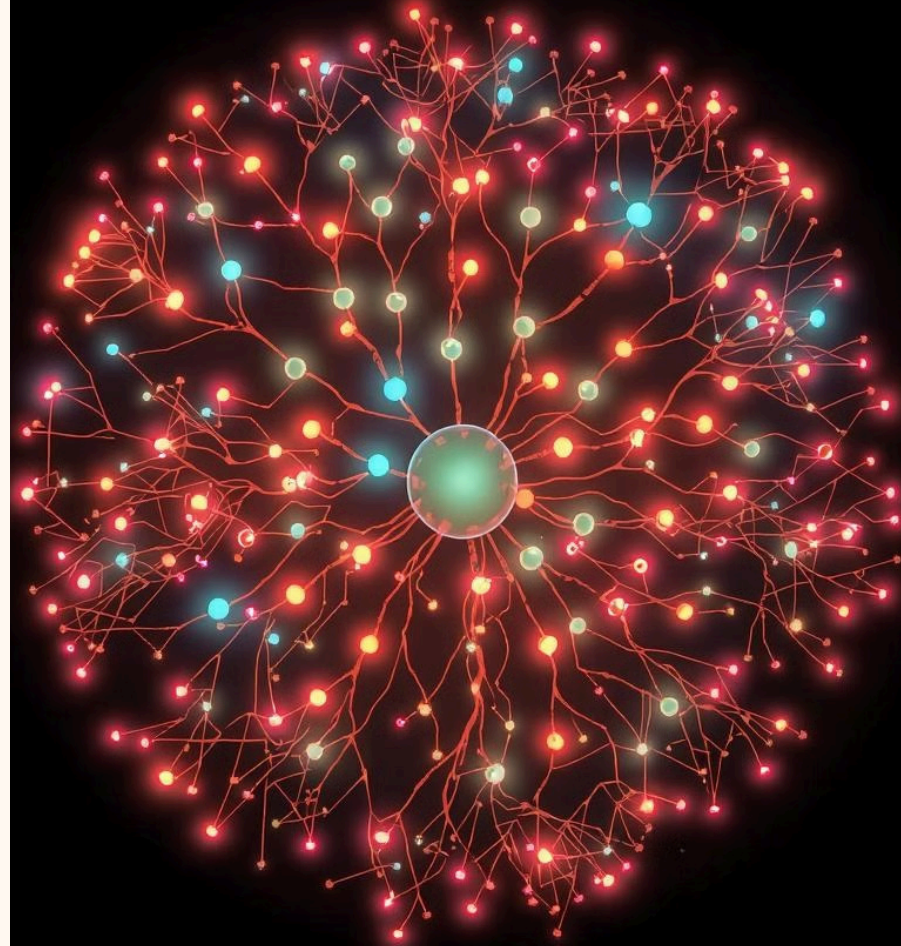


# Neural Network Technology

This presentation will explore the fundamentals of neural network technology, covering its origins, key components, and applications in various domains.

 **by Simranjeet Kaur**



# Introduction to Neural Networks

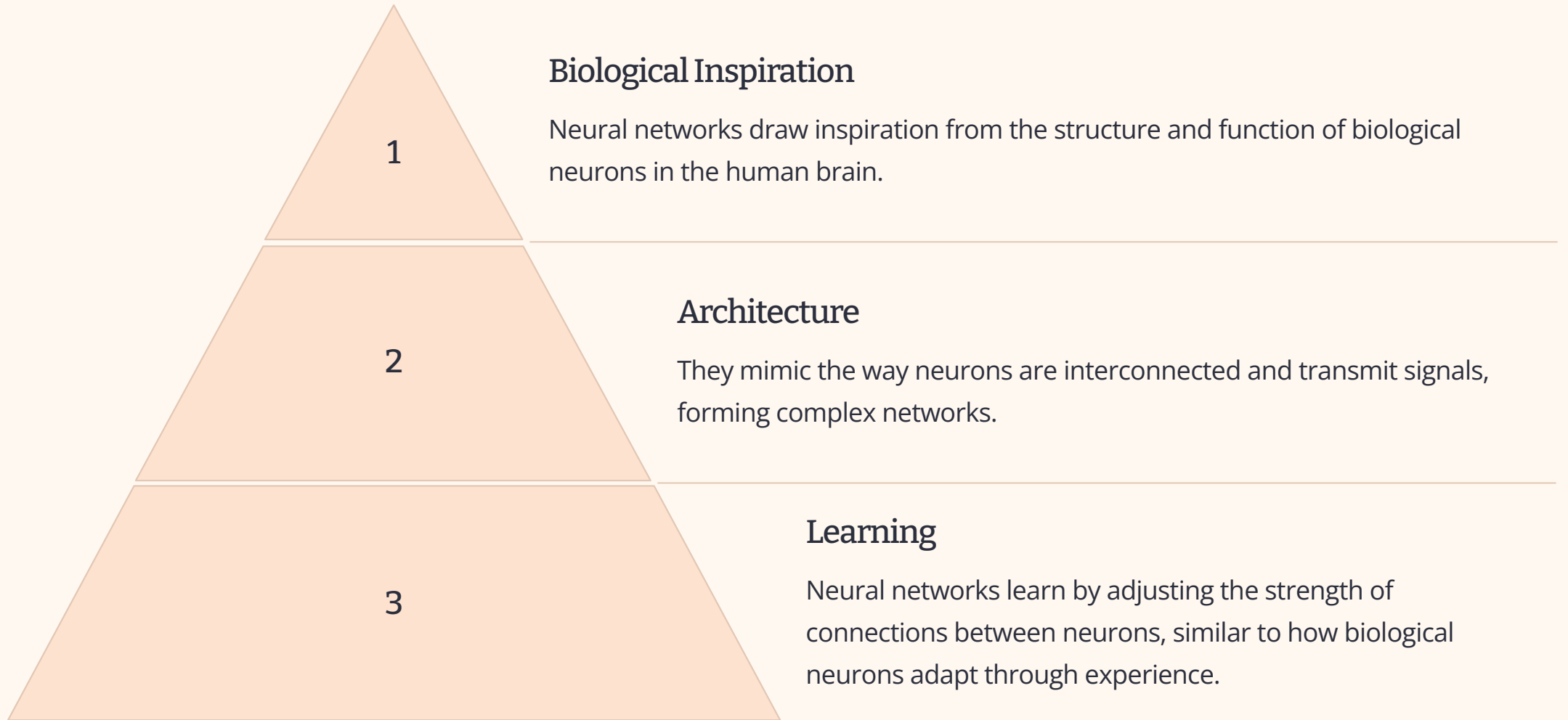
## What are Neural Networks?

Neural networks are computational models inspired by the structure and function of the human brain. They are used to analyze complex data and make predictions or decisions.

## How They Work

They consist of interconnected nodes (neurons) that process information and learn through experience. These networks learn by adjusting the strength of the connections between nodes.

# Biological Inspiration and Architecture





# Key Components of Neural Networks

## 1 Neurons

The basic building blocks of a neural network, processing information and transmitting signals.

## 2 Synapses

Connections between neurons, representing the strength of the signal transmission.

## 3 Weights

Values associated with synapses that determine the strength of connections and influence information flow.

## 4 Activation Function

A mathematical function that determines the output of a neuron based on its input.

# Training Neural Networks

1

## Training Data

Neural networks are trained on large datasets of labeled examples to learn patterns and relationships.

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2

## Backpropagation

An algorithm used to adjust the weights of connections during training, minimizing errors and improving accuracy.

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3

## Optimization

Techniques like gradient descent are employed to fine-tune the weights and find optimal network parameters.

# Applications of Neural Networks



## Autonomous Vehicles

Neural networks power self-driving cars by enabling them to perceive their surroundings and make driving decisions.



## Medical Diagnosis

Neural networks can analyze medical images and patient data to assist doctors in diagnosing diseases.



## Language Translation

Neural networks are used to translate text and speech between different languages with increasing accuracy.

# Advantages and Limitations of Neural Networks

## Advantages

Neural networks excel at pattern recognition, complex data analysis, and adaptability to new information.

## Limitations

They can be computationally expensive to train and require large datasets. Explainability and bias are ongoing challenges.

# The Future of Neural Networks

Neural networks are poised to revolutionize industries, from healthcare to finance. As research continues, we can expect to see even more sophisticated and impactful applications.

