

DDALSSession-17

① Deep learning is a subset of machine learning that utilizes artificial neural networks with multiple layers to model and process complex data. It differs from traditional machine learning in its capacity to automatically learn hierarchical representations of data. Traditional machine learning often requires manual feature extraction, while deep learning algorithms can extract features from raw data.

② Can you explain the concept of deep neural networks and their role in deep learning?

Neural networks are computing systems inspired by the biological neural networks of animal brains.

They consist of interconnected nodes organized in layers.

In deep learning, neural networks with multiple hidden layers are employed to model intricate relationships within data.

Neural networks play a fundamental role in deep learning as they enable us to automatically learn features and representation from the data.



③ What are some common applications of deep learning in various fields?

Deep learning finds applications across various fields include:

Computer vision: Image classification, object detection and segmentation.

Natural Language processing: Language translation, sentiment analysis and speech recognition.

Healthcare: Disease diagnosis, image analysis.

Finance: Fraud detection.

④ How do you train a deep learning model and what are the key components of the training process?

Training a deep learning machine involves iteratively adjusting the model's parameters to minimize the difference between its predictions & the actual label. Key components of training process:

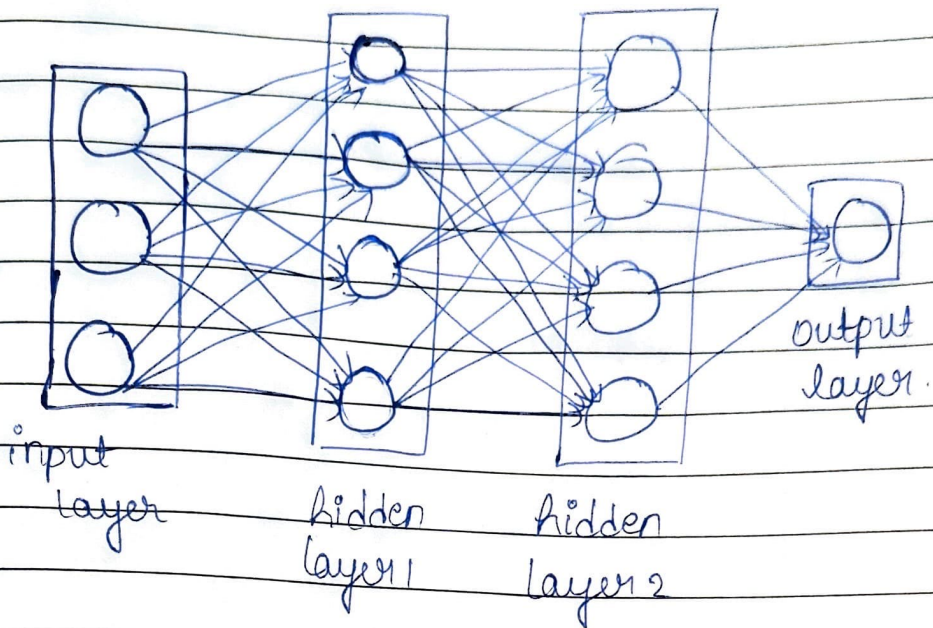
Data preprocessing: Cleaning and preparing the data for training.

Loss function selection: Choosing a suitable function to measure the difference between predicted and actual value.

Validation: Evaluating the model's performance on a separate validation dataset to monitor for overfitting.



⑤ Describe the structure of a typical deep neural network.



A typical deep neural network consists of an input layer, one or two hidden layers, and an output layer.

Each layer is composed of interconnected neurons, where each neuron receives input from the previous layer.

The input layer represents the raw data, while the hidden layers extract hierarchical features; and the output layer produces the final predictions & classifications.