

To unpickle the **CIFAR-10** dataset for a Convolutional Neural Network (CNN), you must deserialize the binary files and then reshape the raw data into a standard image format.

1. The Unpickling Function

For Python 3, use the following routine to load the pickled batch files (e.g., `data_batch_1`) as dictionaries

```
import pickle

def unpickle(file):
    with open(file, 'rb') as fo:
        # 'bytes' encoding is necessary for Python 3 compatibility
        dict = pickle.load(fo, encoding='bytes')
    return dict
```

2. Loading and Reshaping for CNNs

The unpickled data is stored as a NumPy array where each row represents an image. To use it in a CNN, you must reshape and transpose it to restore the RGB channels:

- **Extract Data:** Get the raw image bytes using the key `b'data'`.
- **Reshape:** Change from a flat vector to `(channels, height, width)`.
- **Transpose:** Reorder dimensions to `(height, width, channels)` for libraries like Matplotlib or TensorFlow.
- **Normalize:** Scale pixel values from `[0,255]` to `[0,1]` to improve training stability.

```
import numpy as np

# Load a single batch
batch = unpickle('data_batch_1')
X = batch[b'data']
Y = np.array(batch[b'labels'])

# Reshape to (10000, 32, 32, 3) and normalize
X = X.reshape(10000, 3, 32, 32).transpose(0, 2, 3, 1).astype("float32") /
255.0
*****
```