

lenet -5 and alexnet Assignment

1. Explain the architecture of LeNet-5 and its significance in the field of deep learning

LeNet-5 is a convolutional neural network (CNN) with 7 layers: an input layer, 2 convolutional layers, 2 pooling layers, a fully connected layer, and an output layer. It was one of the first CNNs and significantly advanced the application of deep learning in computer vision.

2. Describe the key components of LeNet-5 and their roles in the network
LeNet-5 includes convolutional layers for feature extraction, pooling layers for dimensionality reduction, and fully connected layers for classification. Its architecture also uses a sigmoid activation function in the hidden layers.

3. Discuss the limitations of LeNet-5 and how subsequent architectures like AlexNet addressed these limitations

LeNet-5 had limited scalability and was designed for small images (e.g., MNIST). AlexNet addressed these limitations by using deeper architectures, larger datasets, and ReLU activation functions to improve training efficiency and performance on large images.

4. Explain the architecture of AlexNet and its contributions to the advancement of deep learning

AlexNet is a deep CNN with 8 layers: 5 convolutional layers and 3 fully connected layers. It introduced ReLU, dropout for regularization, and GPU acceleration, leading to significant improvements in image classification performance and contributing to the deep learning revolution.

5. Compare and contrast the architectures of LeNet-5 and AlexNet. Discuss their similarities, differences, and respective contributions to the field of deep learning

LeNet-5 is simpler and suited for smaller images, while AlexNet is deeper, designed for larger images, and utilizes innovations like ReLU and dropout. Both architectures significantly advanced deep learning, with LeNet-5 laying the foundation and AlexNet demonstrating the power of deeper models and modern training techniques.