Advanced Deep Learning
AIGC 5500
Lab 04
CNN

Start by creating a Python notebook named <FirstName_LastName.ipynb> (e.g., Hossein_Pourmodheji.ipynb). Organize the notebook into clear sections for better readability.

Apply all techniques you have learned to train a CNN model (No RestNet or any other pre-trained model) on the CIFAR-100 to achieve at least 60% accuracy on the test set. Load and preprocess the dataset, including normalization and splitting into training, validation, and test sets. Create a simple CNN with Convolutional layers, Pooling layers, and fully connected layers for classification. Try different kernel sizes (e.g., 3x3 vs. 5x5), strides, and pooling methods. Measure accuracy on the validation and test sets. Plot loss and accuracy curves over epochs. Additionally, experiment with different learning rates and observe the impact on convergence. Also, apply dropout and observe its effect on the model's performance.

In the final markdown cell of the notebook, discuss the challenges you faced in optimizing CNNs and answer the following question:

- How do kernel sizes and stride choices impact feature extraction?
- What would you change in this architecture for a more complex dataset?

Deliverables:

When you're done, save the notebook with all your code, plots, and comments. Export the notebook to a PDF format. Submit both the .ipynb file and the PDF for evaluation. Make sure your work is well-organized and readable.