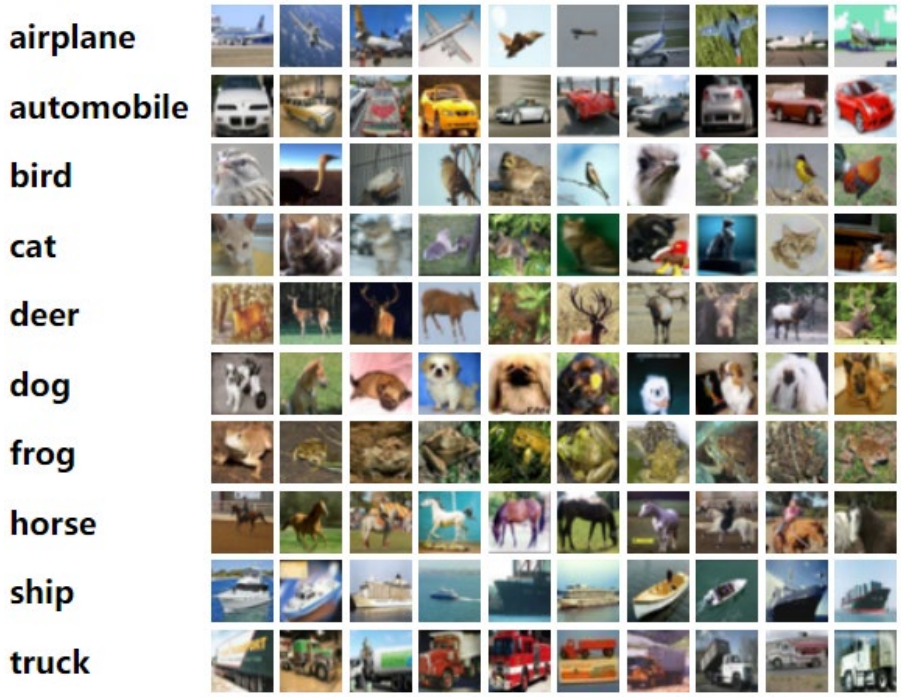
AI 2024, Assignment 1A:

Convolutional Neural Networks (CNNs)

In this assignment, you will learn how to use two classic convolutional neural network architectures—VGG and ResNet—to process the CIFAR-10 dataset. The dataset consists of 60,000 32x32 color images across 10 categories.

CIFAR-10

https://www.cs.toronto.edu/~kriz/cifar.html



Task Requirements:

1. Model Selection and Design: Implement the VGG16 and ResNet50 models using TensorFlow or PyTorch.
2. Train the Models: Train both the VGG and ResNet models on the CIFAR-10 dataset and adjust hyperparameters such as learning rate and batch size.
3. Performance Evaluation: Evaluate the performance of the models on the test set, comparing the accuracy and training time of both models.
4. Results Visualization: Plot the accuracy and loss curves during training, and display some examples of misclassified images.

Deliverables:

1. The code implementation with appropriate comments.
2. A detailed report on the results, including model accuracy, loss, and a comparison of the performance between VGG and ResNet.
3. Relevant charts, such as training curves and misclassification examples.