

Types of Pretrained CNN Architectures

1. Classical Architectures

- **LeNet-5 (1998)** → one of the first CNNs, used for digit recognition (MNIST).
 - **AlexNet (2012)** → breakthrough in ImageNet competition, deeper + ReLU activation.
 - **VGGNet (VGG16, VGG19, 2014)** → very deep (16/19 layers), simple stacked 3×3 conv filters.
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2. Efficient & Deeper Architectures

- **GoogLeNet / Inception (2014–2016)** → uses “Inception modules” (multi-size filters in parallel).
 - **ResNet (2015)** → introduces *skip connections* (residual learning), allows very deep networks (50, 101, 152 layers).
 - **DenseNet (2017)** → connects each layer to every other layer (dense connections).
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3. Lightweight Architectures (for Mobile/Edge devices)

- **MobileNet (V1, V2, V3)** → efficient, depthwise separable convolutions.
 - **ShuffleNet** → lightweight, uses pointwise group convolution and channel shuffle.
 - **SqueezeNet** → very small model size, uses “fire modules.”
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4. Modern High-Performance Architectures

- **EfficientNet (2019)** → scales depth, width, and resolution efficiently.
 - **RegNet** → focuses on designing regular and scalable networks.
 - **ConvNeXt (2022)** → CNN redesigned to compete with Transformers.
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5. Hybrid Architectures (CNN + Other Ideas)

- **Inception-ResNet** → combines Inception modules with ResNet skip connections.

- **NASNet / EfficientNet** → architectures discovered by Neural Architecture Search (NAS).
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