Manarat International University (MIU)

Department of Computer Science and Engineering
Final Examination (Fall 2019)
Neural Network and Fuzzy Systems (CSE-433)

Full Marks: 40 Time: 2.5 Hour

Answer any 8 (Eight) questions. All questions are of equal value.

1 a. What is a **Recurrent Neural Networks** (RNN)? How it does work? 3

b. Why do we need RNN? 2

2 a. Explain the main intuition of **Contrastive Divergence** (CD-k) algorithm. 3

b. What is the primary disadvantage of using (CD-k) algorithm to train a **Restricted Boltzmann Machines (RBMs)**. 2

3 a. Explain the S**oftplus** activation function. Write the equation of **Free Energy** for a RBM. 3

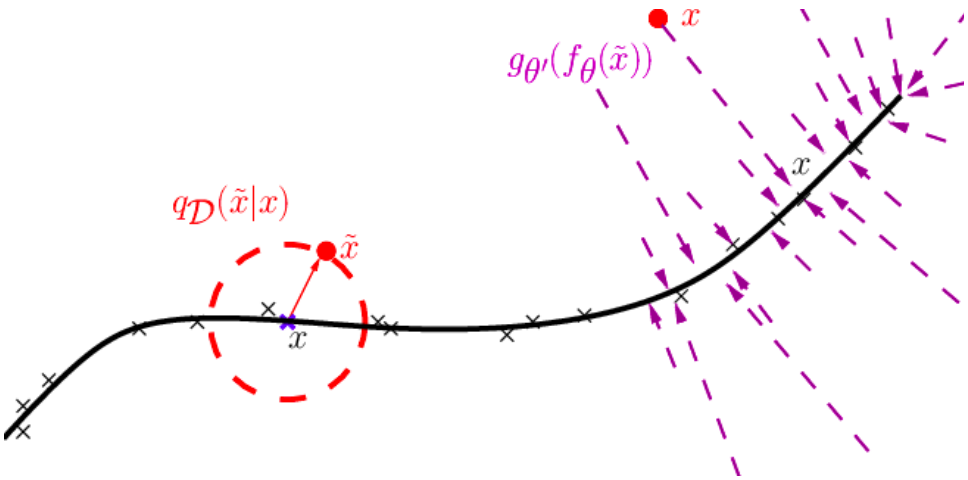
b. Define **semi-restricted** Boltzmann Machines**.** Write the **Energy Function** equation when **x, t**he inputs of visible layer, are **unbounded reals.** 2

4 a. Why is **gradient flow** important when training deep neural networks? 2

b. Explain some common methods that help to ensure good gradient flow. 3

5 a. What is **Denoising Autoencoder** (DAE). How it does work? 3

b. Explain from the following illustration of what the denoising autoencoder is trying to learn ? 2



6 a. What is a **Contractive Autoencoder** (CAE) ? How does it work ? 3

b. Why does the **penalty term** added to the loss function in a CAE ? 2

7	a. What is **Sequence-to-Sequence learning** (Seq2Seq)? What are the applications of it ?	2
	b. Explain a **vanilla RNN** architecture for Seq2Seq learning task.	3
8	a. Explain **Teacher Forcing** algorithm for RNN.	3
	b. Write the main idea of **Bidirectional RNNs ?**	2
9	a. Explain the techniques to get rid of a **badly conditioned curvature**.	2
	b. Why do we need to decay the **learning rate** ? Write a technique to decay the learning rate on an exponential schedule.	3