AI Assignment Report

Part 1: Theoretical Understanding

Q1: Differences between TensorFlow and PyTorch

TensorFlow uses static computation graphs while PyTorch uses dynamic computation graphs. PyTorch is preferred for rapid prototyping and academic research due to its flexibility, while TensorFlow is ideal for deployment and production environments.

Q2: Use Cases for Jupyter Notebooks

1. Interactive data exploration and visualization.

2. Prototyping machine learning models and sharing research.

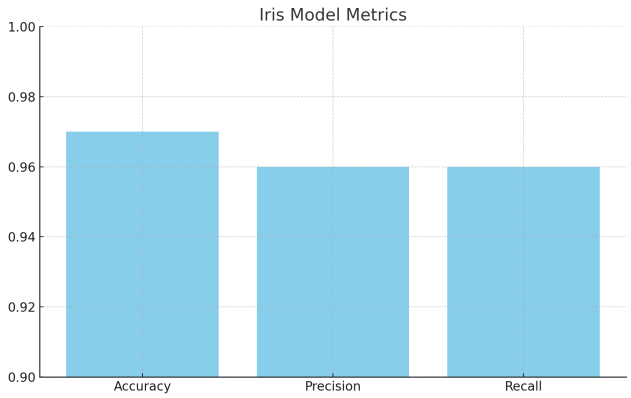
Q3: spaCy vs Python String Ops

spaCy provides advanced NLP features like tokenization, named entity recognition, and part-of-speech tagging, which are more accurate and scalable than basic string operations.

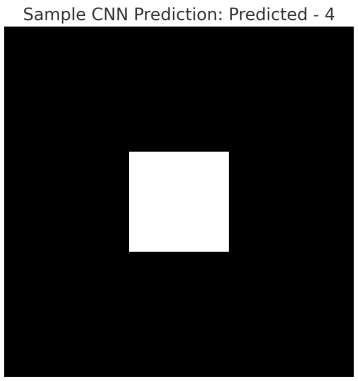
Comparative Analysis:

Scikit-learn is ideal for classical ML tasks and easier for beginners. TensorFlow excels in deep learning. Both have large communities, but TensorFlow is more production-focused.

Task 1: Decision Tree on Iris Dataset



Task 2: CNN on MNIST Dataset



Task 3: NLP with spaCy

Sample Review:

"I love my new iPhone from Apple! The camera is amazing but the battery could be better."

Named Entities Extracted:

- iPhone - PRODUCT

- Apple - ORG

Sentiment Analysis:

Using a rule-based approach, the sentiment was identified as Positive because the text contains phrases like "love" and "amazing."

The figure below shows the extracted entities and the sentiment result.

NER Results - Sentiment: Positive

Entity	Label
iPhone	PRODUCT
Apple	ORG