Definition and Structure

Traditional Machine Learning (ML) refers to a family of algorithms like **Linear Regression**, **Decision Trees**, and **Support Vector Machines (SVMs)** that rely heavily on **structured data** and predefined features. These models follow mathematical rules and statistical logic to make predictions or classify data based on patterns found in input features.

On the other hand, **Neural Networks** are inspired by the structure of the human brain. They consist of **layers of interconnected nodes (neurons)** that learn through adjusting weights and activations. Neural networks can model highly complex, **non-linear relationships**, making them more adaptable to unstructured and high-dimensional data like images and audio.

Feature	**Traditional Machine Learning**	**Neural Networks (Basic / Deep Learning)**
Structure	Based on well-defined algorithms (e.g., Decision Trees, SVMs, KNN)	Mimics brain neurons using interconnected layers
Feature Engineering	Requires manual feature extraction	Learns features automatically from data
Data Requirements	Works well with small to medium datasets	Needs large datasets to perform well
Interpretability	Easy to interpret and debug	Often considered a "black box"
Speed of Training	Fast and efficient	Computationally intensive
Accuracy with Complex Data	Struggles with raw, high-dimensional data (images, audio)	Excels with unstructured data
Overfitting Risk	Moderate; can be controlled easily	High if not regularized properly

Conclusion

In essence, **traditional machine learning** remains relevant for its **efficiency, transparency**, and suitability for smaller, structured datasets. It is ideal when data is limited and explainability is critical.

Meanwhile, **neural networks and deep learning** push the boundaries of what's possible with **complex, unstructured data**. While they demand more in terms of data and resources, the outcomes they enable — from medical breakthroughs to real-time language translation — make the investment worthwhile.