Neural Network Zoo

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Course name: ITAI-2376 Deep Learning Artificial Intel.

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Introduction to Neural Networks:

Overview of Neural Networks

The human brain served as the model for neural networks, which are computer systems. An input layer, one or more hidden layers, and an output layer are the layers of neurons (nodes) that make them up.

In order to process inputs, each neuron applies weights, adds bias, and then runs the outcome via an activation function. The foundation of deep learning is the network's ability to recognize patterns and generate predictions thanks to these layers working together.

The Zoo Concept:

The Neural Network Zoo highlights the "personality" and strengths of various neural network types by comparing them to animals:

There were a lot of them like:

- **RNN Raccoon.**
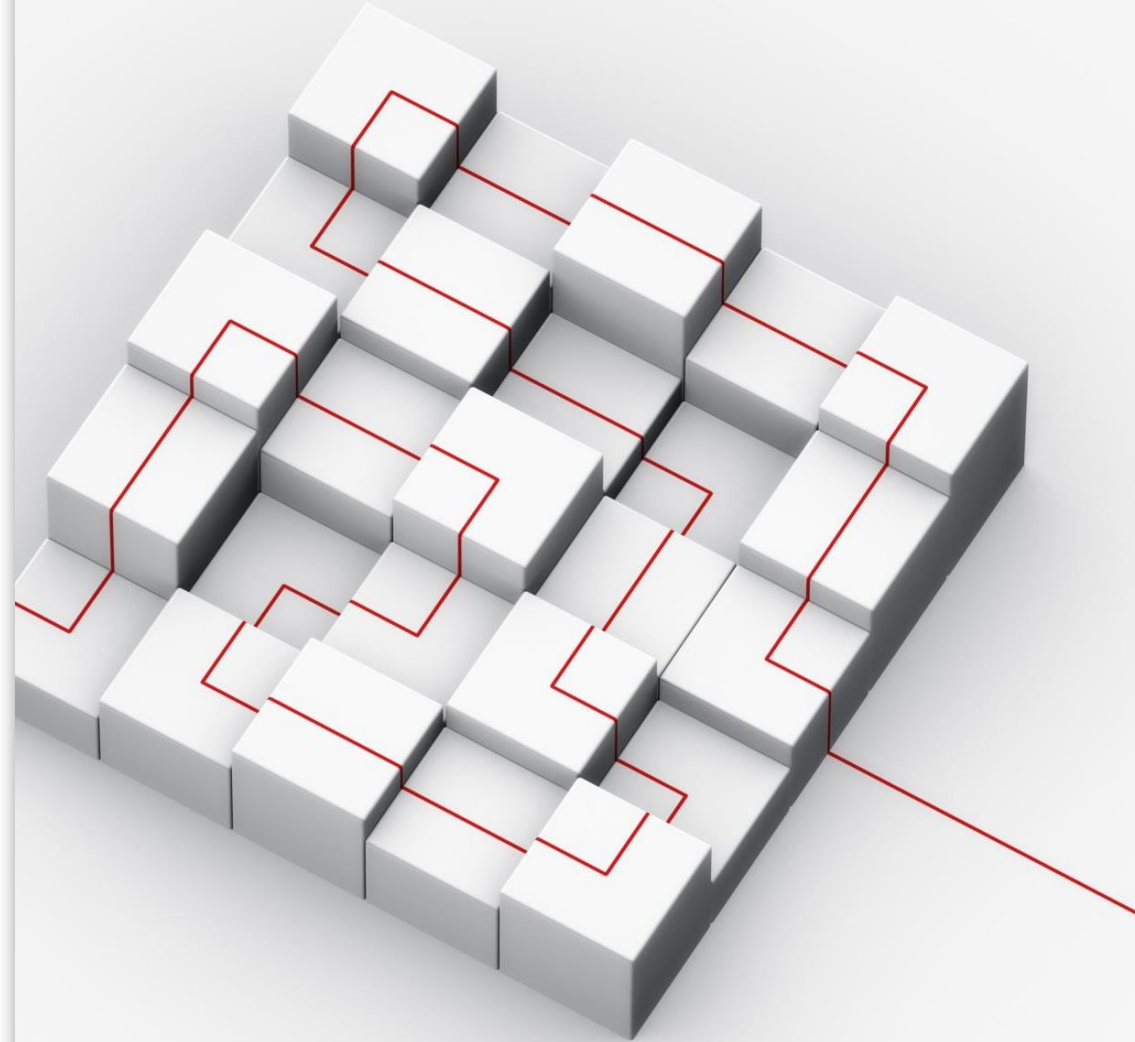- **Transformer Elephant** .
- **GAN Octopus**.

Animal for Neural Networks: Transformer Elephant 🐘.

- The Transformer neural network, renowned for its extensive memory and potent attention mechanism, is symbolized by the Transformer Elephant. This network is one of the sharpest creatures in the Neural Network Zoo because it can comprehend context over lengthy data sequences, much like an elephant that never forgets.

Structure and How It Works

- An encoder-decoder design with feed-forward networks and self-attention layers is used in the construction of the Transformer. Self-Attention: Enables the model to concentrate on crucial terms or characteristics, irrespective of where they are in a series. Without the use of recurrence, positional encoding aids the model in comprehending order. Parallel Processing: Transformers are faster and more scalable than RNNs since they process whole sequences at once.
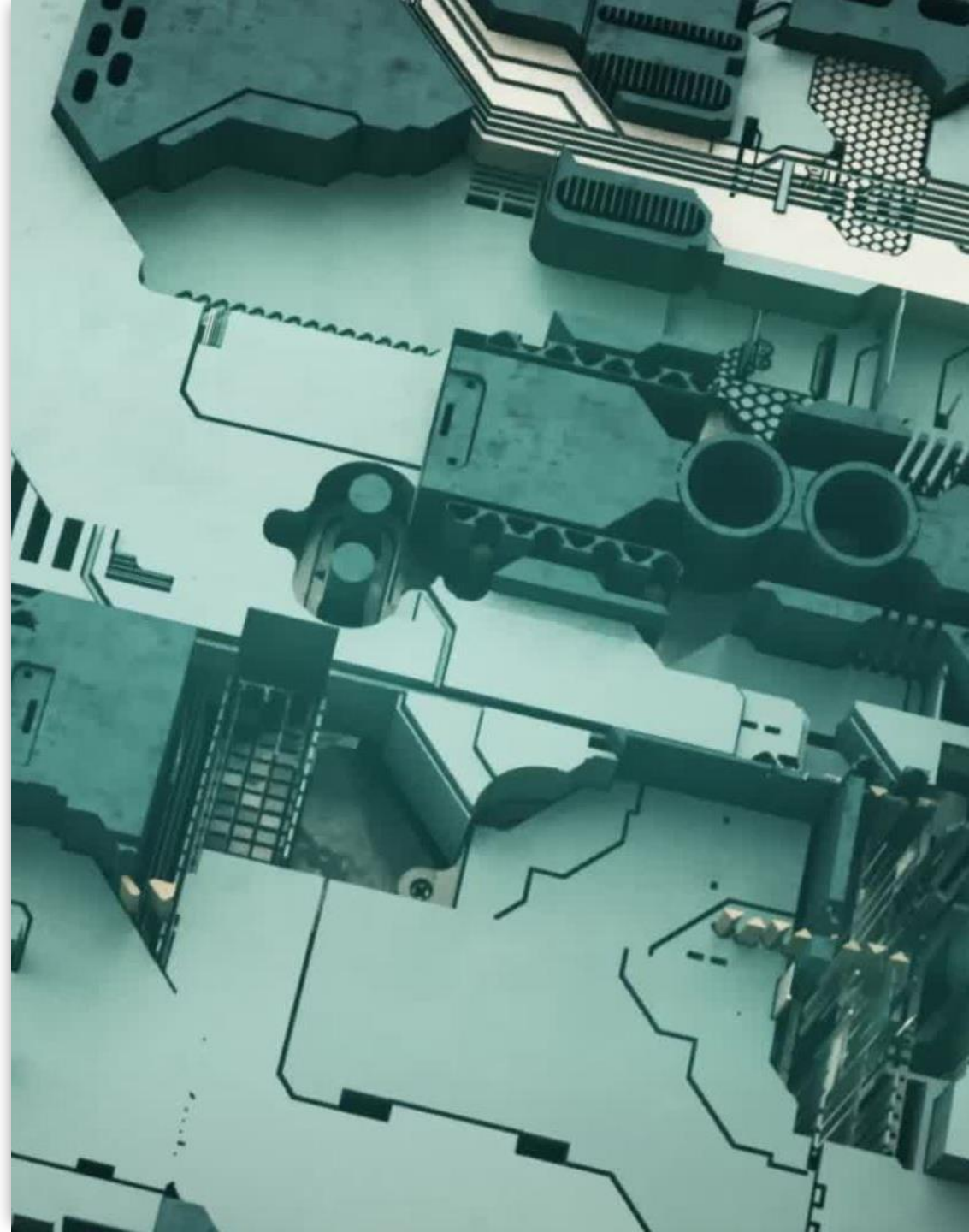
Typical Applications

- In today's AI environment, transformers are prevalent and utilized in:

- 🗣 ChatGPT, BERT, and GPT models for natural language processing (2nd).

- 🖼 Computer Vision: Image recognition using Vision Transformers (ViT) 🎶 .

- Multimodal AI: Text, image, and sound-based models.

- 💬 Translation and Summarization: Effectively translating or summarizing lengthy texts.
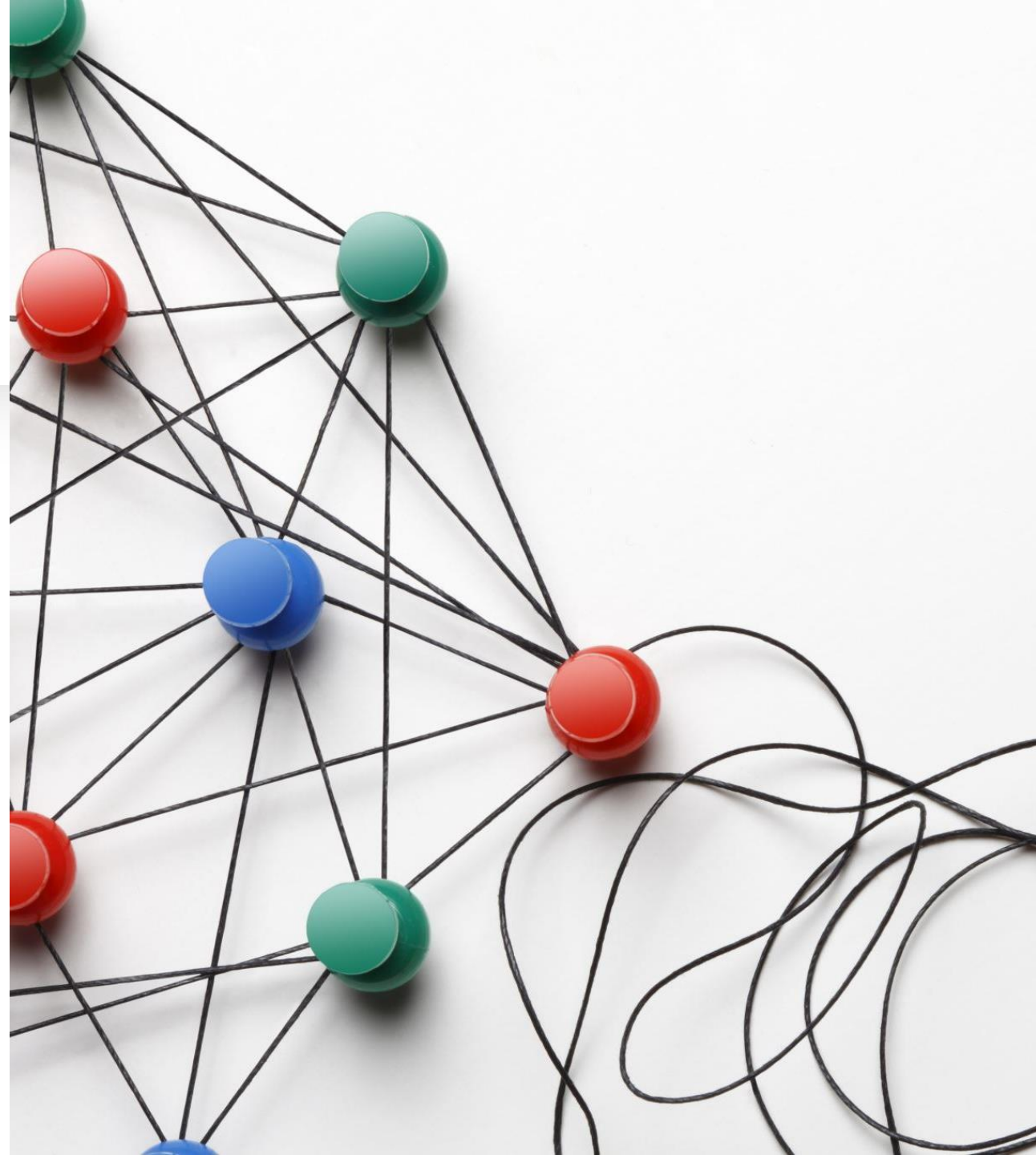
Creative Representation

- The elephant represents: Memory: Transformers store long-term dependencies, just like elephants do.

- Similar to how the model "pays attention" to significant data points, elephants are gregarious and attentive.

- Strength: Today's biggest AI systems are powered by transformers.

- Concept for Poster: Sketch an elephant with glowing "attention beams" that connect phrases, symbols, or pictures to demonstrate how it connects related concepts.

Reflection and Understanding

- Through this exercise, we discovered how the Transformer transformed deep learning by substituting attention for recurrence, which enhanced speed and comprehension of context.

- The Transformer performs better in challenging language and visual tasks and manages lengthier inputs more effectively than other networks like RNNs or LSTMs. Like the smartest zoo animal, the Transformer Elephant is a potent illustration of how deep learning models can "remember," "focus," and "understand."

Thanks have a nice day.