**Assignment NN as Classifier: ANN based Classification with PyTorch on CIFAR-10**

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**Objective:**

Build a Artificial neural network using PyTorch to classify images from the CIFAR-10 dataset. Experiment with deeper architectures, evaluate the model, and visualize results.

**Tasks:**

**1. Dataset Preparation:**

* Load and preprocess the CIFAR-10 dataset.
* Normalize the data (mean = 0, std = 1) for faster convergence.
* Split the dataset into training and testing sets.

**2. Model Design:**

* Construct a Artificial neural network with **at least 5 (or More) hidden layers**.
* Use the **ReLU activation function** for hidden layers.
* Include a final output layer with **10 neurons** and no activation (for classification).
* Use **CrossEntropyLoss** as the loss function.

**3. Model Training:**

* Train the model for **50 epochs** using the **Adam optimizer**.
* Use a **mini-batch size of 64**.

Note: Optimize the parameters as required for better results.

**4. Model Evaluation:**

* Evaluate the model on the testing set.
* Plot the following:
  + Training and validation loss curves.
  + Confusion matrix for test set predictions.
  + Examples of misclassified images with their predicted and true labels.

**Deliverables:**

1. Python code implementing the tasks above.
2. Graphs and plots:
   * Training and validation loss curves.
   * Confusion matrix.
   * Misclassified image samples.
3. A brief report discussing:
   * Model performance (accuracy, loss).
   * How increasing model depth impacted results.
   * Challenges faced and potential improvements.

**Submission Instructions:**

* Submit a Python notebook (.ipynb) with your code, visualizations, and report included.

Good luck