**Pattern Recognition in English (104-2)**

**Group Discussion Form (2016/06/07)**

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| Name |  |
| Group  Members |  |
| Topic | **Deep Neural Networks (DNNs)** |

Source: Neural Networks and Deep Learning, by Michael Nielsen, 2015. <http://neuralnetworksanddeeplearning.com/>

Question 1 (Chapter 4 A visual proof that neural nets can compute any function)

Except for step function, other activation functions with two properties, such as sigmoid and RELU, can also help neural networks achieve function approximation. **What are the two properties?**

Ans:

Question 2 (Chapter 5 Why are deep neural networks hard to train?)

There are 6 factors that make the training of DNNs be hard (mentioned in the last paragraph of this chapter): instability of gradients, the choice of activation function, the way weights are initialized, implementation details of gradient descent learning, choice of network architecture, and choice of hyper-parameters. **Please explain how do the six factors effect DNNs training?**

Ans:

Question 3 (Chapter 6 Deep learning)

There are 7 versions of NN/DNN for MNIST with improved accuracy from 97.8% to 99.6%. Each version adds one more technique to the learning algorithm of previous version. **Draw a table and/or graph to illustrate the improvement, and describe the new technique of each version.**

Ans: