**Object Recognition in cifar-10 using a Convolutional Neural Network**

Object Recognition:

**Object recognition** is a computer vision technique for identifying **objects** in images or videos. **Object recognition** is a key output of deep learning and machine learning algorithms. When humans look at a photograph or watch a video, we can readily spot people, **objects**, scenes, and visual details. The goal is to teach a computer to do what comes naturally to humans: to gain a level of understanding of what an image contains.

Cifar-10 dataset:

The **CIFAR-10 dataset** ([Canadian Institute For Advanced Research](https://en.wikipedia.org/wiki/Canadian_Institute_for_Advanced_Research)) is a collection of images that are commonly used to train [machine learning](https://en.wikipedia.org/wiki/Machine_learning) and [computer vision](https://en.wikipedia.org/wiki/Computer_vision) algorithms. It is one of the most widely used datasets for machine learning research.[[1]](https://en.wikipedia.org/wiki/CIFAR-10#cite_note-1)[[2]](https://en.wikipedia.org/wiki/CIFAR-10#cite_note-2) The CIFAR-10 dataset contains 60,000 32x32 color images in 10 different classes.[[3]](https://en.wikipedia.org/wiki/CIFAR-10#cite_note-HopeResheff2017-3) The 10 different classes represent airplanes, cars, birds, cats, deer, dogs, frogs, horses, ships, and trucks. There are 6,000 images of each class

Here are the classes in the dataset, as well as 10 random images from each:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| airplane | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/airplane10.png |
| automobile | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/automobile10.png |
| bird | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/bird10.png |
| cat | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/cat10.png |
| deer | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/deer10.png |
| dog | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/dog10.png |
| frog | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/frog10.png |
| horse | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/horse10.png |
| ship | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/ship10.png |
| truck | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck1.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck2.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck3.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck4.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck5.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck6.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck7.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck8.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck9.png | https://www.cs.toronto.edu/~kriz/cifar-10-sample/truck10.png |

Libraries:

My programming language of choice for this project was python and major part of the project was done using keras.

Model Architecture: