Deep Learning Book
Lesson 1 r 1: Introduction to Deep Learning

What is Deep Learning?
Deep learning is a subfield of machine learning that deals with algorithms inspired by the structure and function of the human brain, known as artificial neural networks. It is widely used for tasks such as image recognition, speech processing, and natural language understanding.

Key Concepts
- Neural Networks: Computational models inspired by biological neural networks that are used to approximate complex functions.
- Activation Functions: Mathematical functions applied to the outputs of neurons to introduce non-linearity, enabling the network to learn complex patterns.
- Supervised vs. Unsupervised Learning:
  - Supervised Learning: The model is trained on labeled data.
  - Unsupervised Learning:The model works with data that has no labels, often finding hidden structures or patterns.

Code Example: Building a Simple Neural Network in TensorFlow

```python
import tensorflow as tf
from tensorflow import keras

 Define a simple sequential model
model = keras.Sequential([
    keras.layers.Dense(10, activation='relu', input_shape=(5,)),  # 5 input features, 10 neurons in hidden layer
    keras.layers.Dense(1, activation='sigmoid')  # Output layer with 1 neuron (binary classification)
])

 Compile the model
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])

 Summary of the model
model.summary()
```

Key Topics to Explore:
- Neural Network Layers: Understand the structure of a neural network and the roles of input, hidden, and output layers.
- Training a Model: Learn how to feed data to the model, adjust the weights during training using backpropagation, and use an optimizer for better performance.

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