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1. Which of the below are key reasons behind the current deep learning boom (select all that apply)? **1 / 1 point**

- [x] The amount of data available for training neural networks has grown exponentially in recent years

Correct

- [x] Computational power has increased tremendously in recently years, enabling the training of much deeper neural networks

Correct

- [ ] Neural networks were only recently invented and so we are just now beginning to realize what they can do
- [x] Numerous researchers and practitioners have made significant efforts to label vast amounts of data for training supervised models

Correct

2. In which of the following situations would a neural network **not** be a good choice of algorithm to use? **1 / 1 point**

- ( ) We have a very large number of features, such as in computer vision where each pixel of an image can be considered a feature
- (•) Interpretability of the model outputs is very important
- ( ) There are complex relationships between the input features and the target values
- ( ) We have a vast amount of training data available

Correct

3. What is the key difference between neural network training using stochastic gradient descent (SGD) and batch training? **1 / 1 point**

- ( ) If we use SGD we do not need to split our data to create separate training and test sets, as we do with batch training
- ( ) Batch gradient descent can be used for training on very large datasets which SGD cannot
- (•) When training using SGD we iteratively update the model weights using one observation at a time, while in batch training we calculate the weight updates based on all observations in the training set for each iteration
- ( ) In SGD we can take advantage of vectorized operations to speed training, while in batch training we cannot

Correct

4. What is the advantage of using a deep neural network with many layers relative to a shallow network with only an input and output layer? **1 / 1 point**

- (•) Neural networks with many hidden layers can handle problems with very complex decision boundaries while shallow networks are more limited in their ability to represent complex relationships
- ( ) Deep neural networks can process large amounts of data while shallow networks cannot
- ( ) Deep neural networks are more interpretable than shallow networks
- ( ) Deep neural networks always give better performance in generalizing to predict on new data as compared to shallow networks

Correct

5. We are building a classification model using a neural network to identify five different lung diseases from chest x-ray images. How many units would be in the output layer of our neural network? **1 / 1 point**

- ( ) A single unit in the output layer

- Ten units in the output layer
- The number of output units is a hyperparameter we can optimize by trying different values
- Five units in the output layer

Correct

6. Which of the following are correct regarding the role of the learning rate in training a neural network (select all that apply)? **1 / 1 point**

- [x] The learning rate determines how much the model weights change during every iteration of training

Correct

- [ ] If the learning rate is too small, the model training will converge too quickly
- [x] If the learning rate is too large, the gradient will bounce around and may diverge, preventing the model training from converging to the optimal weights

Correct

- [ ] We should always use a learning rate of 0.01 in training neural networks

7. Why do we commonly use transfer learning when using neural networks for tasks in computer vision or natural language processing? **1 / 1 point**

- We use transfer learning because it gives us access to a model which is ready to use for our specific task with no additional training needed
- It is impossible for an individual person to fully train a neural network from scratch for a single project, so we must use transfer learning
- We benefit from the significant earlier training of the model while still being able to perform fine-tuning training to enable the model to perform well on our specific task
- Transfer learning always gives us a model with better performance than training one completely from scratch

Correct

8. In computer vision, what is the difference between image classification and object detection? **0 / 1 point**

- In image classification we seek to identify what object(s) are contained in the image, whereas with object detection we also seek to identify the location of each object
- In object detection we seek to classify every pixel in the image as an object, whereas in image classification we seek only to identify the primary object in the image
- In image classification we are classifying static images while in object detection we classify objects found in video
- Image classification and object detection refer to the same task

Incorrect
Semantic segmentation refers to the classification of each pixel in an image by the object it belongs to.

9. What is the current dominant approach for text sequence modeling? **1 / 1 point**

- Bag of words
- Transformer models
- GloVe
- Word embeddings

Correct

10. Which of the following are issues that are often encountered in working with neural networks (select all that apply)? **1 / 1 point**

- [x] Neural networks can be very computationally expensive and power-hungry to train and use for inference

Correct

- [x] Neural networks can easily overfit, particularly on small data

Correct

- [x] The output of neural networks can be difficult to interpret

Correct

- [ ] Relative to other models, neural networks can struggle on problems with many features such as computer vision or natural language processing