

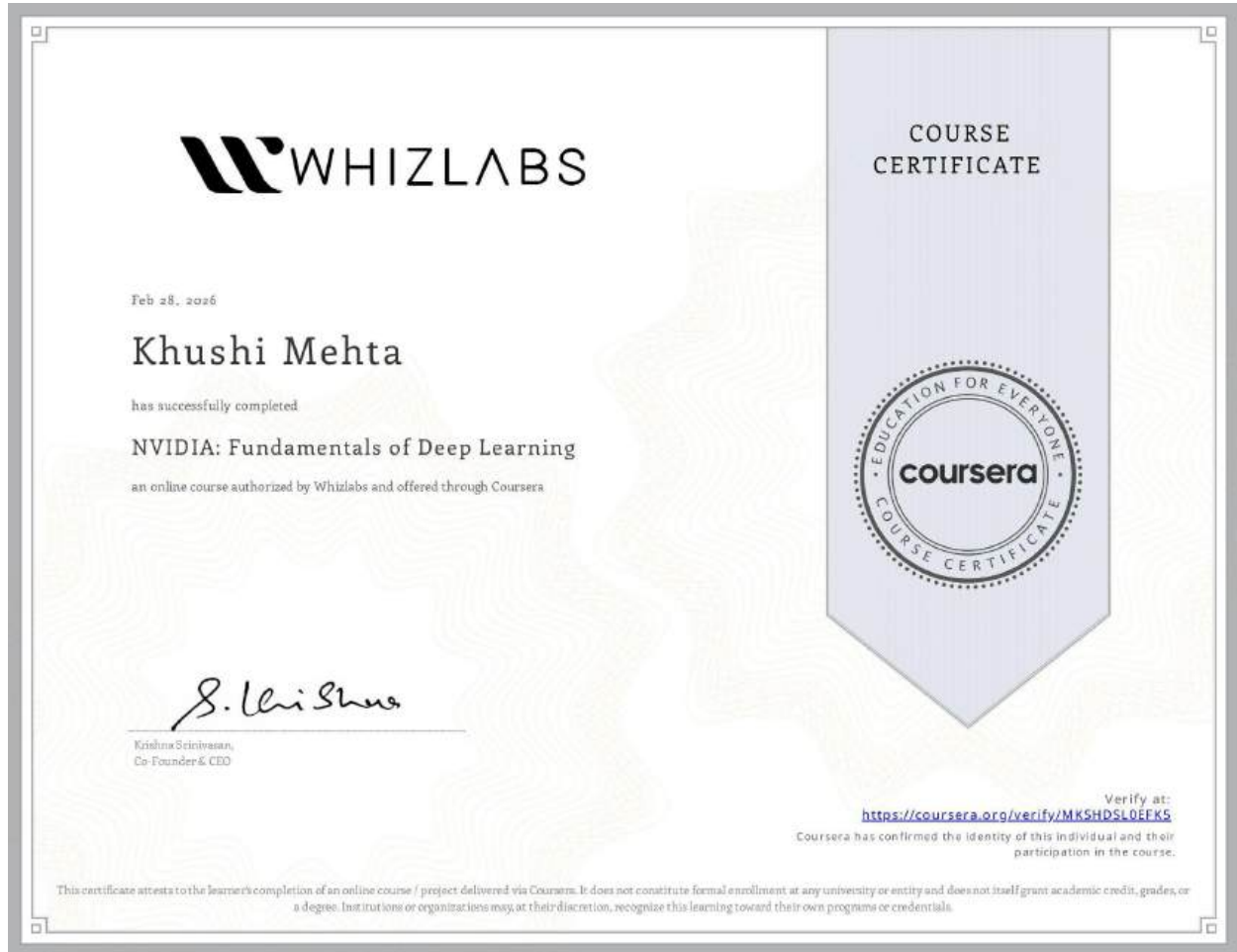
# NVIDIA: Fundamentals of Deep Learning (Coursera)

Course : Deep Learning  
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B.E. Third Year Batch - 3C54  
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Computer Science and Engineering Department  
Thapar Institute of Engineering and Technology  
Jan - June 2026

## Certificate of completion



# Module 1

## Fundamentals of Deep Learning

### Practice Assignment

The screenshot shows the Coursera interface for a knowledge check assignment. On the left, a sidebar lists the course content under 'NVIDIA: Fundamentals of Deep Learning'. The main area displays the assignment title 'Introduction to Deep Learning & Neural Networks - Knowledge check'. Below the title, there's a 'coach' section with a message and buttons for 'Help me practice' and 'Let's chat'. The 'Assignment details' section shows the submission date as Feb 20, 8:22 PM EST and the attempt as 'Unknyled', with a 'Retry' button. The 'Your grade' section shows a score of 100% with a note that the user needs at least 80% to pass. There are buttons for 'View submission' and 'See feedback'. At the bottom right, there's a 'Go to next item' button.

**Introduction to Deep Learning & Neural Networks - Knowledge check**

**coach**  
Ready to review what you've learned before starting the assignment? If not, here to help.  
[Help me practice](#) [Let's chat](#)

**Assignment details**  
Submitted: Feb 20, 8:22 PM EST Attempts: Unknyled [Retry](#)

**Your grade**  
To pass you need at least 80%. We keep your highest score.  
**100%** [View submission](#) [See feedback](#)

[Like](#) [Dislike](#) [Report an issue](#)

[Go to next item](#)

The screenshot shows the feedback page for the knowledge check. At the top, a green banner displays 'Your grade: 100%' with a 'Next Item' button. Below the banner, the feedback for two questions is shown. Question 1 asks which layer in a DNN is responsible for receiving the raw input data, with 'Input Layer' selected and marked correct. Question 2 asks which type of Deep Neural Network is best suited for processing images and videos, with 'Convolutional Neural Network (CNN)' selected and marked correct. Each question has a '1 / 1 point' indicator.

**Your grade: 100%**  
Your latest: 100% • Your highest: 100% • To pass you need at least 80%. We keep your highest score. [Next Item](#)

**1. Which layer in a DNN is responsible for receiving the raw input data?** 1 / 1 point

☒ Input Layer  
☐ Hidden Layer  
☐ It determines the accuracy of the model.  
☐ It has no significant role in machine learning.

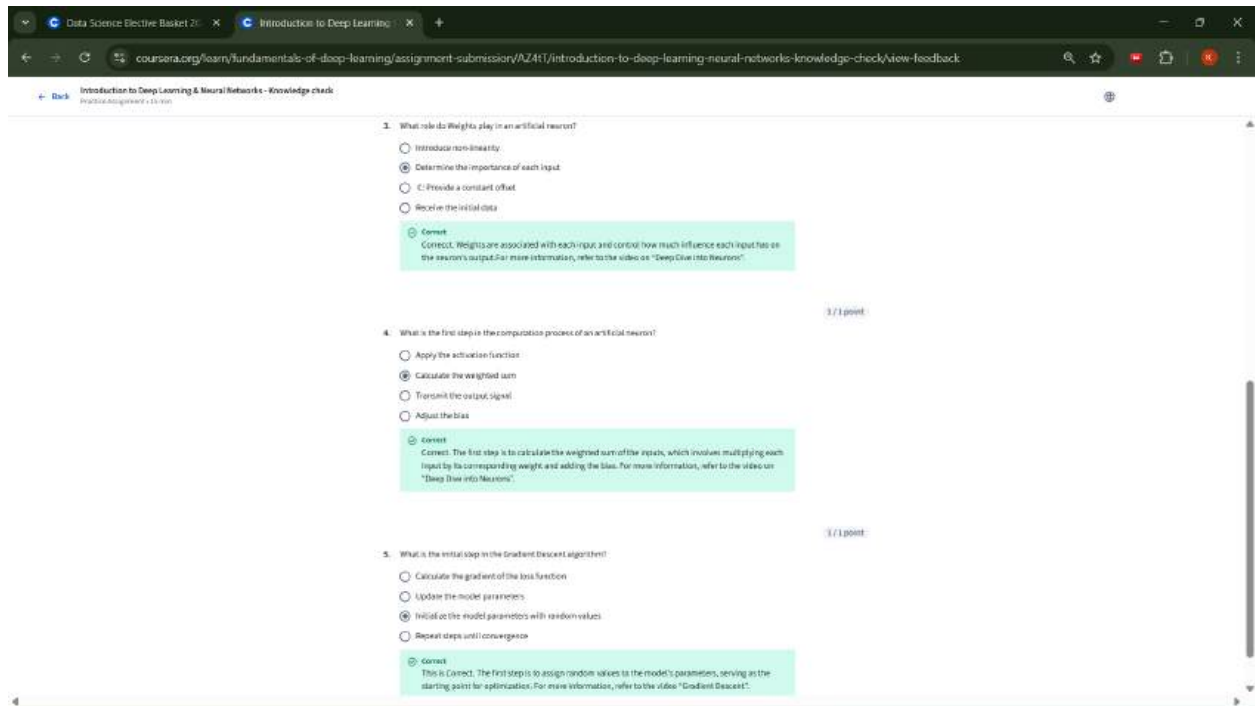
**Correct:**  
Correct. The Input Layer is the first layer in a DNN and is designed to take in the raw, unprocessed data. For more information, refer to the video "What is Deep Learning?".

**2. Which type of Deep Neural Network is best suited for processing images and videos?** 1 / 1 point

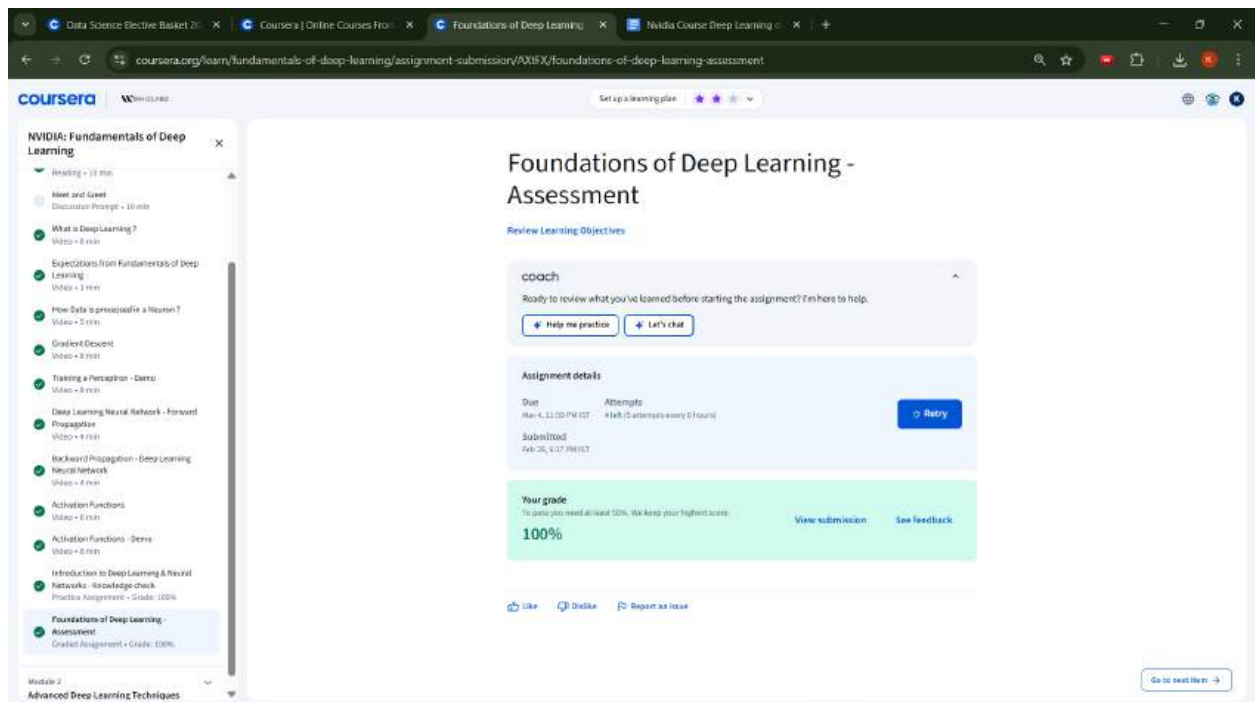
☐ Multi-Layer Perceptron (MLP)  
☒ Convolutional Neural Network (CNN)  
☐ Recurrent Neural Network (RNN)  
☐ Generative Adversarial Network (GAN)

**Correct:**  
Correct. Convolutional Neural Networks (CNNs) are specifically designed to handle image and video data due to their ability to capture spatial patterns. For more information, refer to the video on "What is Deep Learning?".

1 / 1 point



## Graded Assignment



Foundations of Deep Learning - Assessment

Your grade: 100%

1. What is the mathematical formula for the ReLU activation function?

☒  $f(x) = \max(0, x)$

☐  $f(x) = 1/(1 + e^{-x})$

☐  $f(x) = \tanh(x)$

☐  $f(x) = x$

**Correct**  
This is Correct. The ReLU function outputs the input directly if it is positive, otherwise it outputs zero. For more information, refer to the video "Taking a Neuron Class".

2. What is the purpose of applying an activation function to a neuron?

☐ To normalize the input values

☒ To introduce non-linearity into the model

☐ To calculate the weighted sum of inputs

☐ To produce the final prediction

**Correct**  
This is Correct. Activation functions introduce non-linearity, allowing the network to learn complex patterns in the data. For more information, refer to the video "Using Learning Through Networks - Forward Propagation".

3. In the equation  $Z = W \cdot X + b$ , what does  $Z$  represent?

☐ The weight matrix

☐ The input matrix

☐ The bias vector

☒ The total of weighted inputs for all neurons in a layer

**Correct**  
This is Correct.  $Z$  is the result of the matrix multiplication between the weight matrix ( $W$ ) and the input matrix ( $X$ ), plus the bias vector ( $b$ ). It is the total weighted sum for all neurons in a layer before the activation function is applied. For more information, refer to the video "Deep Learning Neural Network - Forward Propagation".

4. What is the primary goal of backpropagation in neural networks?

☐ To initialize the model's parameters

☐ To make predictions on new data

☒ To minimize the total error and improve model accuracy

☐ To introduce non-linearity into the model

**Correct**  
This is Correct. Backpropagation is a process to iteratively adjust the network's weights and biases to reduce the error between its predictions and the true values, thereby improving the model's accuracy. For more information, refer to the video "Backward Propagation - Deep Learning Neural Network".

Foundations of Deep Learning - Assessment

5. Which step involves feeding the input data through the network to generate a prediction?

☒ Forward Pass

☐ Loss Calculation

☐ Backward Pass

☐ Weight Initialization

**Correct**  
This is Correct. The Forward Pass is where the input data flows through the network, layer by layer, resulting in the final output or prediction. For more information, refer to the video "Backward Propagation - Deep Learning Neural Network".

6. Given a categorical feature with values ('red', 'green', 'blue'), what would be the one-hot encoded representation of 'green'?

☐ [1, 0, 0]

☒ [0, 1, 0]

☐ [0, 0, 1]

☐ [1, 1, 0]

**Correct**  
This is Correct. In one-hot encoding, each category gets its own binary column. Since 'green' is the second category, its representation is [0, 1, 0]. For more information, refer to the video "Deep Learning - Training a Multi-Class Classification".

# Module 2

## Advanced Deep Learning Techniques

### Practice Assignment

The screenshot shows the Coursera interface for the course 'NVIDIA: Fundamentals of Deep Learning'. The left sidebar lists the course content, including 'Module 2: Advanced Deep Learning Techniques'. The main content area displays the 'Deep Learning & Transfer Learning Techniques - Knowledge check' page. It shows the assignment details, including the submission date (Feb 25, 7:42 PM IST) and the attempt status (Unattempted). The 'Your grade' section shows a score of 100%, indicating that the user has completed the assignment successfully. There are links for 'View submission' and 'See feedback'.

The screenshot shows the feedback page for the 'Deep Learning & Transfer Learning Techniques - Knowledge check'. The top section displays the 'Your grade: 100%' and a 'Next item' button. Below this, there are two questions with multiple-choice answers. The first question is 'What type of data are Convolutional Neural Networks (CNNs) primarily designed to process?' and the correct answer is 'Grid-like data, such as images and video'. The second question is 'What is the primary purpose of Pooling Layers in a CNN?' and the correct answer is 'To reduce the spatial dimensions of the data by downsampling'. Both questions are worth 1/1 point.

**1. What type of data are Convolutional Neural Networks (CNNs) primarily designed to process?** 1/1 point

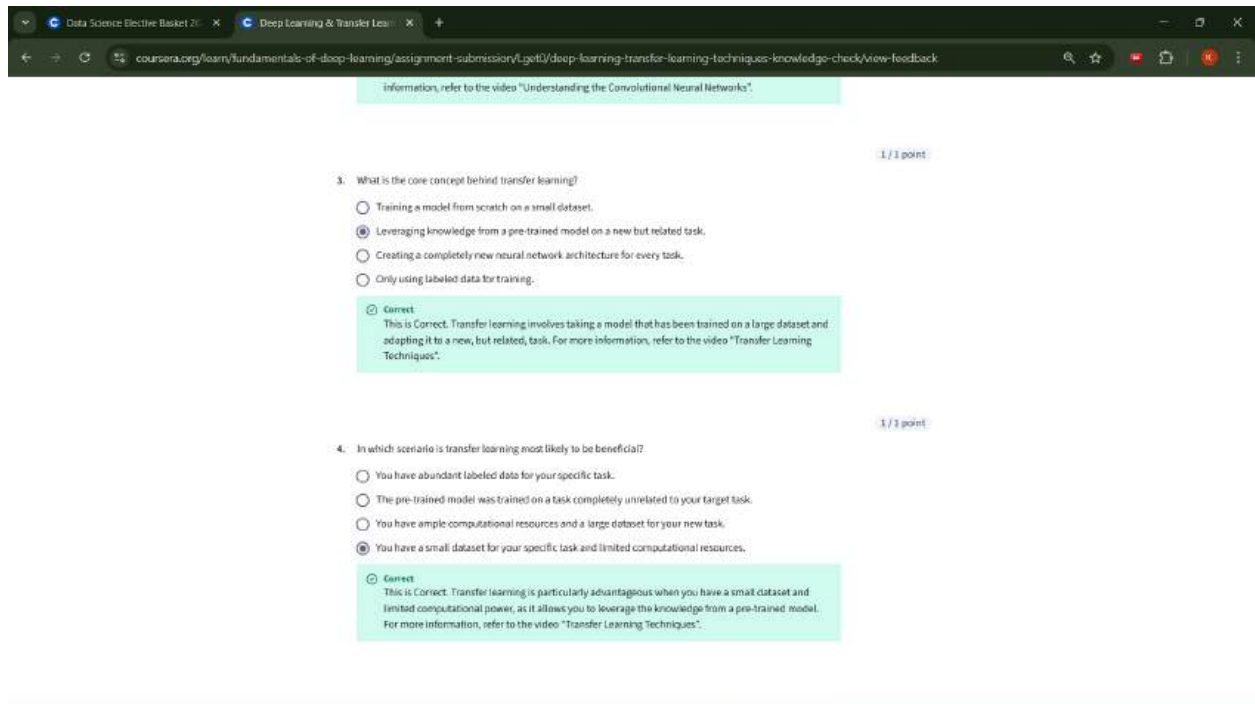
- ☐ Sequential data, such as text or time series
- ☐ Tabular data with structured features
- ☒ Grid-like data, such as images and video
- ☐ Audio data

**Correct:**  
This is Correct. CNNs excel at handling grid-like data due to their ability to capture spatial relationships within the data using convolutional layers. For more information, refer to the video "Understanding the Convolutional Neural Networks".

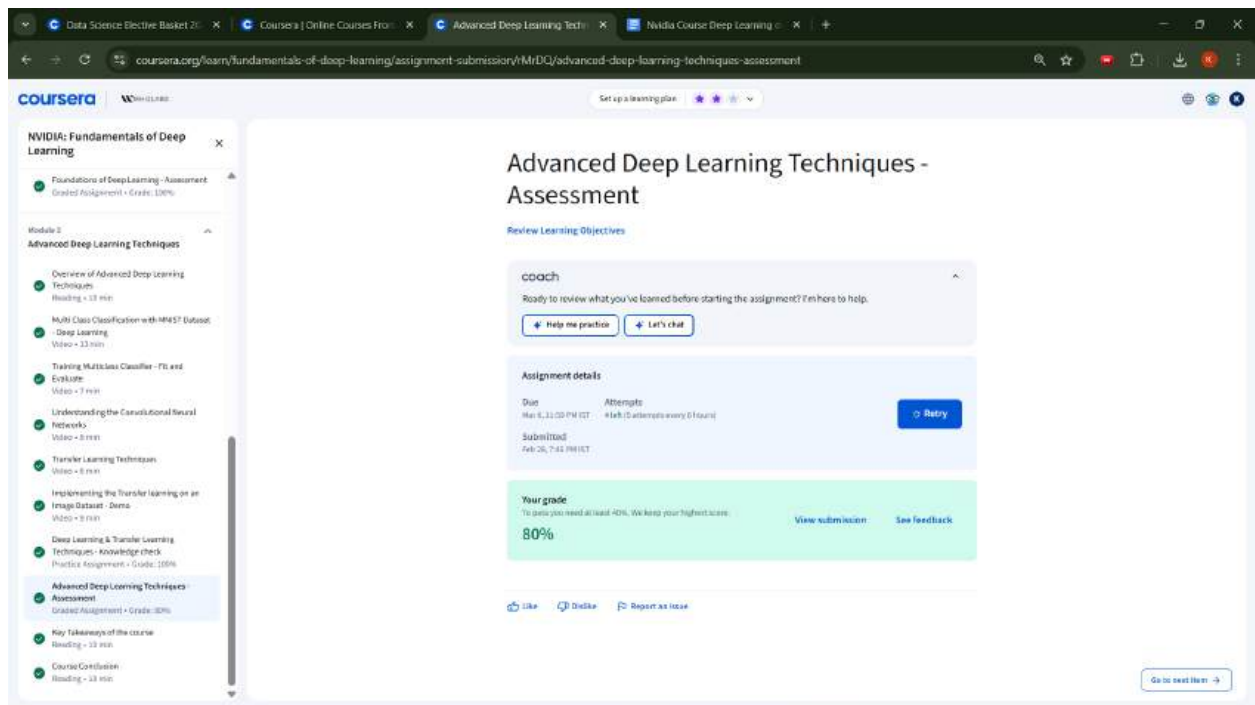
**2. What is the primary purpose of Pooling Layers in a CNN?** 1/1 point

- ☐ To increase the spatial dimensions of the data
- ☐ To introduce non-linearity into the model
- ☒ To reduce the spatial dimensions of the data by downsampling
- ☐ To generate the final output predictions

**Correct:**  
This is Correct. Pooling layers downsample the feature maps, reducing their spatial dimensions and making the network more computationally efficient and robust to small shifts in the input. For more information, refer to the video "Understanding the Convolutional Neural Networks".



## Graded Assignment



Advanced Deep Learning Techniques - Assessment  
Graded Assignment • 13 min

Due Mon 8, 11:39 PM IST

1/1 point

3. Which activation function maps the input to a range between 0 and 1 and is historically popular but suffers from vanishing gradients?

- ☒ Sigmoid
- ☐ Hyperbolic Tangent (tanh)
- ☐ Rectified Linear Unit (ReLU)
- ☐ Linear

☒ Correct  
This is Correct. The sigmoid function has an S-shaped curve that outputs values between 0 and 1. It was widely used in early neural networks, but its gradients tend to become very small as the input values move away from zero, hindering learning in deep networks. For more information, refer to the video "Activation Functions".

1/1 point

4. Which activation function is similar to sigmoid but maps the input to a range between -1 and 1?

- ☐ A. Sigmoid
- ☒ Hyperbolic Tangent (tanh)
- ☐ Rectified Linear Unit (ReLU)
- ☐ Linear

☒ Correct  
This is Correct. The tanh function is similar in shape to the sigmoid but its output range is between -1 and 1. This centering often leads to faster convergence during training compared to sigmoid. For more information, refer to the video "Activation Functions - Demo".

1/1 point

Advanced Deep Learning Techniques - Assessment  
Graded Assignment • 13 min

Due Mon 8, 11:39 PM IST

**Your grade: 80%**

Your latest: 80% • Your highest: 80% • To pass you need at least 40%. We keep your highest score.

Next item →

1/1 point

1. When loading the VGG16 model, what does setting `include_top=False` signify?

- ☒ It excludes the final fully connected classification layers of the model
- ☐ It excludes the convolutional base of the model
- ☐ It loads the model without pre-trained weights
- ☐ It disables transfer learning

☒ Correct  
This is Correct. `include_top=False` removes the original classification layers, allowing you to add your own custom layers for the new task. For more information, refer to the video "Transfer Learning - Demo".

1 point

2. What is the purpose of freezing layers in the VGG16 model during transfer learning?

- ☐ To prevent the pre-trained weights from being updated during training
- ☐ To slightly speed up the training process
- ☒ To ensure the model learns only from the new data
- ☐ To reduce the model's complexity

☒ Incorrect  
This is Incorrect. The model still leverages the knowledge from the pre-trained layers, even if they are frozen. For more information, refer to the video "Transfer Learning - Demo".

1/1 point



Data Science Elective Basket 21

Advanced Deep Learning Techni

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← Back

Advanced Deep Learning Techniques - Assessment

Created Assignment • 13 min

🌐 Due Mon 8, 11:34 PM IST

values move away from zero, hindering learning in deep networks. For more information, refer to the video "Activation Functions".

1 / 1 point

4. Which activation function is similar to sigmoid but maps the input to a range between -1 and 1?

☐ A: Sigmoid

☒ B: Hyperbolic Tangent (tanh)

☐ C: Rectified Linear Unit (ReLU)

☐ D: Linear

✔ Correct

This is Correct. The tanh function is similar in shape to the sigmoid but its output range is between -1 and 1. This centering often leads to faster convergence during training compared to sigmoid. For more information, refer to the video "Activation Functions - Deeper".

1 / 1 point

5. Which of the following is a common approach in transfer learning?

☐ A: Training a model from scratch with random weights

☐ B: Completely discarding pre-trained models in every training iteration

☐ C: Avoiding the use of neural networks

☒ D: Using a pre-trained model as a feature extractor and fine-tuning only specific layers

✔ Correct

Correct. This is a common approach in transfer learning where the lower layers of a pre-trained model are retained, and only the higher layers are fine-tuned for a specific task. For more information, refer to the video on "Transfer Learning Techniques".