Lesson 6: Building a Convolutional Neural Network (CNN)

What Are CNNs?
CNNs are specialized deep learning models designed to process structured grid data, such as images. They are powerful for tasks like image classification, object detection, and segmentation.

Key Components:
- Convolutional Layers: Apply filters to input images to detect patterns like edges or textures.
Pooling: Reduces the spatial dimensions of the input, keeping only the most important information.
- Feature Extraction:CNNs automatically learn to extract useful features from images.

Code Example: Building a CNN in TensorFlow

python
```
model = keras.Sequential([
    keras.layers.Conv2D(32, (3,3), activation='relu', input_shape=(28,28,1)),
    keras.layers.MaxPooling2D(2,2),
    keras.layers.Flatten(),
    keras.layers.Dense(10, activation='softmax')
])
```

Key Topics to Explore:
- Data Augmentation: Enhance the dataset by generating variations of images (e.g., rotations, flips) to improve generalization.
- Transfer Learning with CNNs: Fine-tuning pre-trained CNNs for specialized tasks.