CNN Architecture

Assignment Questions

PW SKILLS

CNN Architecture

1. What is a Convolutional Neural Network (CNN), and why is it used for image processing?
2. What are the key components of a CNN architecture?
3. What is the role of the convolutional layer in CNNs?
4. What is a filter (kernel) in CNNs?
5. What is pooling in CNNs, and why is it important?
6. What are the common types of pooling used in CNNs?
7. How does the backpropagation algorithm work in CNNs?
8. What is the role of activation functions in CNNs?
9. What is the concept of receptive fields in CNNs?
10. Explain the concept of tensor space in CNNs.
11. What is LeNet-5, and how does it contribute to the development of CNNs?
12. What is AlexNet, and why was it a breakthrough in deep learning?
13. What is VGGNet, and how does it differ from AlexNet?
14. What is GoogLeNet, and what is its main innovation?
15. What is ResNet, and what problem does it solve?
16. What is DenseNet, and how does it differ from ResNet?
17. What are the main steps involved in training a CNN from scratch?

Practical

1. Implement a basic convolution operation using a filter and a 5x5 image (matrix).
2. Implement max pooling on a 4x4 feature map with a 2x2 window.
3. Implement the ReLU activation function on a feature map.
4. Create a simple CNN model with one convolutional layer and a fully connected layer, using random data.
5. Generate a synthetic dataset using random noise and train a simple CNN model on it.
6. Create a simple CNN using Keras with one convolution layer and a max-pooling layer.
7. Write a code to add a fully connected layer after the convolution and max-pooling layers in a CNN.
8. Write a code to add batch normalization to a simple CNN model.
9. Write a code to add dropout regularization to a simple CNN model
10. Write a code to print the architecture of the VGG16 model in Keras?
11. Write a code to plot the accuracy and loss graphs after training a CNN model.
12. Write a code to print the architecture of the ResNet50 model in Keras?
13. Write a code to train a basic CNN model and print the training loss and accuracy after each epoch?