**NEURAL NETWORK: Multilayer Perceptron**

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| * File Reading | Data is read from train.txt and test.txt file as a 28x28 matrix flattened into a list of **length = 784** which represents each image. |
| * Normalization image inputs | To prevent data **overflow**, normalization results in scaling of data between 0 and 1 done even before the image is loaded onto the member data list. |
| * Cross Entropy Loss | A default loss function to use for **multi-class classification** problem where the values are a set from {1……n} where **n=9** because it is a number classification problem. |
| * Sigmoid and Soft-max Function | 1. We use sigmoid function to calculate activations of the hidden layer. 2. Soft-max function is used to calculate activations for output layer because we’re dealing with a multi-classification in logistic regression model. |
| * History | The training model returns history that decreases with each **epoch** as the training model runs twice and the **updated** values are **evaluated** and used during the second training model. |
| * Accuracy | Recorded accuracy = **90.15%**  Methods employed to get a better fit for accuracy:   * Using Cross Entropy Loss instead of standard cost function. * Use of soft-max as opposed to only sigmoid. * Use of hidden layer. |