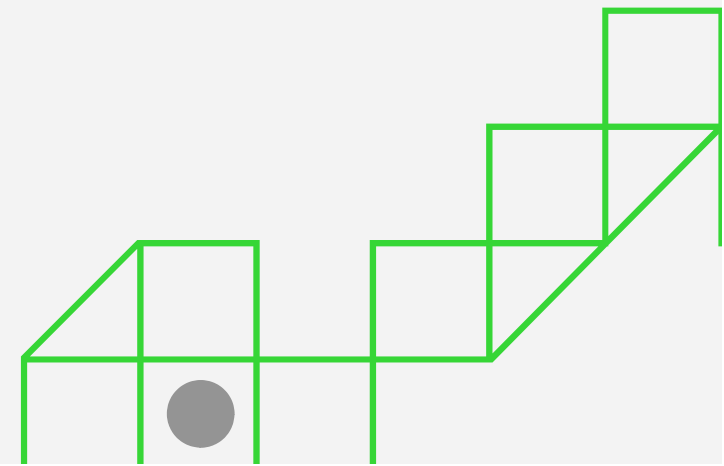


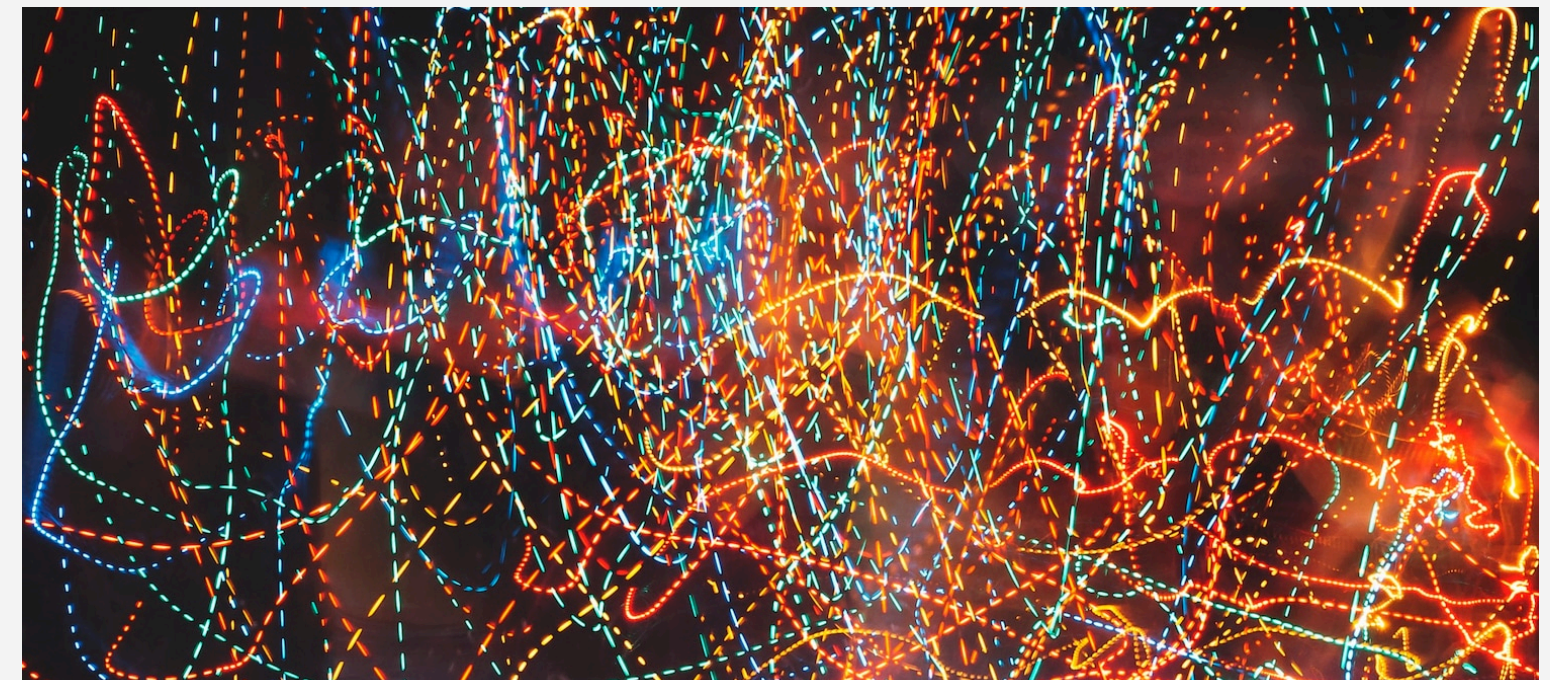
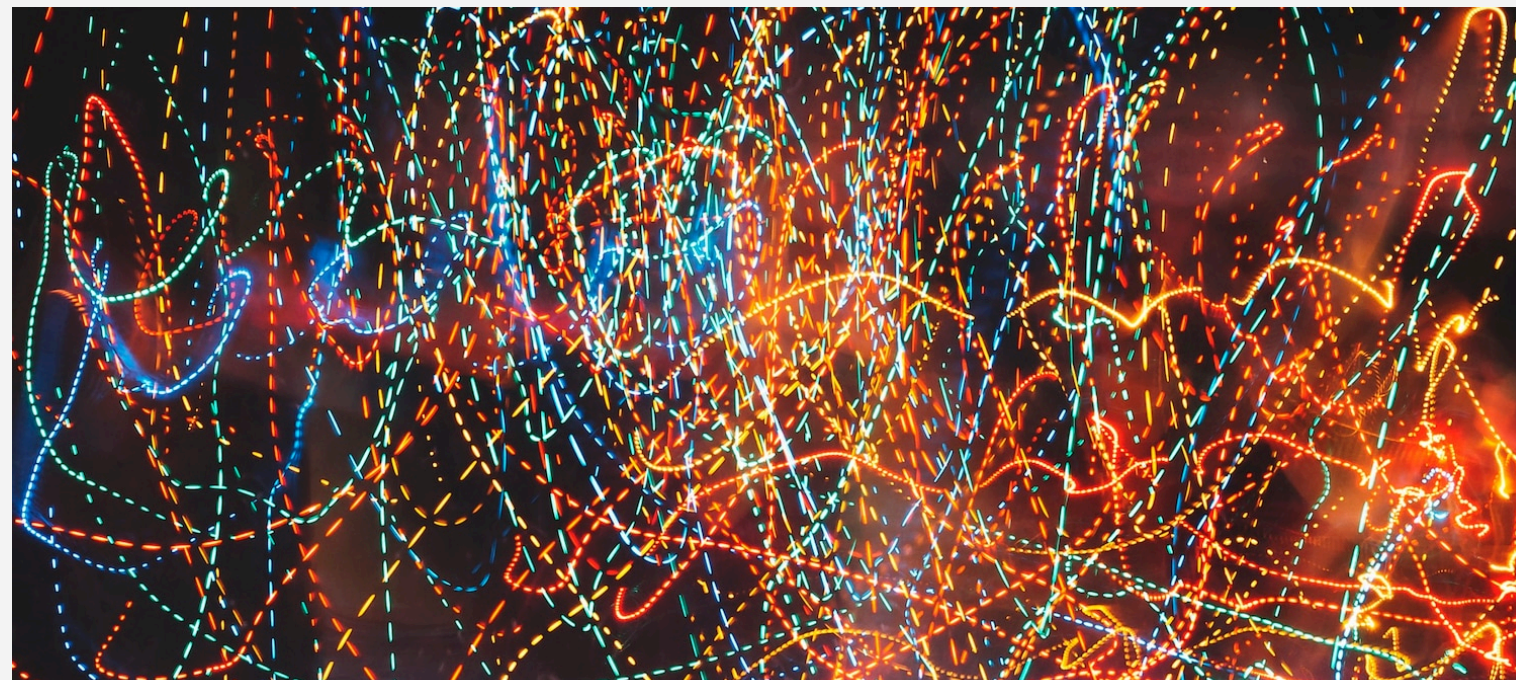


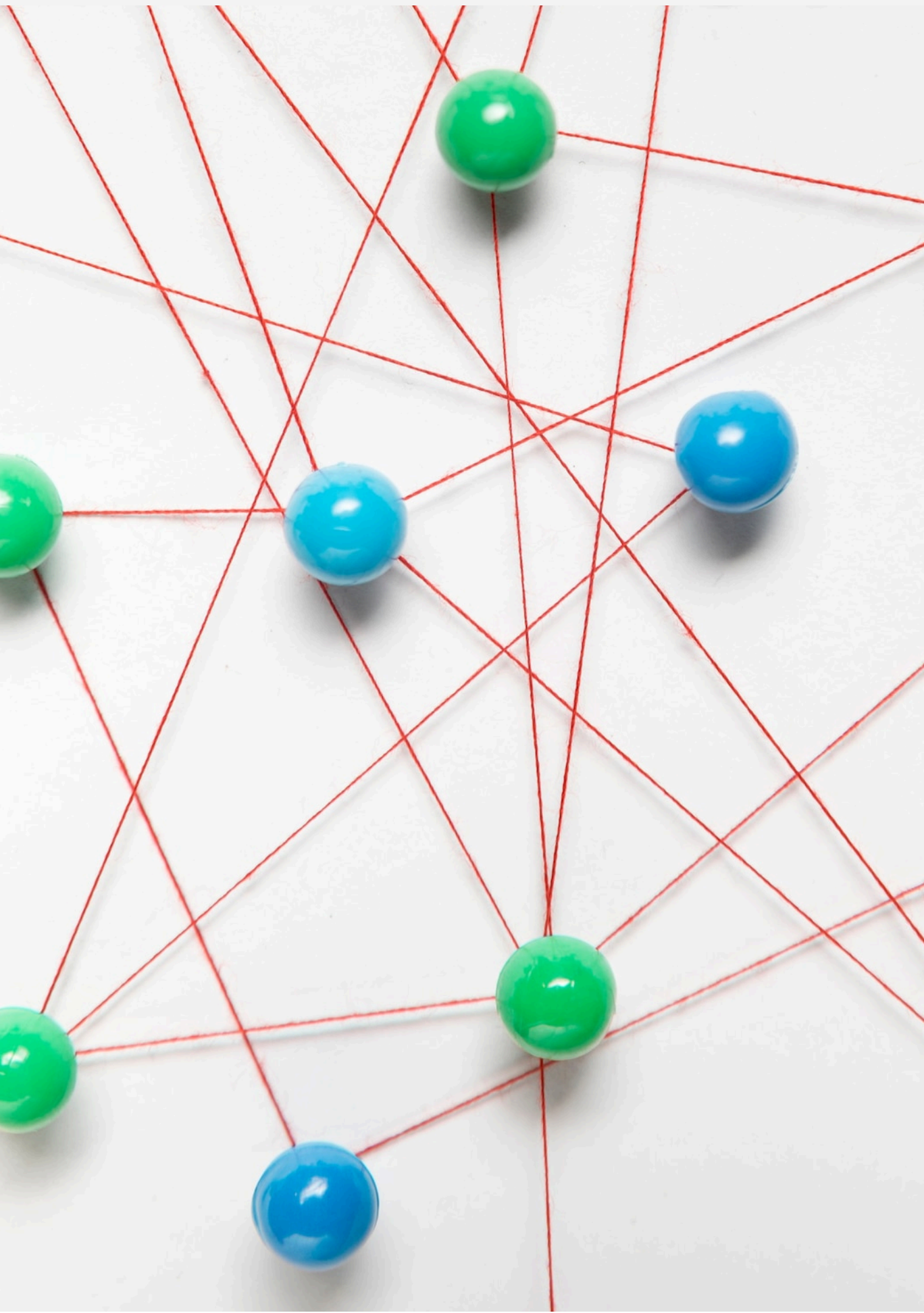
Deep Learning Demystified: A Beginner's Guide to Neural Networks and Their Foundations



INTRODUCTION TO DEEP LEARNING

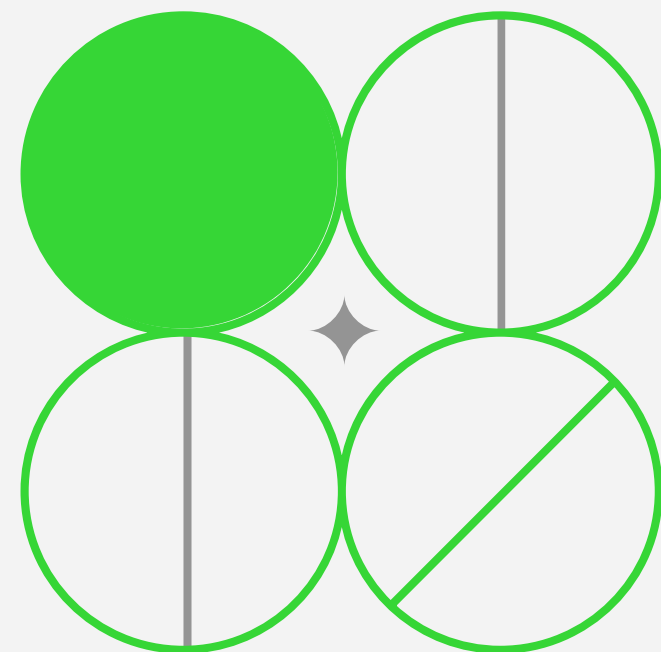
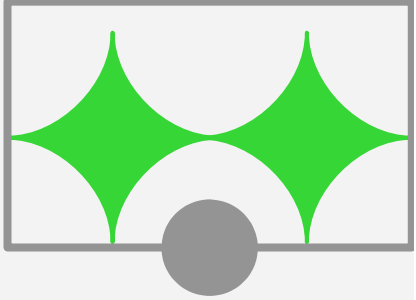
Deep Learning is a subset of **machine learning** that uses **neural networks** to model complex patterns. This presentation aims to demystify the concepts and provide a beginner-friendly guide to understanding the foundations of deep learning.





What is a Neural Network?

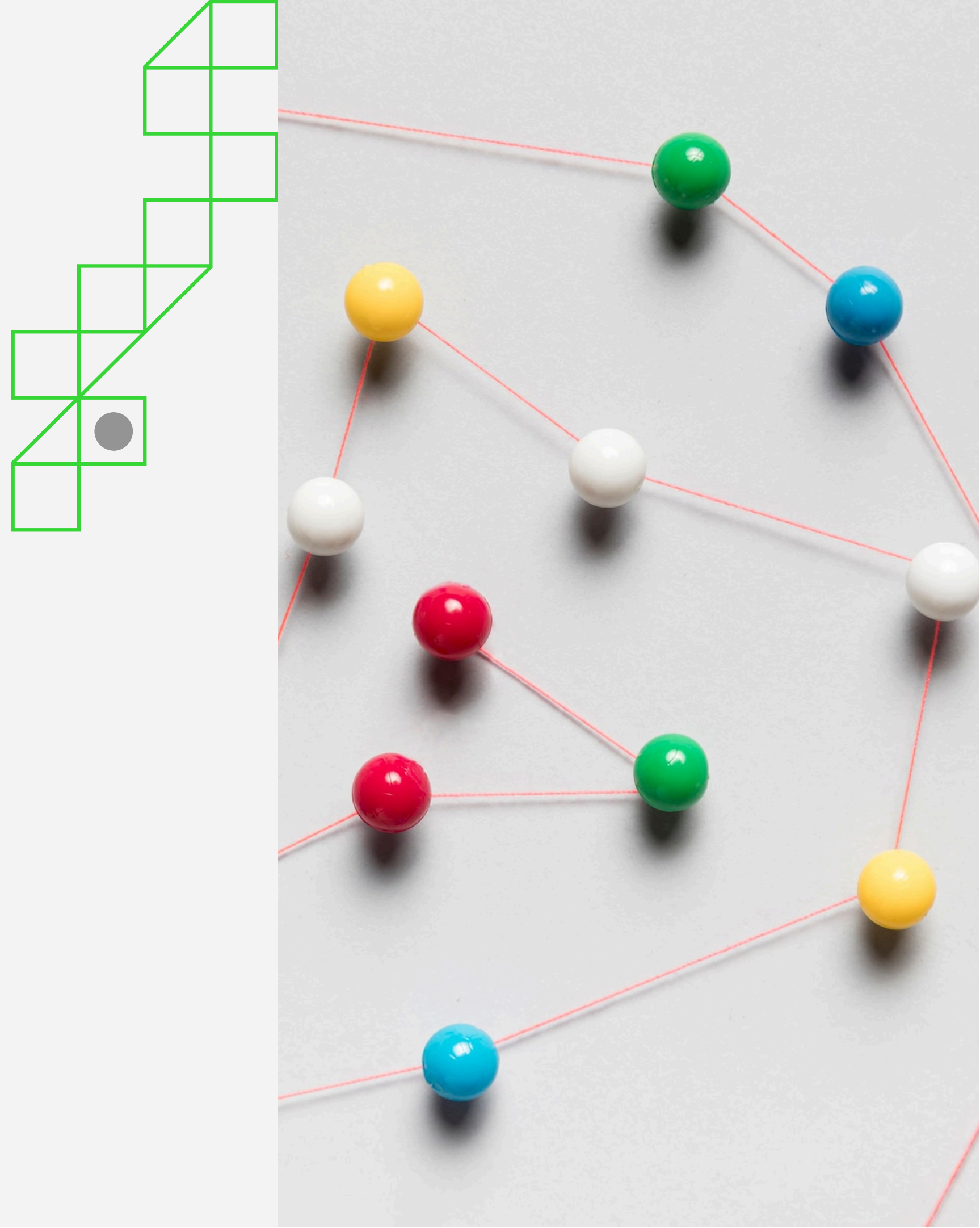
A **neural network** is a computational model inspired by the way biological **neurons** work. It consists of layers of interconnected nodes that process input data, enabling the network to learn and make predictions based on patterns.





History of Neural Networks

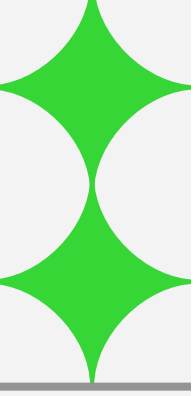
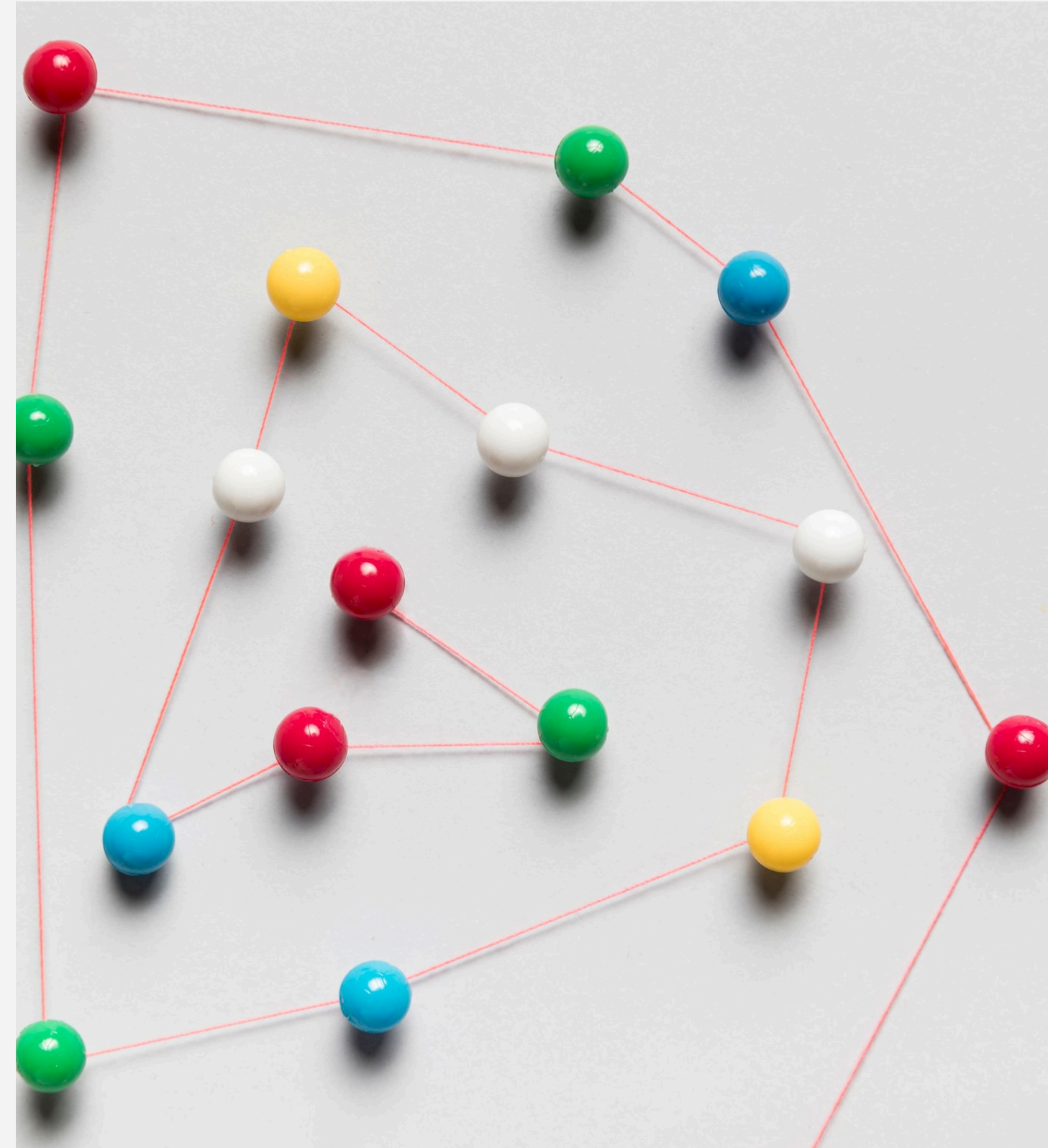
The concept of **neural networks** dates back to the 1940s, but significant advancements occurred in the 1980s and 2010s. This evolution has led to breakthroughs in areas like **computer vision** and **natural language processing**.

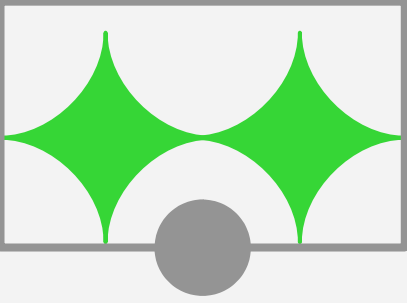




Types of Neural Networks

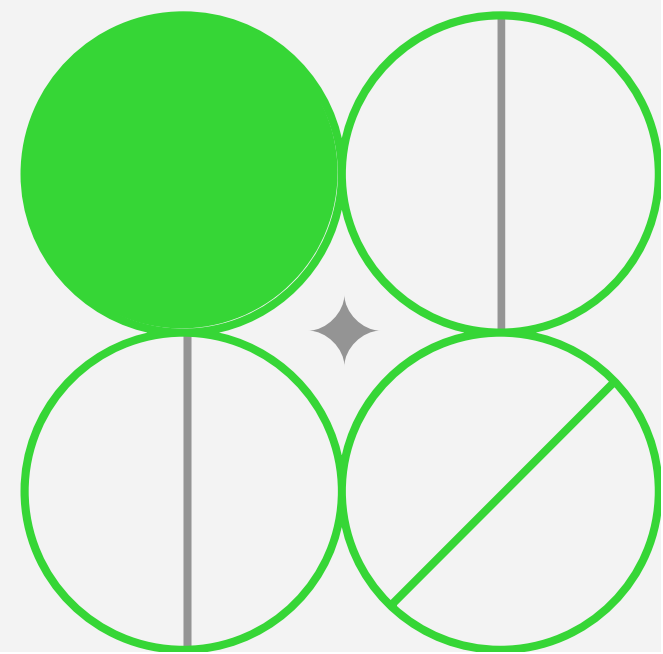
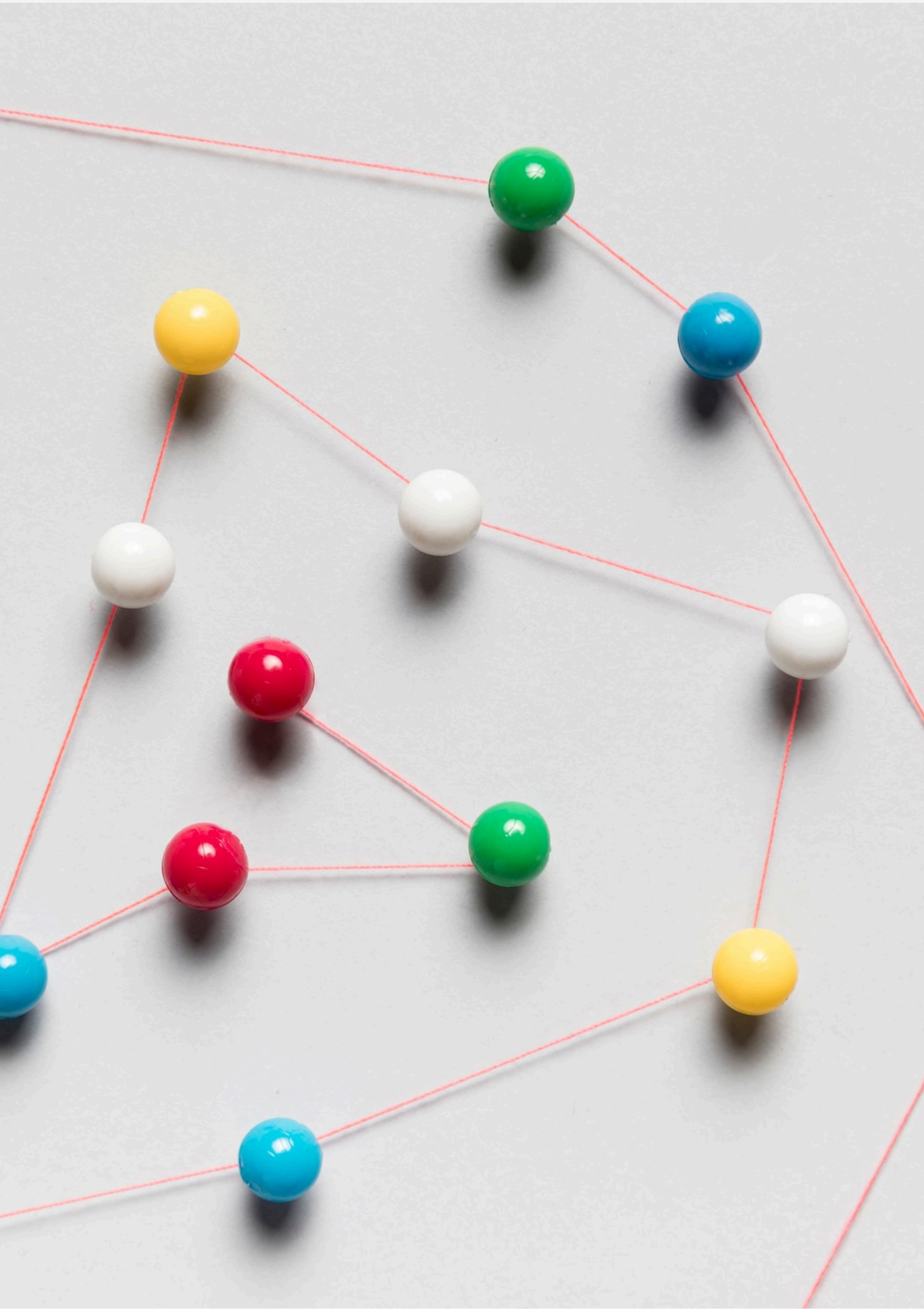
There are various types of **neural networks**, including **feedforward**, **convolutional**, and **recurrent** networks. Each type is designed for specific tasks, such as image recognition or sequence prediction.





How Neural Networks Work

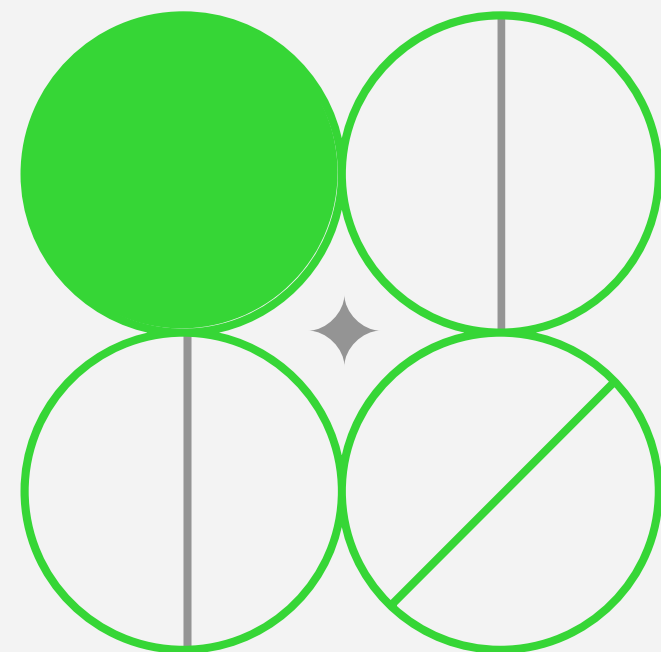
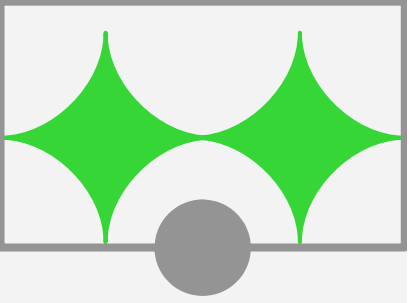
Neural networks work by passing data through multiple layers, where each layer transforms the input. The final output is a prediction or classification based on the learned features from the data.

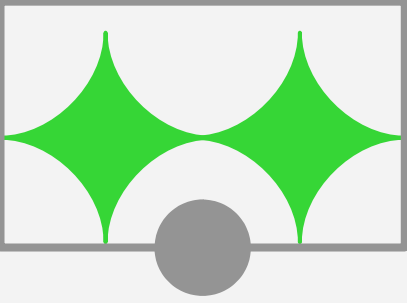




Activation Functions Explained

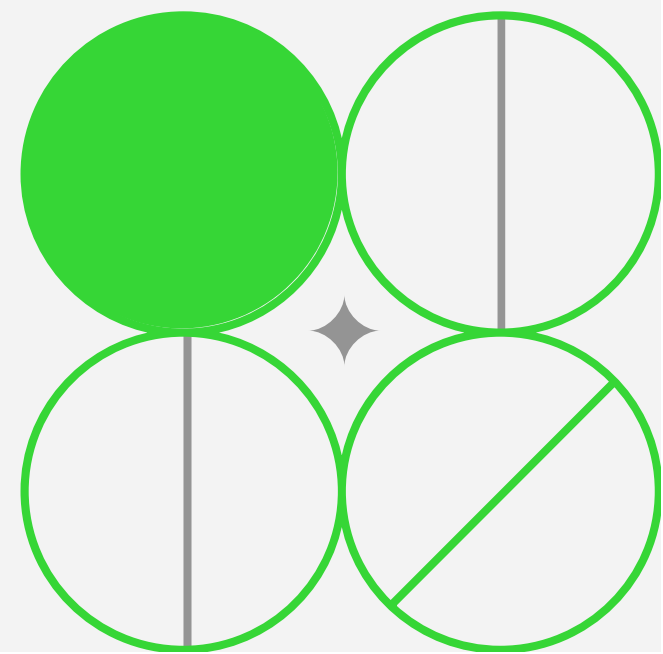
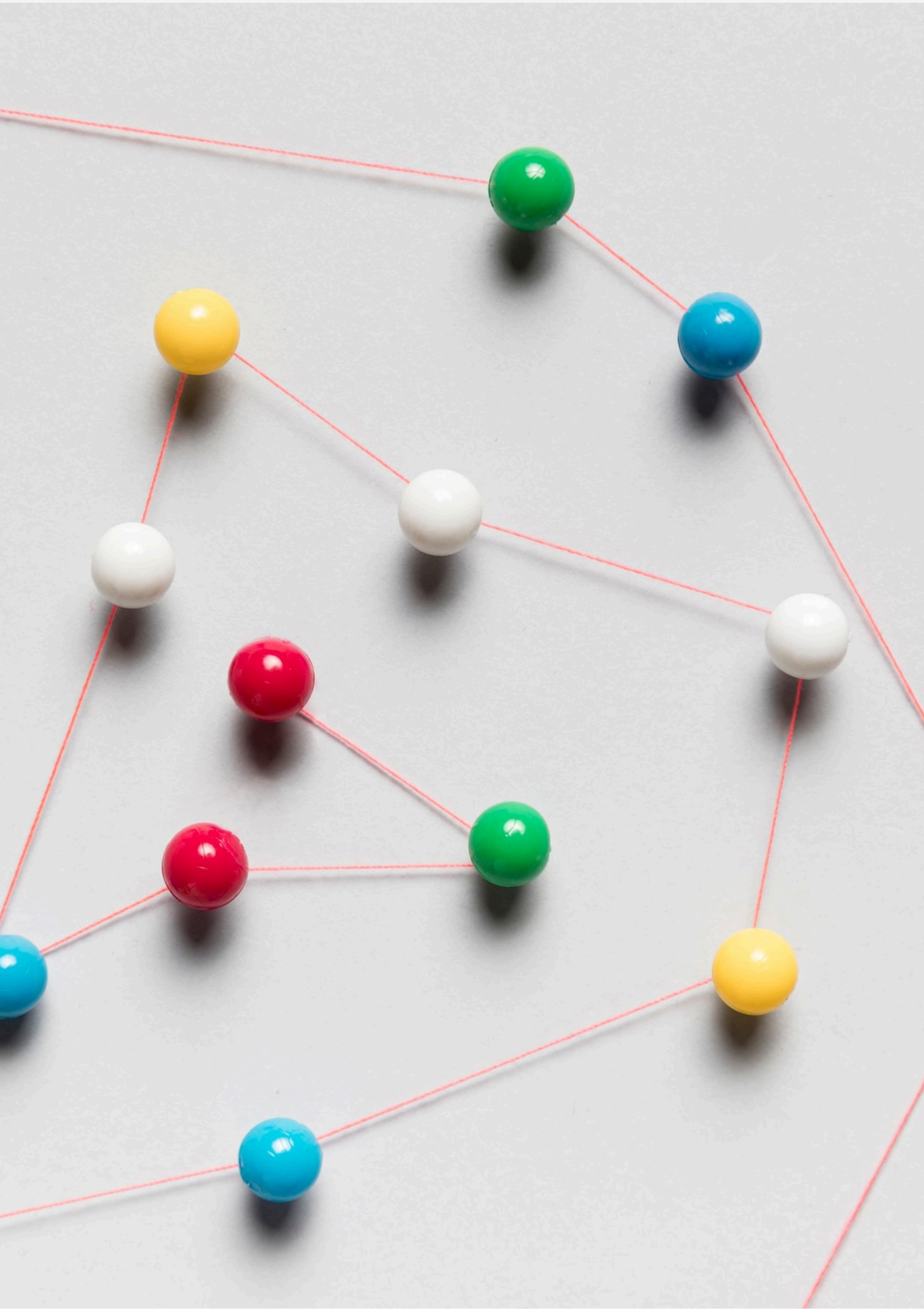
Activation functions determine the output of a neural network node. Common functions like **ReLU**, **sigmoid**, and **softmax** introduce non-linearity, allowing the network to learn complex patterns.

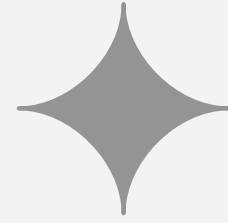




Training Neural Networks

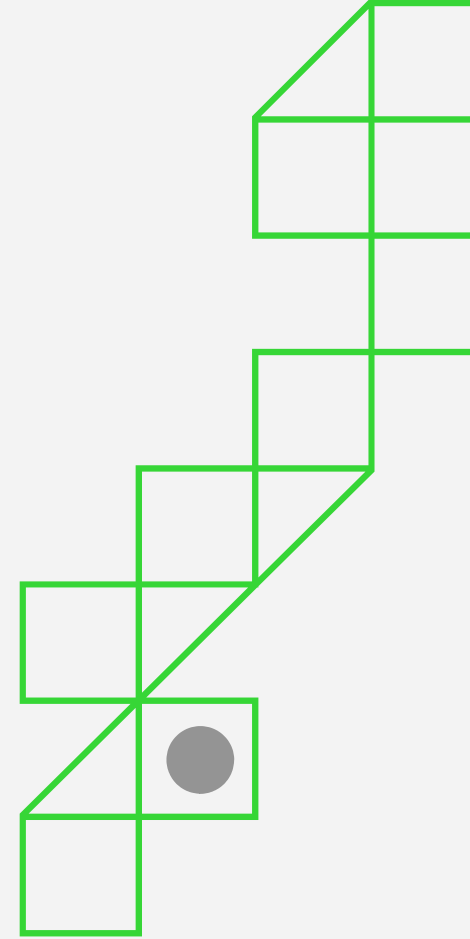
Training a neural network involves adjusting its weights using a process called **backpropagation**. This is done by minimizing the **loss function**, which measures the difference between predicted and actual values.

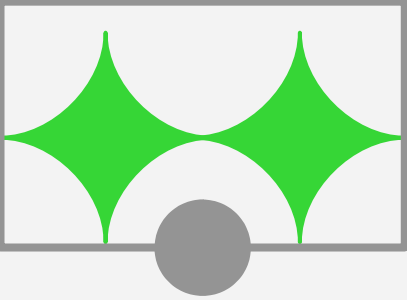




Overfitting and Regularization

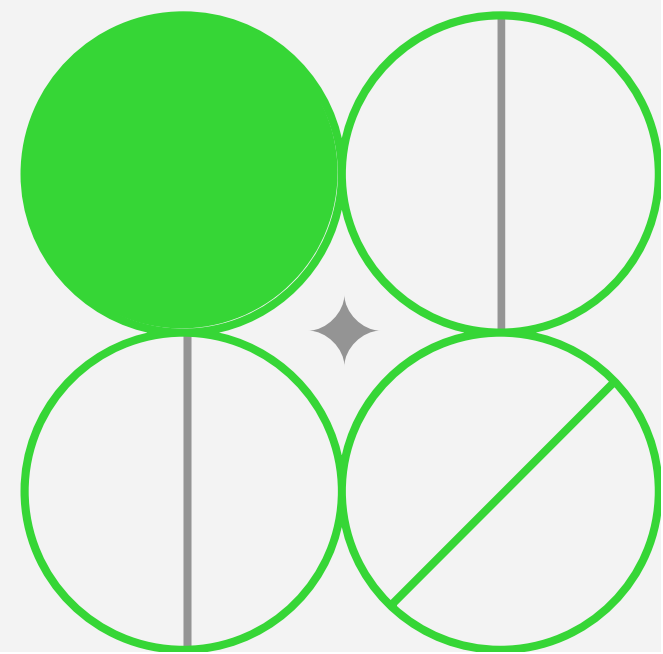
Overfitting occurs when a model learns too much from training data, failing to generalize. Techniques like **dropout** and **L2 regularization** help mitigate overfitting, ensuring better performance on unseen data.





Popular Deep Learning Frameworks

Several frameworks facilitate deep learning development, including **TensorFlow**, **PyTorch**, and **Keras**. These tools provide robust libraries and resources for building and deploying neural network models efficiently.



APPLICATIONS OF DEEP LEARNING

Deep learning has numerous applications, from **image classification** and **speech recognition** to **autonomous vehicles** and **healthcare diagnostics**. Its versatility makes it a powerful tool across various industries.



Challenges in Deep Learning

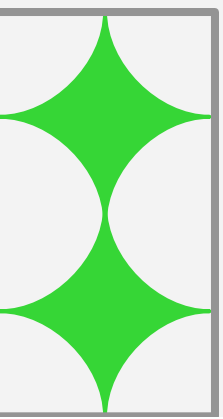
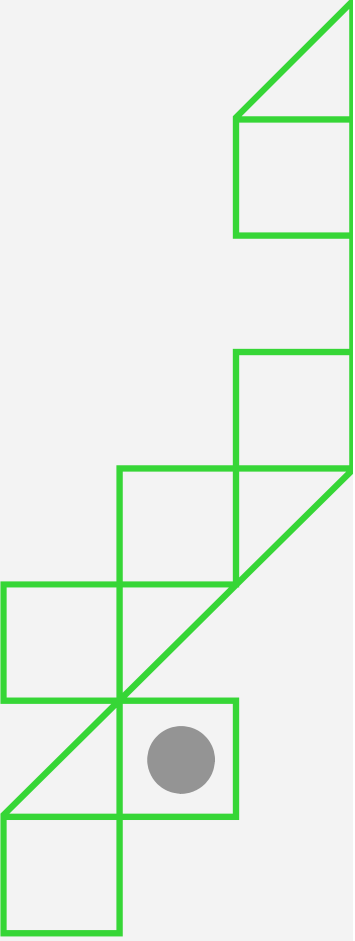
Despite its potential, deep learning faces challenges such as **data requirements**, **computational costs**, and **interpretability** issues. Addressing these challenges is crucial for advancing the field further.

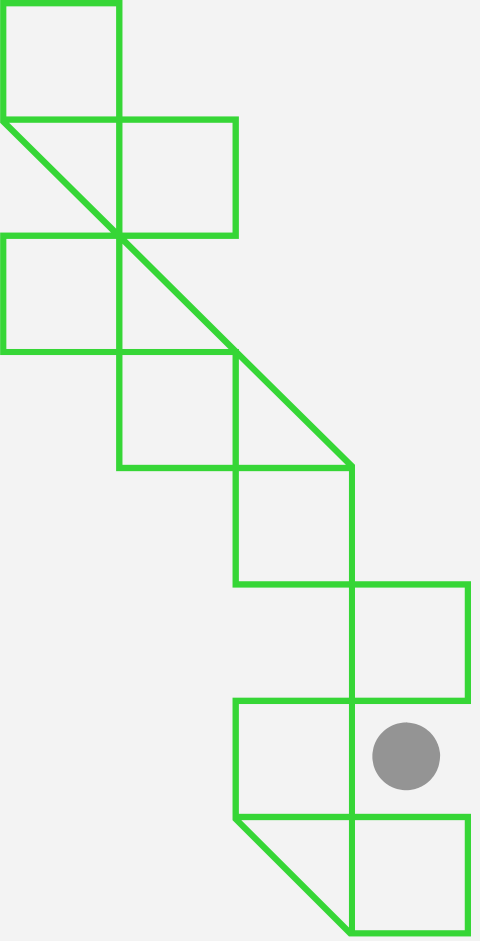




CONCLUSION

In summary, **deep learning** is a transformative technology that leverages **neural networks** to solve complex problems. Understanding its foundations equips beginners to explore its vast potential and applications.





Thanks!

