UNIT 7 ASSIGNMENT

Deep Learning and Computer Vision

## Instructions

The questions below will prepare you for future interviews as they relate to concepts discussed throughout the week. You’ve practiced these concepts in the coding activities, exercises and coding portion of the assignment. Now, let’s formulate your programming into well-thought responses.

Except as indicated, use this document to record all your assignment work and responses to any questions. At a minimum, you will need to turn in a digital copy of this document to your facilitator as part of your assignment completion. You may also have additional supporting documents that you will need to submit. Your facilitator will provide feedback to help you work through your findings.

**Note:** Though your work will only be seen by those grading the course and will not be used or shared outside the course, you should take care to obscure any information you feel might be of a sensitive or confidential nature.

*Begin your assignment by completing the questions below. Directions to submit your work can be found on the assignment page. Information about the grading rubric is available on any of the course assignment pages online. Do not hesitate to contact your facilitator if you have any questions about the assignment.*

Unit 7 Written Portion

# Implementing Neural Networks

Answer the questions below about deep learning and computer vision.

## Questions:

1. What is deep learning? List some real-word applications of deep learning.

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| Deep learning is a subset of machine learning that involves complex machine learning models that can contain many layers in training. Examples that use deep learning: facial recognition, self driving cars, natural language processing |

1. Compare and contrast a neural network to a linear model such as logistic regression. What are the advantages of using a neural network instead of a linear model?

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| Neural networks can capture the nonlinear and complex relationships between different features a lot better than linear models. |

1. Describe the architecture of a traditional neural network and its core components.

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| *Architecture: input layer, hidden layers, activation function, pooling layer, dropout layer, output layer* |

1. Summarize the training process of a traditional neural network.

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| The process involves going through several layers mentioned above so the neurons can learn the features of the dataset. Then, in the end it is responsible for coming up with a decision/prediction |

1. Describe a few advantages and disadvantages of using a neural network.

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| Advantages: can easily find relationships in complex features.  Disadvantages: quickly becomes very complex and challenging to understand how a specific model may have made certain predictions since the layers can become extremely deep. They are also prone to overfitting |

1. Why is a specific neural network architecture needed for image data?

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| Images are much more complex and using a convolutional neural network specifically handles translation invariance. Meaning it can handle small translations of the object in the image without losing its meaning better than a regular NN. |

1. Compare and contrast a traditional neural network with a convolutional neural network.

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| Similarities: still have the input layer, convo and activation functions, and output layers  Differences: CNN better at handling images than NN. NN usually used to handle vectorized data that are not images. |



*To submit this assignment, please refer to the instructions in the course*.