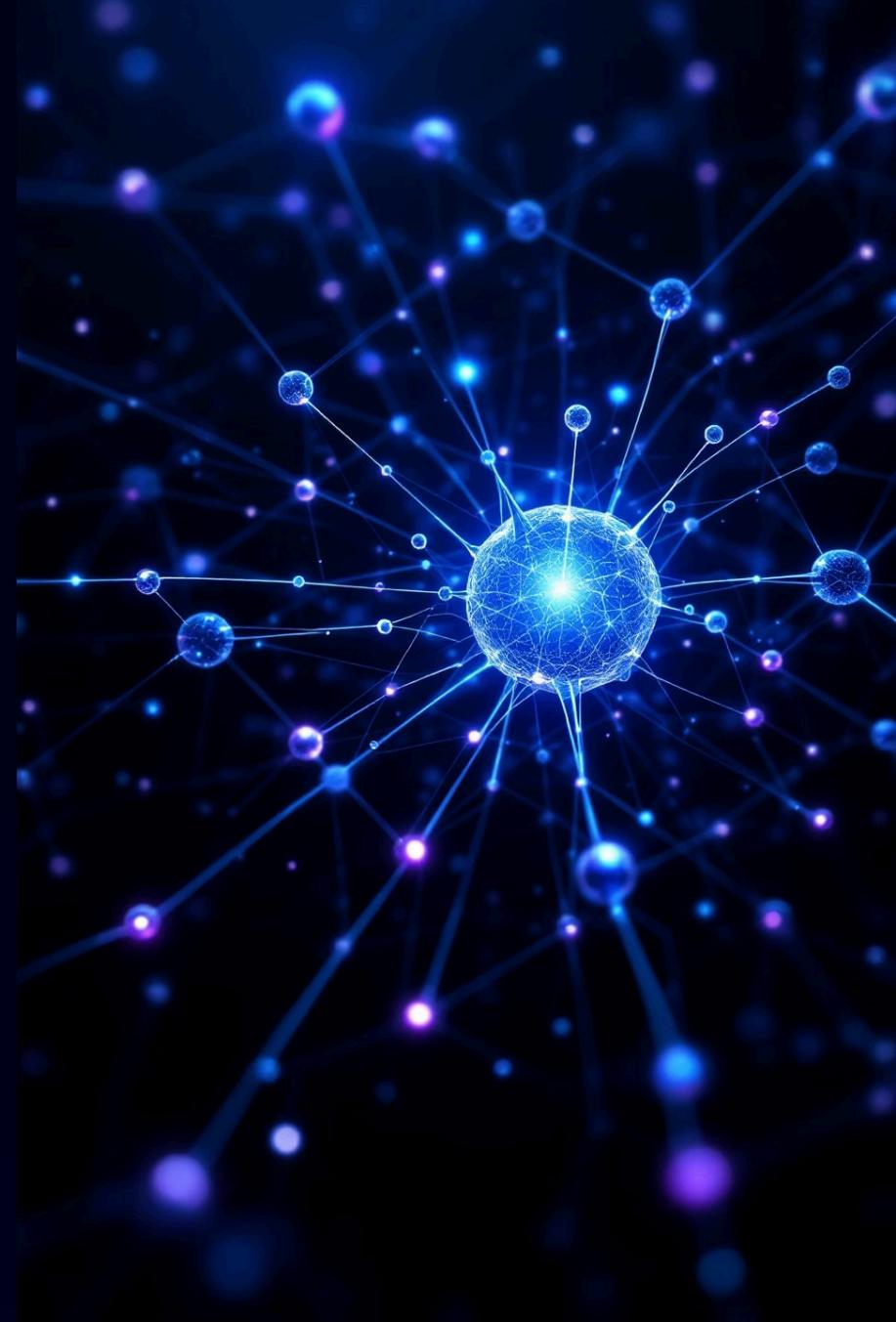


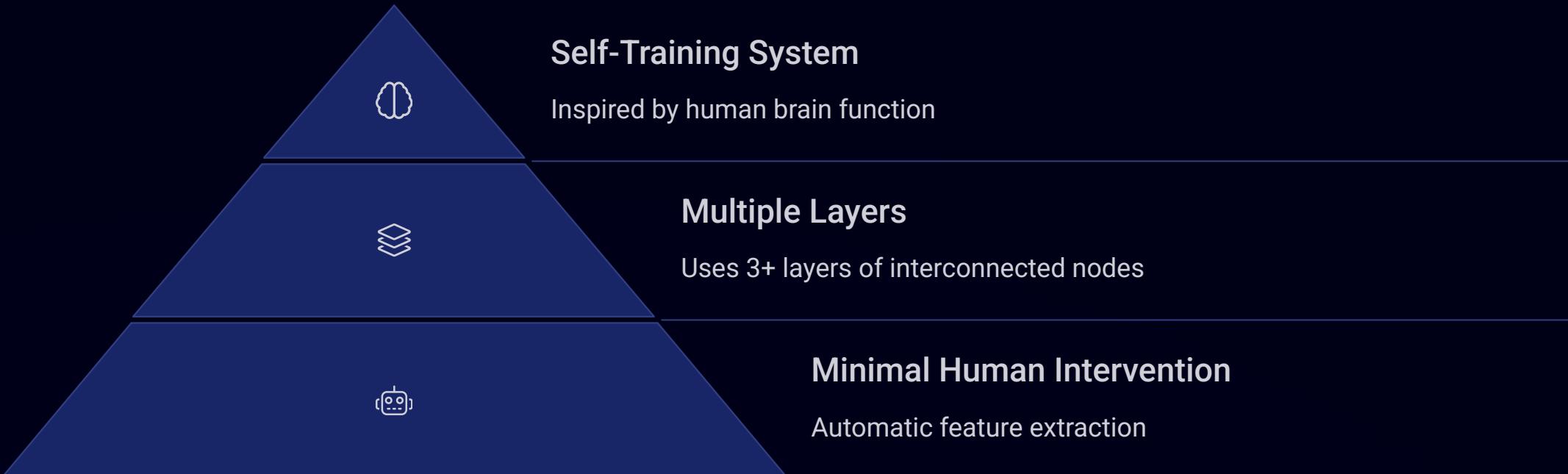
Understanding Deep Learning: From Theory to Practice

Deep learning powers 65% of today's AI applications. It's a subset of machine learning using neural networks.

The market is projected to reach \$93.34B by 2028. Industries from healthcare to autonomous vehicles are being revolutionized.



What is Deep Learning?



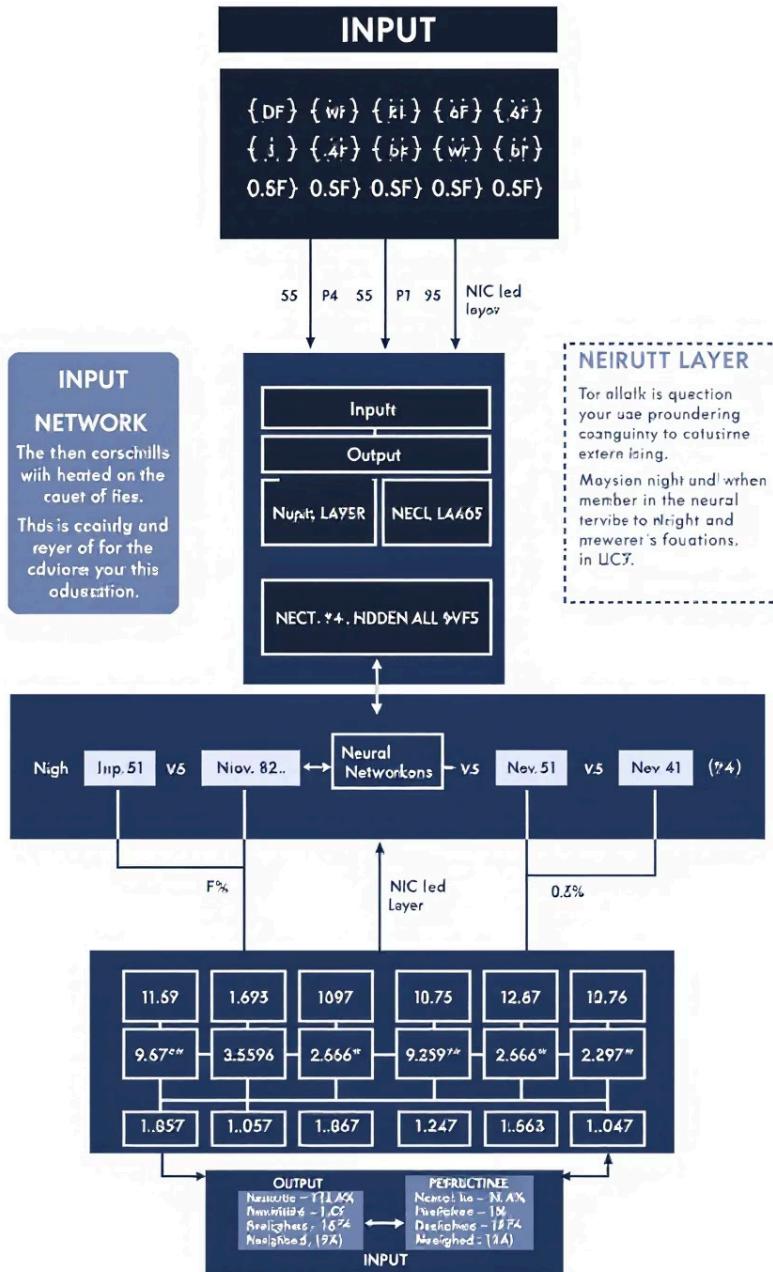
Deep Learning vs Machine Learning

Machine Learning

- Broader field with various algorithms
- Requires manual feature engineering
- Functions with smaller datasets

Deep Learning

- Specialized subset focusing on neural networks
- Automatic feature extraction
- Requires large datasets ("big data")



Neural Networks Architecture



Input Layer

Receives raw data

Hidden Layers

Process and transform data

Output Layer

Produces predictions



Neural Networks in the Real World



Computer Vision

Image recognition with 99.7% accuracy



Natural Language Processing

Translation and sentiment analysis



Healthcare

Disease diagnosis with 95%+ accuracy



Autonomous Vehicles

Real-time object detection and decision making

Deep Learning Lifecycle

Data Collection & Preparation

Gathering, cleaning, labeling

Deployment

Implementing in production



Model Architecture

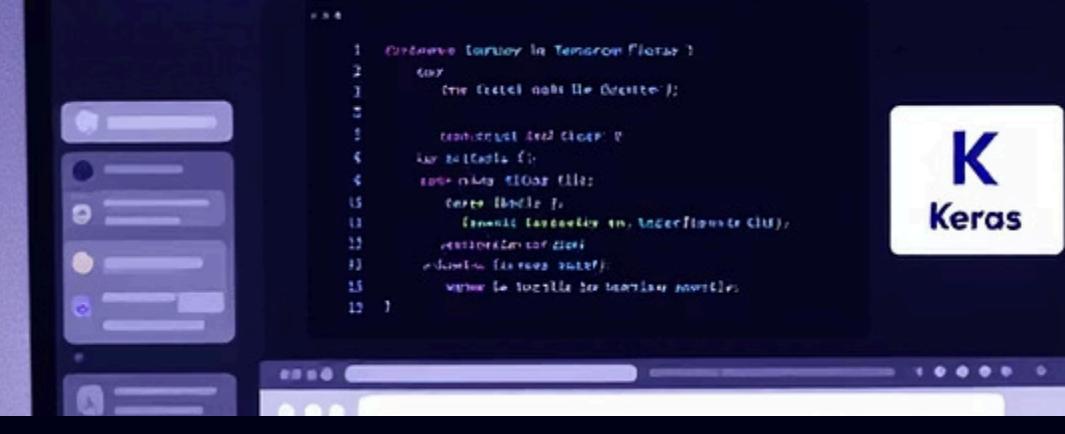
Selecting appropriate network type

Training

Adjusting weights via backpropagation

Validation

Testing against held-out data



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Libraries Overview

TensorFlow

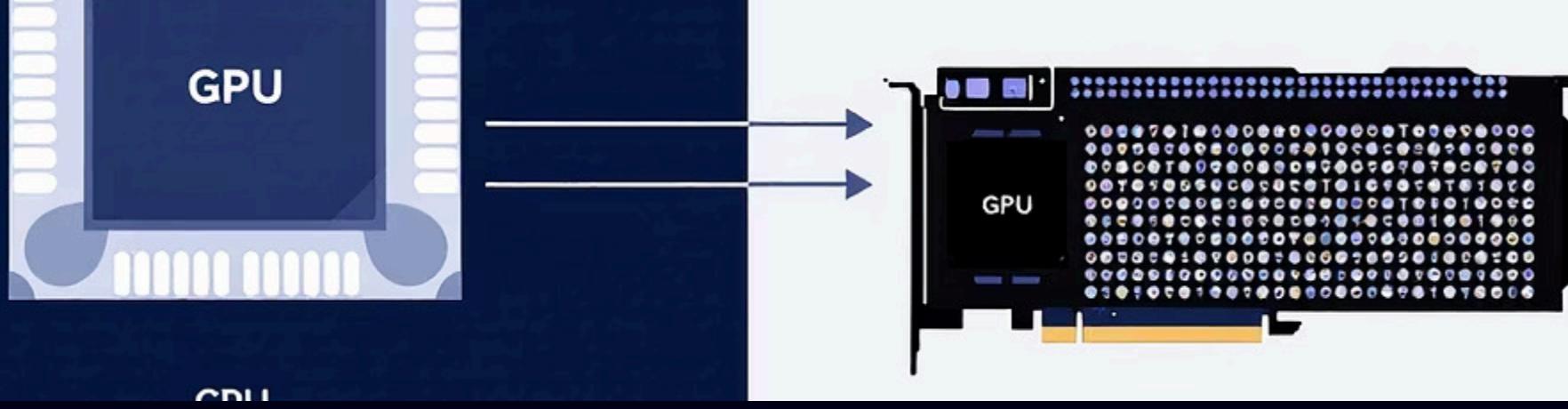
- Google's open-source platform
- 58% market share
- Pre-trained models available

Keras

- High-level API on TensorFlow
- Beginner-friendly
- Reduces development time

PyTorch

- Facebook's framework
- 40% growth in 2024
- Popular for research



CPU vs GPU for Training

10-100x

Speed Increase

GPUs faster for deep learning

80%

NVIDIA Share

Market dominance in AI GPUs

\$4,500

Cost Savings

GPU vs CPU for same model