



Do You Know How Cameras Detect Objects?

Introduction to Image Classification with CIFAR-10

Welcome to the world of image classification. Today, we will explore the CIFAR-10 dataset. This dataset is a cornerstone for understanding computer vision. Let's learn about convolutional neural networks.

CIFAR-10: A Closer Look

Dataset Structure

60,000 32x32 color images are available. The dataset includes 10 classes. There are 50,000 training and 10,000 testing images.

Challenges

- Low resolution makes it harder to distinguish between classes (e.g., bird vs. airplane)
- Subtle differences between similar classes (e.g., cat vs. dog).

airplane



automobile



bird



cat



deer



dog



frog



horse



ship



truck



Can Increase the Video Speed to 1.5x

CNN Architecture

1

Convolutional Layers

Extract features using convolutional filters.

2

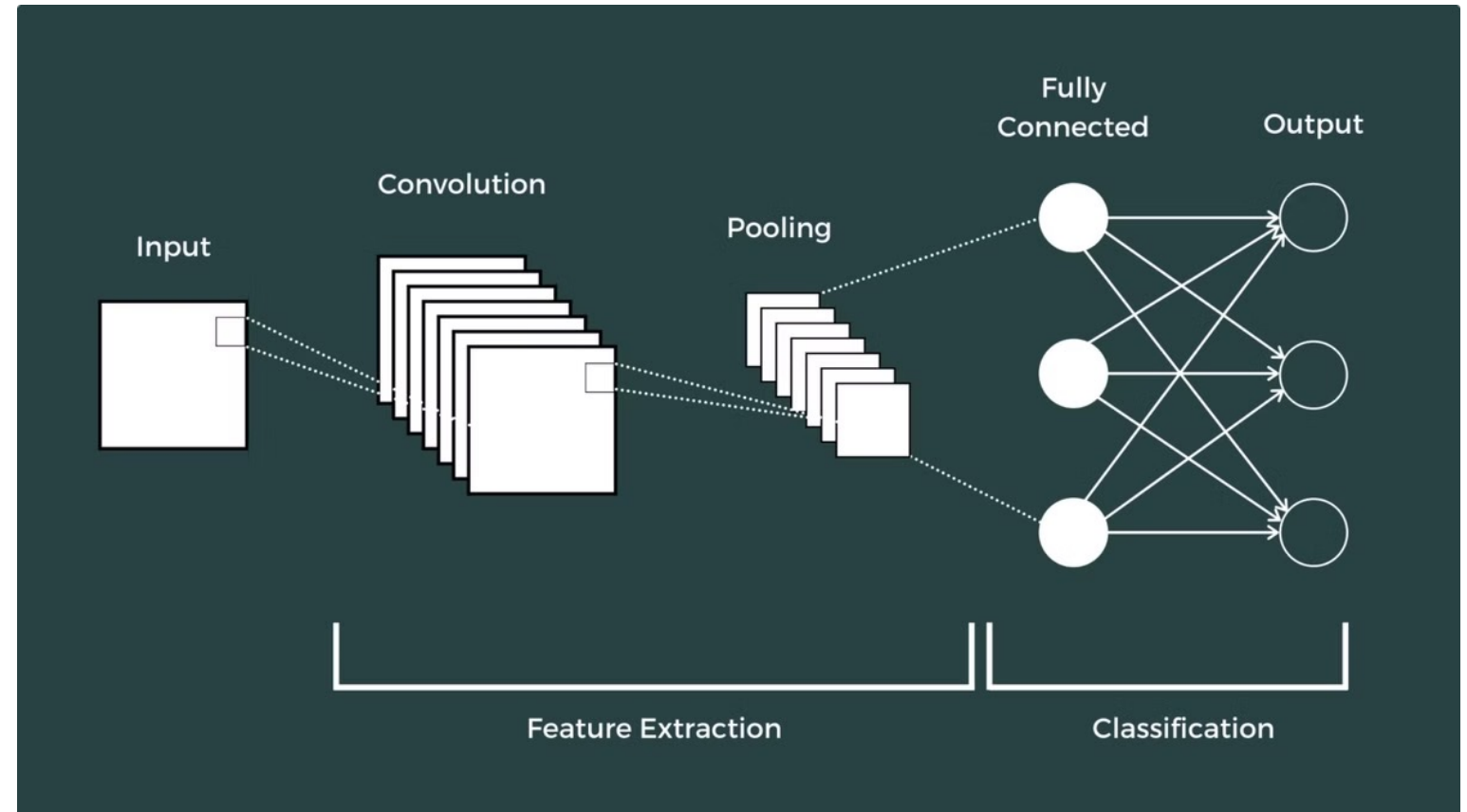
Pooling Layers

Reduce dimensionality and retain important features.

3

Fully Connected Layers

Classify images based on learned features.



Building and Training a CNN Model

1

TensorFlow

Use TensorFlow to build a CNN model.

2

Epochs

Tune the number of epochs.

3

Batch Size

Adjust the batch size.

4

Learning Rate

Set the learning rate and optimizer, such as Adam.

Training and Evaluation

Training

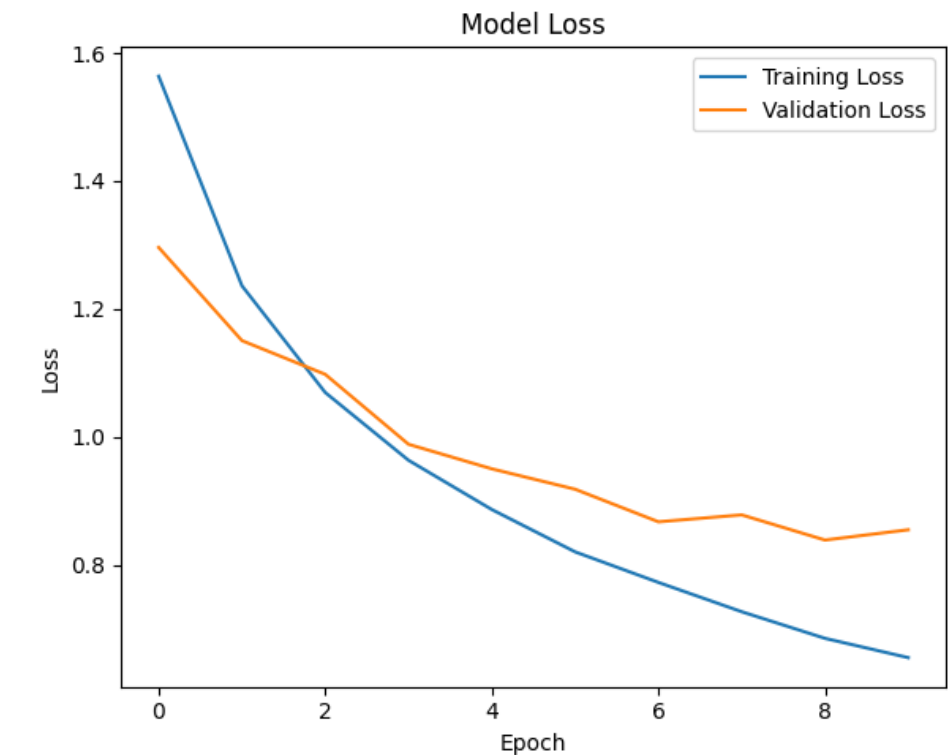
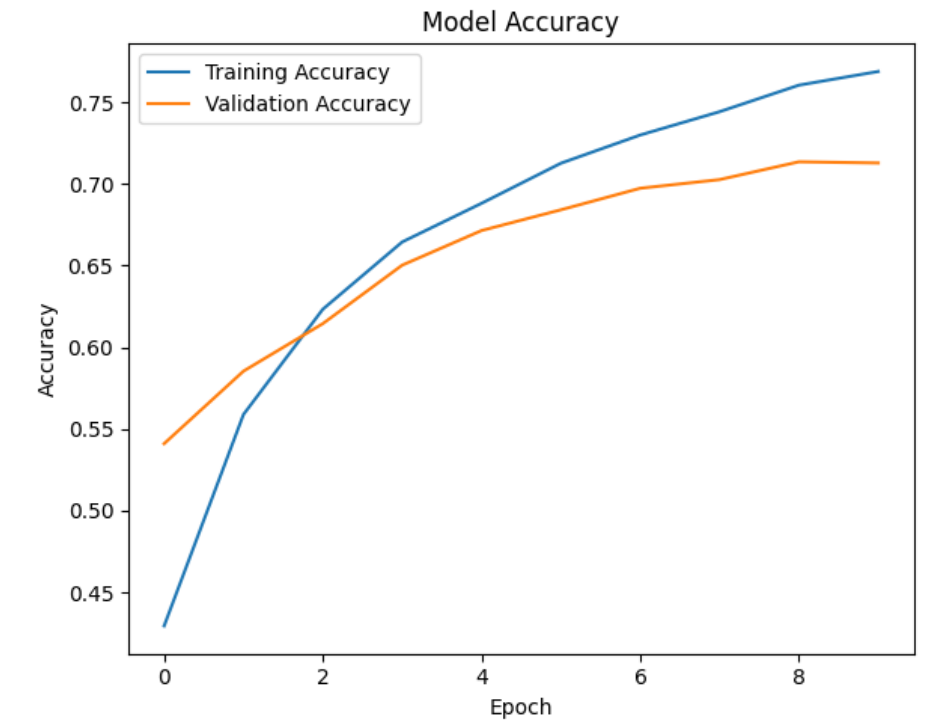
Feed training data to the model and adjust weights.

Validation

Monitor performance on the validation set.

Testing

Evaluate the model on unseen test data.



Conclusion and Key Takeaways

- 1 Powerful Tools
CNNs are powerful for image classification.
- 2 Real-World Challenges
CIFAR-10 presents low resolution and subtle differences.
- 3 Building a CNN
Use convolutional layers and fully connected layers to classify.
- 4 Future Applications
More advanced architectures are on the way.

Real-world deployment will be in industries like healthcare. Security and autonomous vehicles are also on the way.

