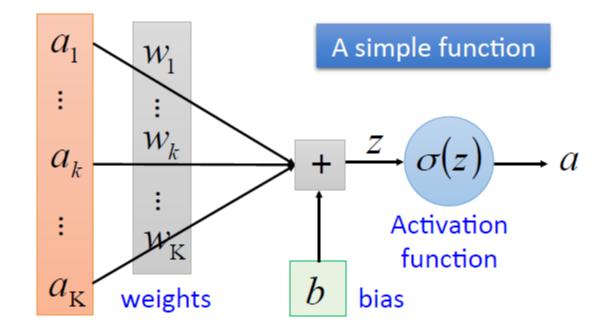
MATRIX APPLICATION NEURAL NETWORK

Ms. Liu

NEURON Neural Network

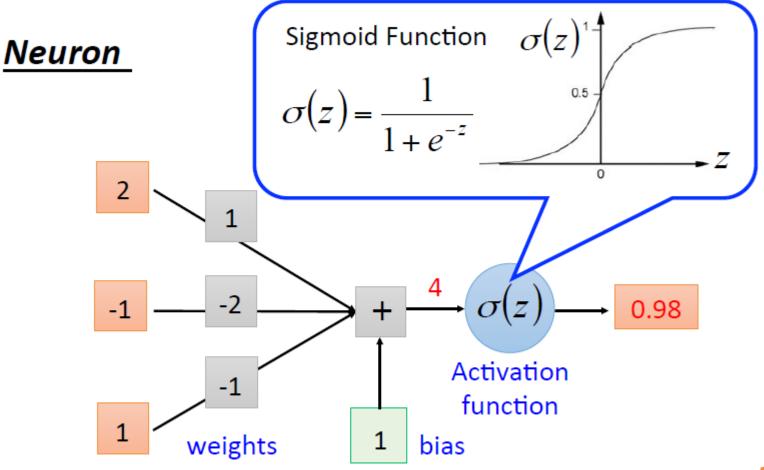
Neuron (a building block)

$$z = a_1 w_1 + \dots + a_k w_k + \dots + a_K w_K + b$$



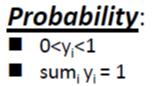
Deep Learning Tutorial by Hung-yi Lee http://www.slideshare.net/tw_dsconf/ss-62245351

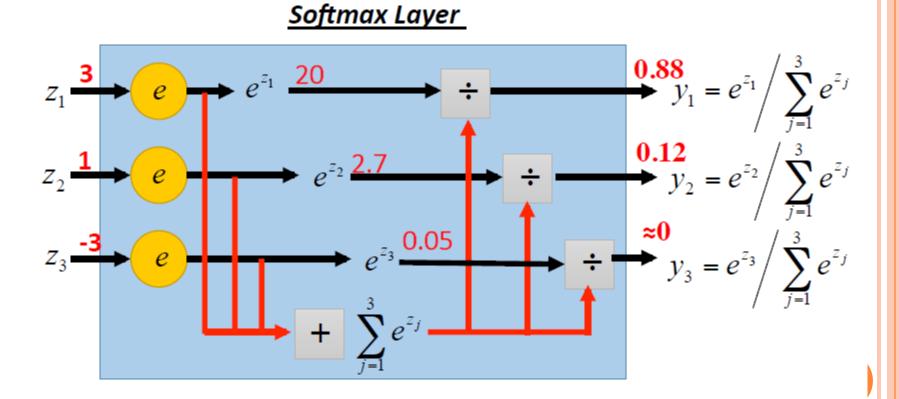
NEURON Neural Network



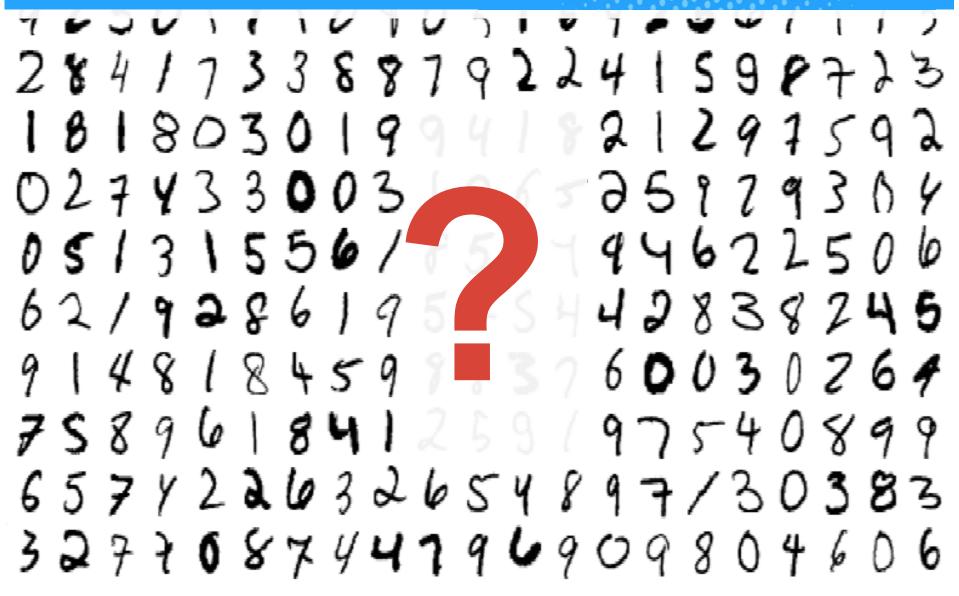
Output Layer

Softmax layer as the output layer



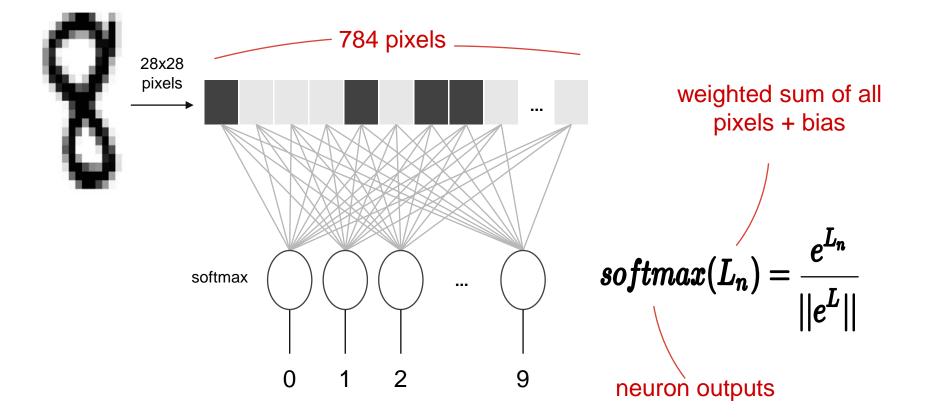


Hello World: handwritten digits classification - MNIST



MNIST = Mixed National Institute of Standards and Technology - Download the dataset at http://yann.lecun.com/exdb/mnist/

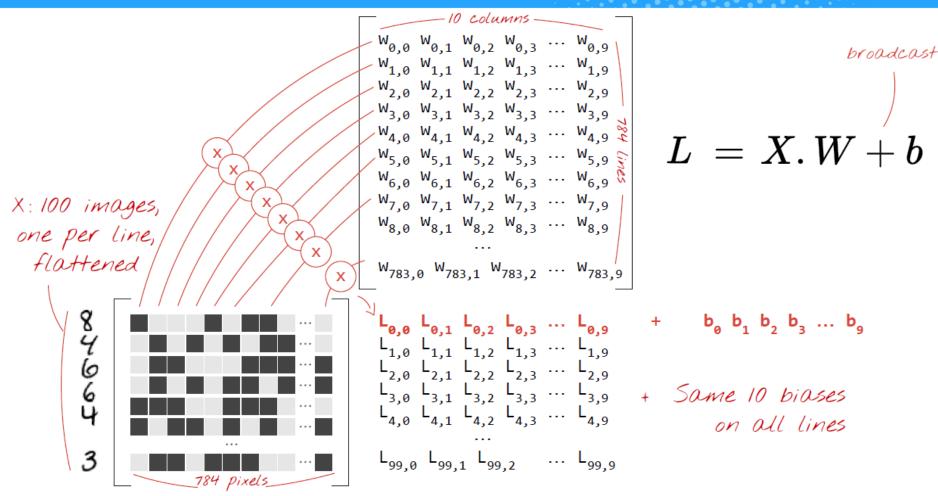
Very simple model: softmax classification



from TensorFlow and Deep Learning, Martin Gorner

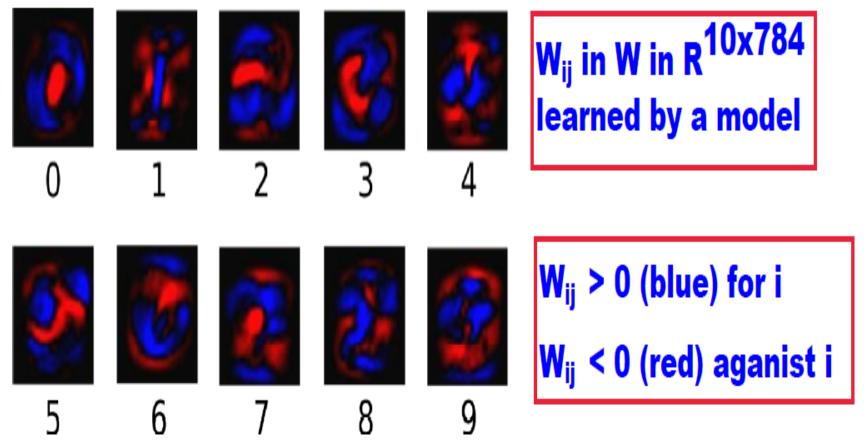


In matrix notation, 100 images at a time



What is W (learned parameter)?

algorithm y = Wx + b



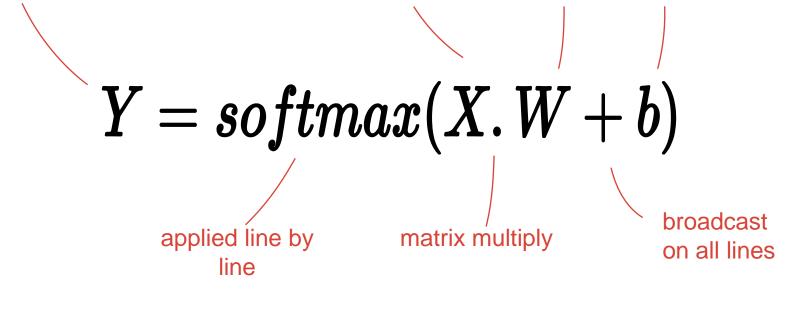
Jinn-Liang Liu



Softmax, on a batch of images

Predictions Y[100, 10]

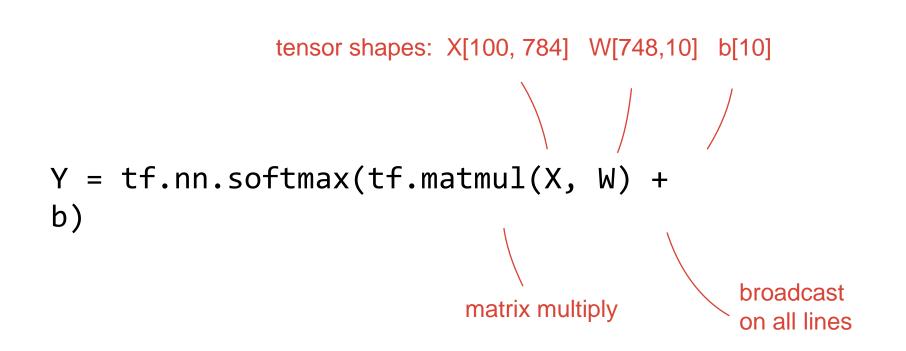
Images Weights Biases X[100, 784] W[784,10] b[10]



tensor shapes in []



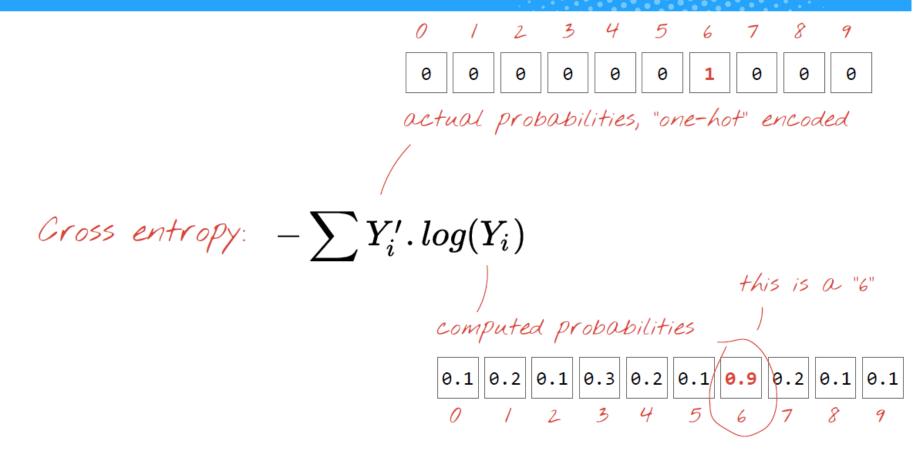








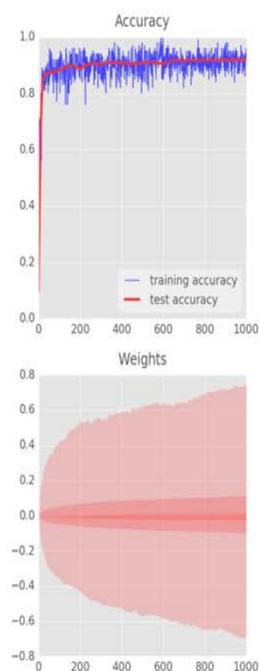
Success?

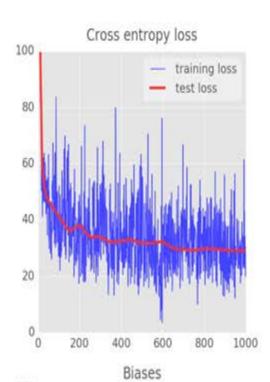


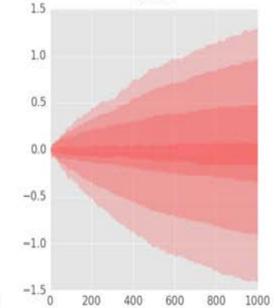


(9) Google Cloud Platform











Test digits 100% C43827ATLCTPALADEARSD123DE12332293265331 \$1112211343228742126361344062232715745388 \$32,475,2471,532,42,535,12,74,7558,642,77,01,79,752,7 21-22166(520)/350306/52926/2212000088 215192219-22620193251238729422342234148237544 98% 11153411156438492186521141012024,24210726 103072117440118824/301115612415255555251)57 \$**\$15151217\$137\$\$\$\$4**%**\$3149\$\$3233444**\$**\$ 7731048213111911481548548144754041442()76834 96% LUSIERASIDEN AND REAL ASSALS FOR ALLONG TOPIN (3112) 10179 635343577613423361347813178A **: \$\$\$\$.54,72,531,05876,00,1516,763,764,72,764,44 \$3,54**5451515168189992229999999**21**214**0000828 94% \$4309111103931161616359257959595944442121693 q.132+1417-1-1-1-2-2-1322113221344231351514854 ///Ac//+/P11+1/54114#6951V959**599181953 3689,499,77462,4260,99,421,833725627,718,1282,838 92% C121172/04/44900401547844645401401313727 1211344351444635566419538121430302111317 1\$21\$4736736736731#1\$6920546427448736244423 5414105854457813144413141826985515403486 90% 54450+1+1252:11111100002501/100161280/