# Neural Network for Handwritten Digits Recognition

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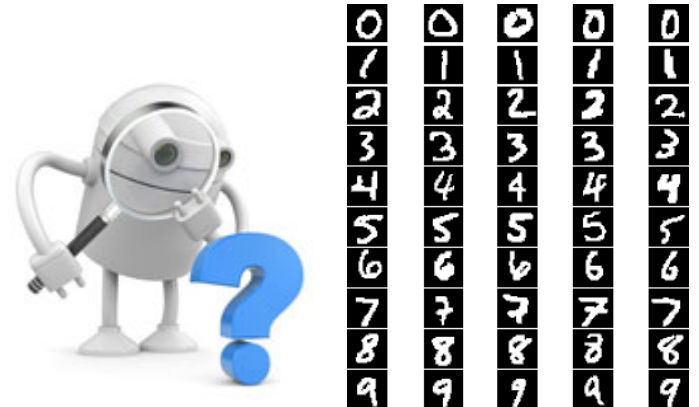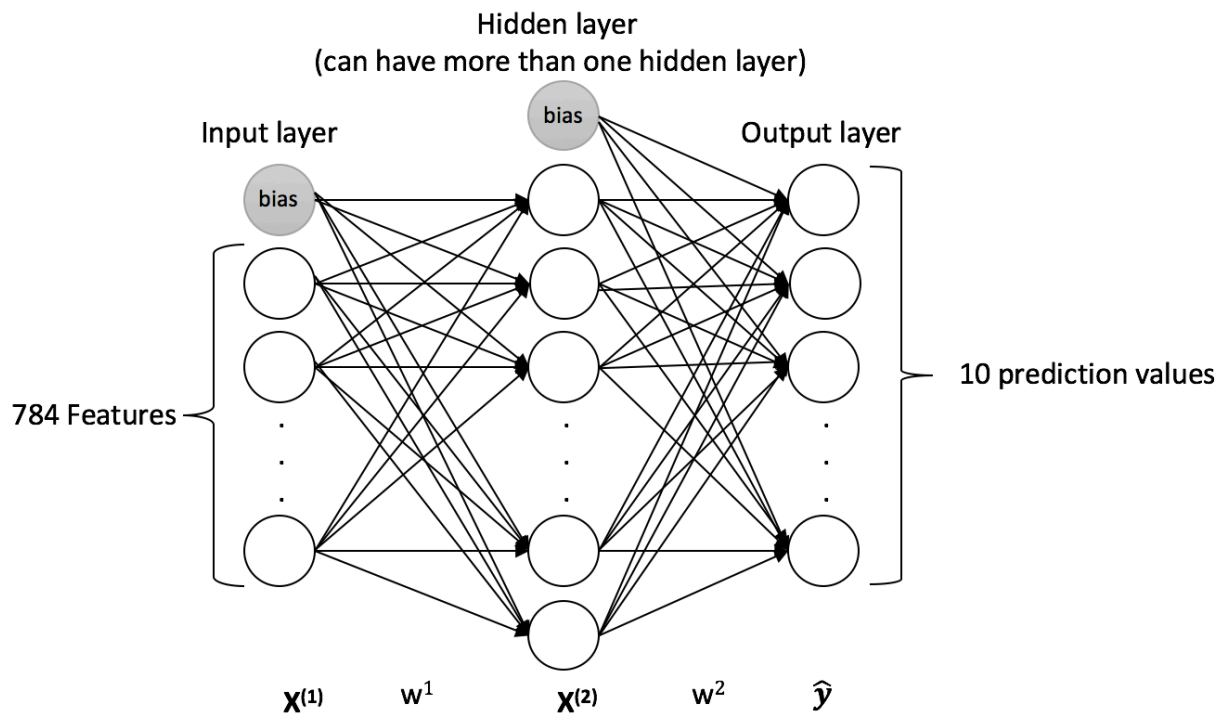
# Dataset

| A | DW | DX | DY | DZ | EA | EB | EC |
|---|---|---|---|---|---|---|---|
| label | pixel125 | pixel126 | pixel127 | pixel128 | pixel129 | pixel130 | pixel131 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | 130 | 245 | 161 | 221 | 254 | 254 | 2 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Total 28x28 Features

# Model & Key Ingredients

Hidden layer
(can have more than one hidden layer)

bias

Input layer

bias

Output layer

10 prediction values

784 Features

$X^{(1)}$  $W^1$  $X^{(2)}$  $W^2$  $\hat{y}$
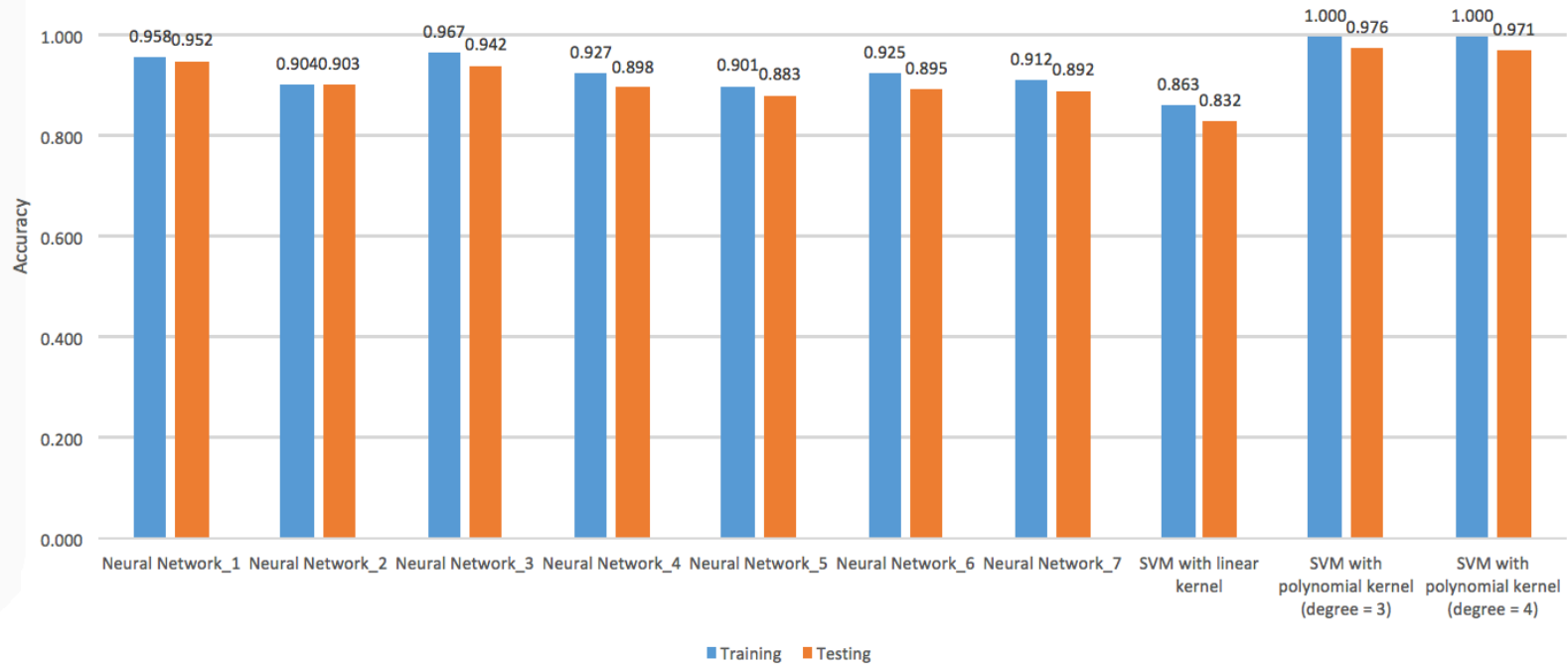
Feedforward

Backpropagation

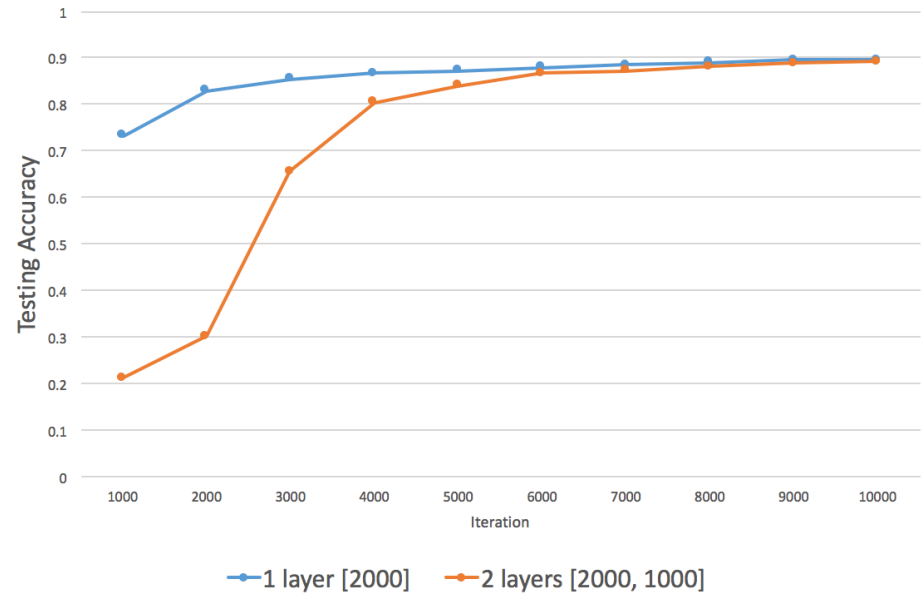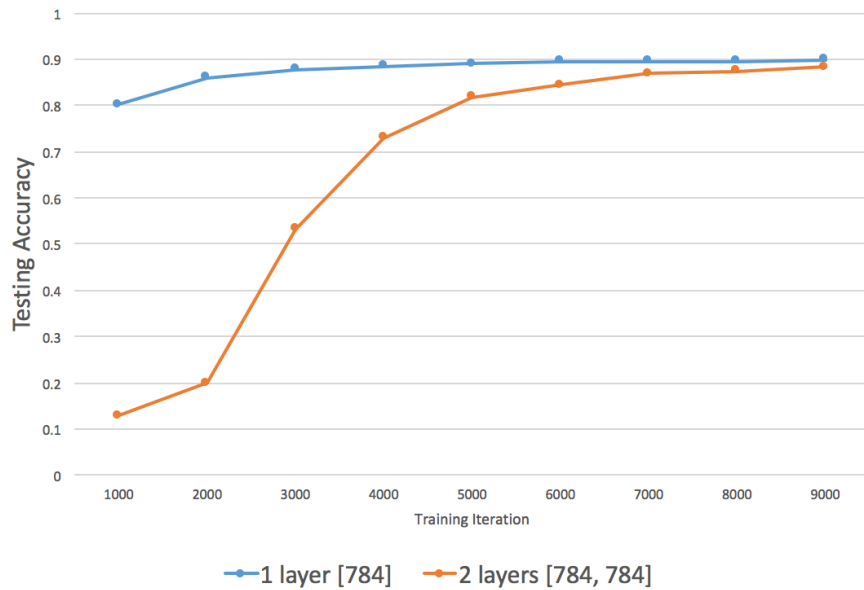Support arbitrary number of hidden layer and nodes

Support batch and mini-batch update

Feature Scaling

# Performance Comparison

# 1 layer vs 2 layers

# Thank You!