Printable ML Cheat Sheet: CNN • RNN • Transformers

Quick reference for deep learning fundamentals (images, sequences, attention).

Convolutional Neural Networks (CNNs)

What: Neural networks for images & spatial data.
Key Idea: Learn local patterns (edges → shapes → objects).
Core Layers: Convolution → Pooling → Flatten → Dense.
Used For: Image classification, object detection, medical imaging.

Concept	Remember It As
Filter / Kernel	Feature detector (edges, curves)
Pooling	Downsampling / summarizing
Weight Sharing	Fewer parameters, faster learning

Recurrent Neural Networks (RNNs)

What: Neural networks for sequences (time, text).
Key Idea: Maintain memory of previous steps.
Variants: LSTM, GRU (fix long-term memory issues).
Used For: Text, speech, time-series forecasting.

Concept	Remember It As
Hidden State	Memory notebook
Vanishing Gradient	Forgetting long history
LSTM / GRU	Smart memory gates

Transformers

What: Attention-based models for sequences.
Key Idea: Look at all tokens at once using self-attention.
Core Parts: Self-Attention, Multi-Head Attention, Feed-Forward, Positional Encoding.
Used For: NLP, translation, chatbots, code generation.

Concept	Remember It As
Self-Attention	Highlight important words
Multi-Head	Multiple perspectives
Parallelism	Fast training

When to Use What

Model	Best For	Think Of It As
CNN	Images / spatial data	Eyes
RNN / LSTM	Short sequences	Memory
Transformer	Long text / NLP	Attention

Memory Tricks

CNN → **See** patterns • RNN → **Remember** past • Transformer → **Pay Attention** to everything