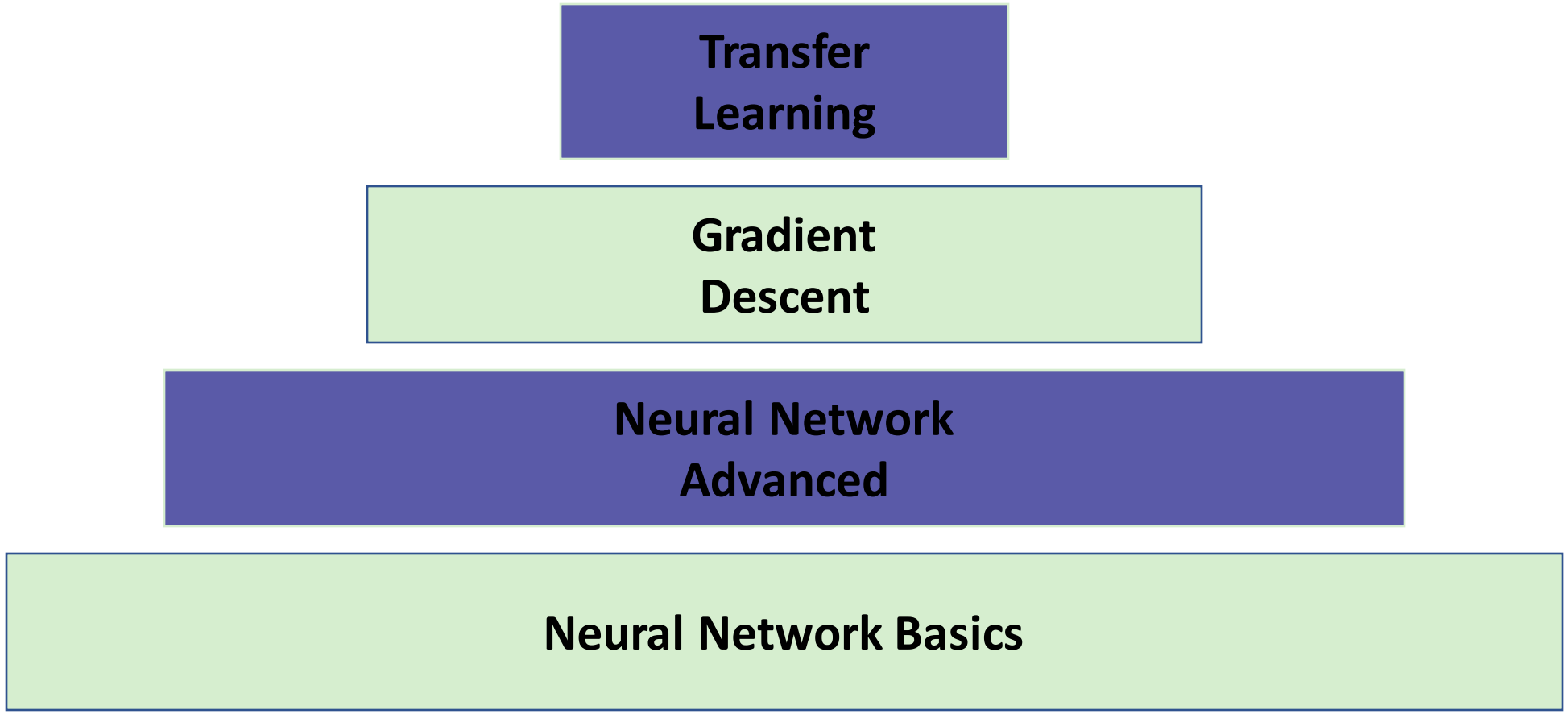
Neural Network: Basics

Deep Learning Foundations

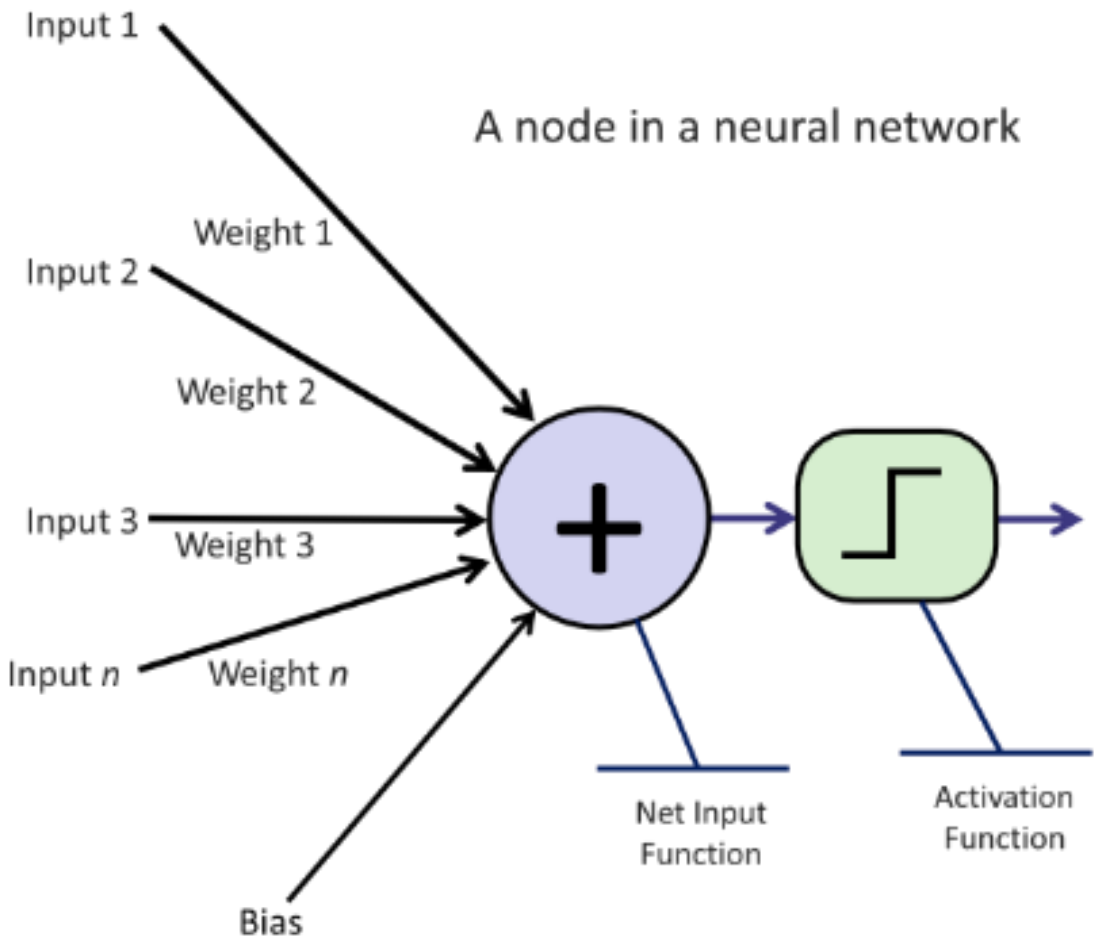


Module 1 Objectives

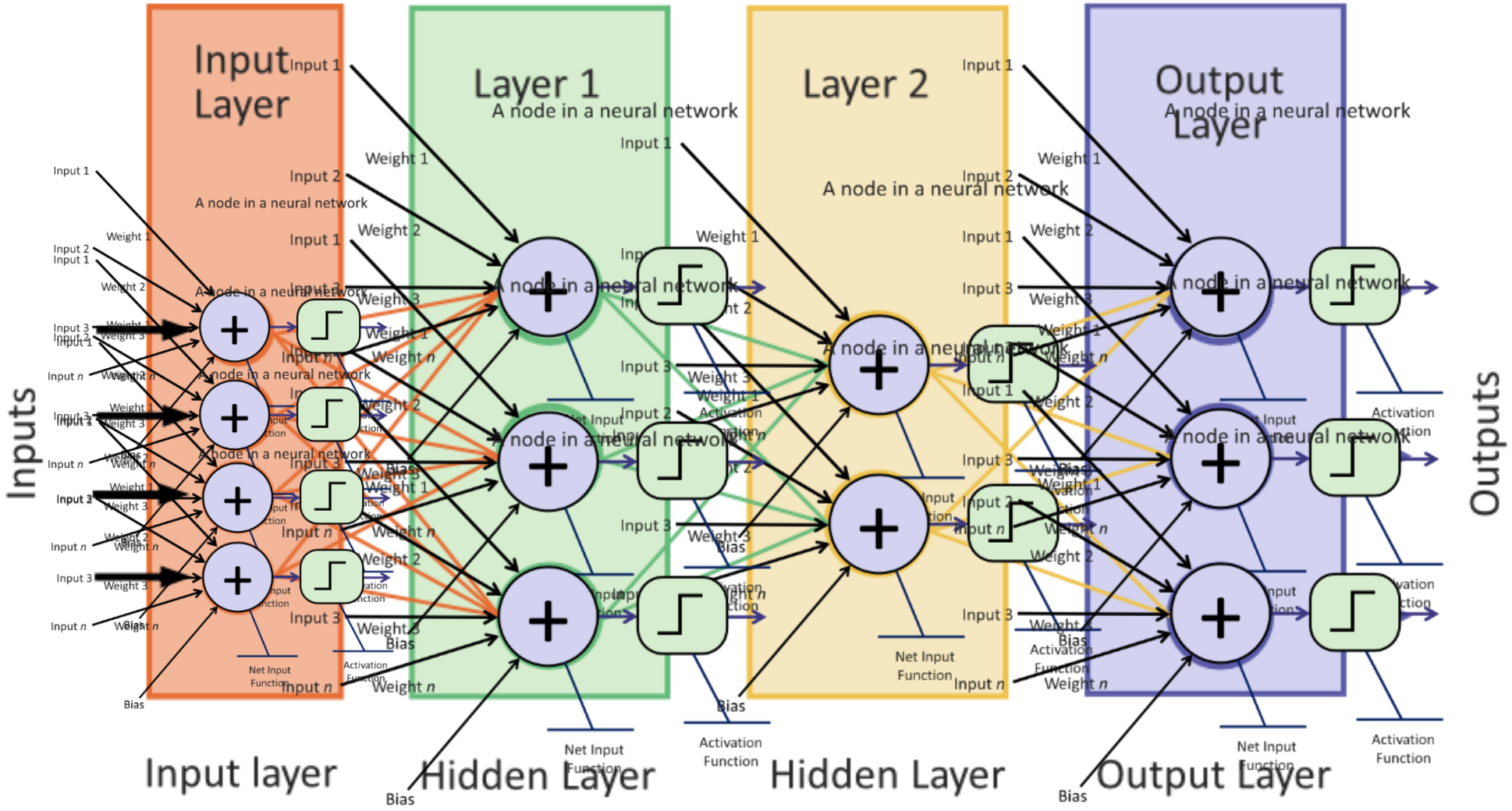
1. Define a neural network.
2. Describe how a neural network works.
3. Discuss what can be done with neural networks.
4. Discuss deep networks.
5. Use a deep learning pre-trained model to classify an image.
6. Discuss Python AI Frameworks.

What Are Neural Networks?

Introducing, The Node



Many Nodes Create a Network



Gradual Improvement Over Time

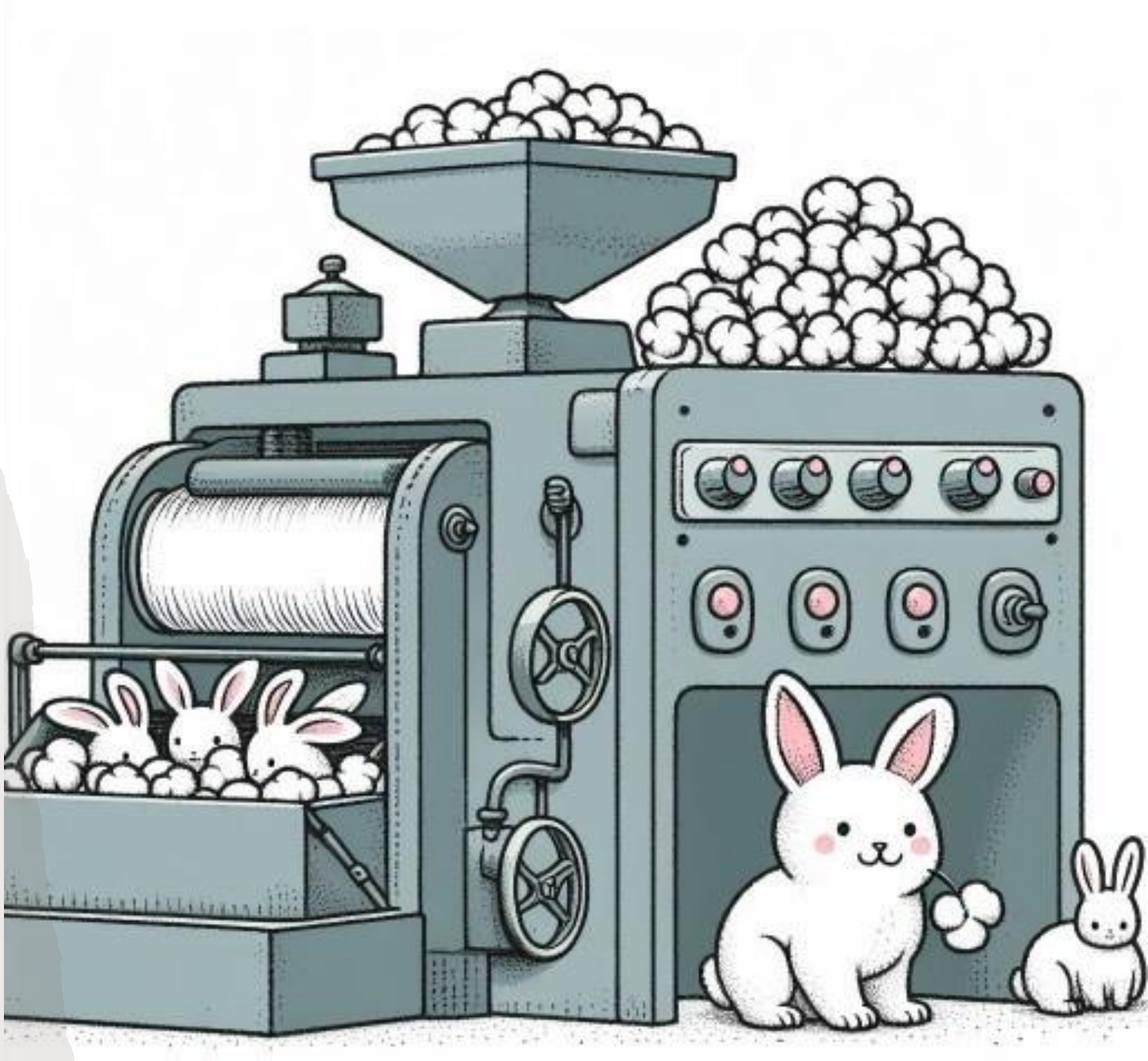


Image generated using AI tools

What is Deep Learning?

Imagine You're Making a Cake…

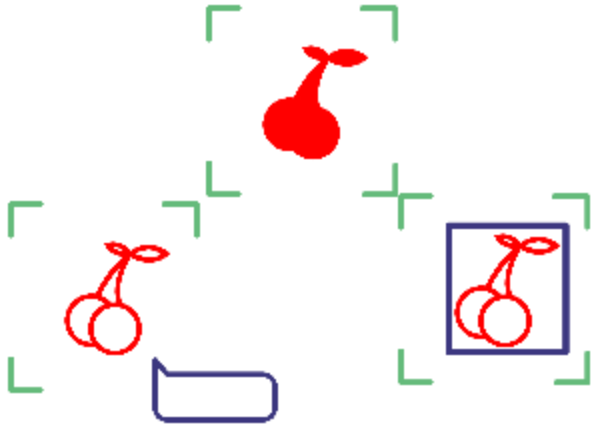
Input(s) →  → Output

What Can I Do with Neural Networks?

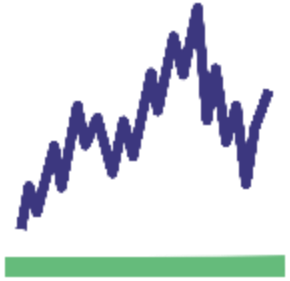
Example Neural Network Applications

Natural Language Processing

Generative Methods



Computer Vision

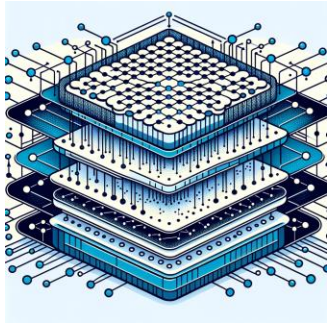


Time Series Analysis

Types of Networks

Example Network Architectures

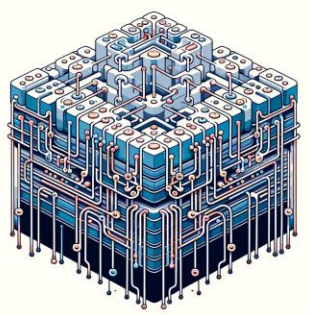
Stable Diffusion

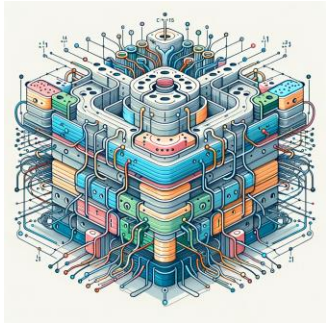


CNN

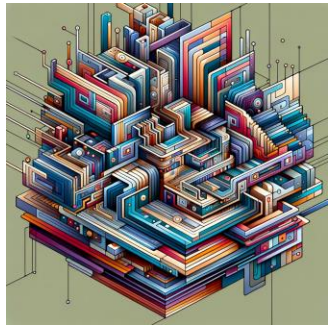
GAN

LSTM



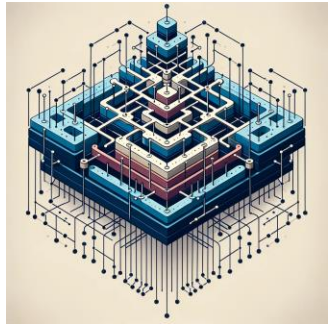


Transformer



cGAN

RNN



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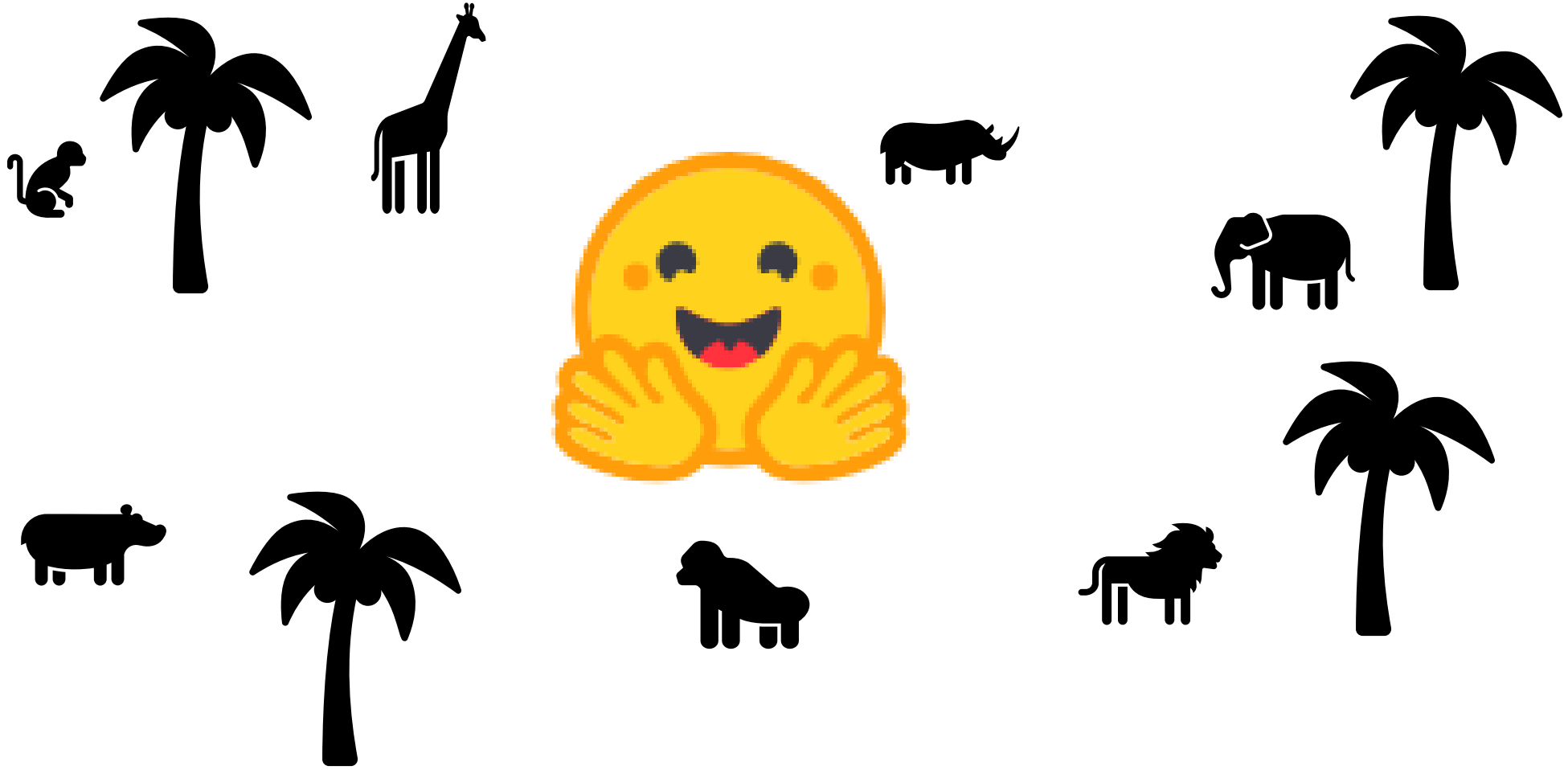
A Word on Model Zoos



Exercise

A Vision Quest

01_deep_learning_tour.ipynb

This notebook will walk you through instantiating your own pre-trained vision model, then texting it against new images!

Python AI Frameworks

Which Framework to Use?

Framework	Initial Release	Focus
PyTorch	September 2016	General deep learning library
TensorFlow	November 2015	General deep learning library
Keras	March 2015	Easy-to-use interface to TensorFlow, but the latest version now also provides an interface to PyTorch and Jax.
(Jax)	May 2022	Speeding up some parts of model training and providing easy scaling across multiple GPUs

Questions?

(QR CODE FOR SURVEY!)