Neural Network Type Quick Reference

Dense (Feed-Forward / MLP)

Best for: Tabular or numeric data.
Input: 1D feature vectors.
Learns: Nonlinear relationships between features.
Example: Predict rainfall from temperature, humidity, and windspeed.

CNN (Convolutional Neural Network)

Best for: Images, spatial data, radar maps.
Input: 2D or 3D grids (pixels, rasters).
Learns: Spatial patterns, shapes, and textures.
Example: Classify clouds or land-cover from satellite imagery.

1D CNN

Best for: Sequential numeric data (time series).
Input: 1D signals.
Learns: Short-term temporal patterns.
Example: Detect anomalies in temperature sequences.

RNN / LSTM / GRU

Best for: Sequential or temporal data.
Input: Ordered sequences.
Learns: Long-term dependencies across time.
Example: Predict next-day weather from previous week's readings.

Transformer / Attention Network

Best for: Language, time series, or mixed sequences.
Input: Variable-length sequences or grids.
Learns: Global dependencies across inputs.
Example: Time-series forecasting or Vision Transformer (ViT) for satellite imagery.

Autoencoder / Variational Autoencoder (VAE)

Best for: Unlabeled data, compression, or denoising.
Input: Any structured data.

Learns: Latent (compressed) representation of input.
Example: Denoise or compress satellite imagery.

GAN / Diffusion Model

Best for: Generating new synthetic data.
Input: Random noise vectors.
Learns: Data distribution to generate realistic samples.
Example: Generate synthetic satellite or radar images.

Graph Neural Network (GNN)

Best for: Spatial networks or relational data.
Input: Graphs (nodes + edges).
Learns: Relationships between connected points.
Example: Model interactions between weather stations or sensors.

Hybrid (CNN + Dense)

Best for: Combined numeric + image data.
Input: Multi-input (images + vectors).
Learns: Spatial + quantitative relationships.
Example: Predict rain using satellite imagery + sensor readings.

CNN + LSTM (Spatiotemporal)

Best for: Image sequences, satellite videos.
Input: Time-ordered image stacks.
Learns: Space-time dependencies.
Example: Predict storm movement or cloud evolution.

Capsule / Liquid / Neural ODE

Best for: Physics-inspired or dynamic systems.
Input: Continuous or evolving states.
Learns: Object hierarchies, dynamic changes.
Example: Drone flight control, environmental modeling.