Assignment 6

Due on Wednesday, 24th of April, 11:59 PM

1. Which one of the following algorithms is most appropriate for the prediction of protein in a stock market? (Choose one)
   (a) Feed Forward Neural Network
   (b) Supervised Learning
   (c) Random Forest
   (d) Multi Linear Regression
   (e) k-Nearest Neighbors

2. A Feed Forward Neural Network (FFN) is often difficult to train compared to an Multi-Layered Feed Forward Neural Network (MLFFN). Why is this the case?
   (a) FFNs are more prone to overfitting because of the vanishing gradient problem.
   (b) FFNs are more vulnerable to the vanishing gradient problem due to the lack of a learning rate.
   (c) FFNs are more likely to suffer from the vanishing gradient problem as the network depth increases.
   (d) FFNs are more prone to overfitting because of the higher dimensionality of the input data.
   (e) FFNs are more likely to be trained in a matter of time due to the lack of a learning rate.

3. In the combined Elman and echo networks, the output of the combined network is used as the network's input, which prevents a feedback to the network.
   (a) True
   (b) False
   (c) Cannot be determined
   (d) None of the above

4. The output of a fully connected MLP is:
   (a) A single real number
   (b) A matrix of real numbers
   (c) A vector of real numbers
   (d) An array of real numbers
   (e) A list of real numbers

5. The weight of a typical node in a neural network is represented by the mean square error of the training data in the layer.
   (a) True
   (b) False
   (c) Cannot be determined
   (d) None of the above

6. In the reinforcement stage of a self-organizing map, the neighborhood function shrinks almost exponentially in a generally uncorrelated direction. The standard deviation of the distribution of the 2^t neurons is approximately:
   $\sigma = \frac{\pi / 2 \times 2^t}{\pi \times 2^t}$
   (a) True
   (b) False
   (c) Cannot be determined
   (d) None of the above

7. The standard deviation of the input layer is:
   (a) 1
   (b) 0
   (c) Cannot be determined
   (d) None of the above

8. In a fully connected Convolutional Neural Network (CNN), the layer of neurons in the layer after the input and hidden layers, and the hidden layer itself are:
   (a) Increasing in training and decreasing in testing, respectively
   (b) Increasing in training and increasing in testing, respectively
   (c) Decreasing in training and increasing in testing, respectively
   (d) Decreasing in training and decreasing in testing, respectively
   (e) None of the above

9. If extra features are used in conjunction with the output layer, the number of the output layer is:
   (a) Increased
   (b) Decreased
   (c) Remains the same
   (d) Cannot be determined
   (e) None of the above

10. What are the following statements true or false for a known Handwritten Digit Recognition system?
    (a) Both the input and output are in the form of handwritten digits.
    (b) The input is represented in a discrete manner, while the output is in a continuous manner.
    (c) The input is represented in a continuous manner, while the output is in a discrete manner.
    (d) Both the input and output are in the form of handwritten digits.
    (e) None of the above

11. In the multi-layered Convolutional Neural Network, the number of the output layer is:
    (a) Increased
    (b) Decreased
    (c) Remains the same
    (d) Cannot be determined
    (e) None of the above

12. Which of the following statements are true or false for a known Handwritten Digit Recognition system?
    (a) Both the input and output are in the form of handwritten digits.
    (b) The input is represented in a discrete manner, while the output is in a continuous manner.
    (c) The input is represented in a continuous manner, while the output is in a discrete manner.
    (d) Both the input and output are in the form of handwritten digits.
    (e) None of the above