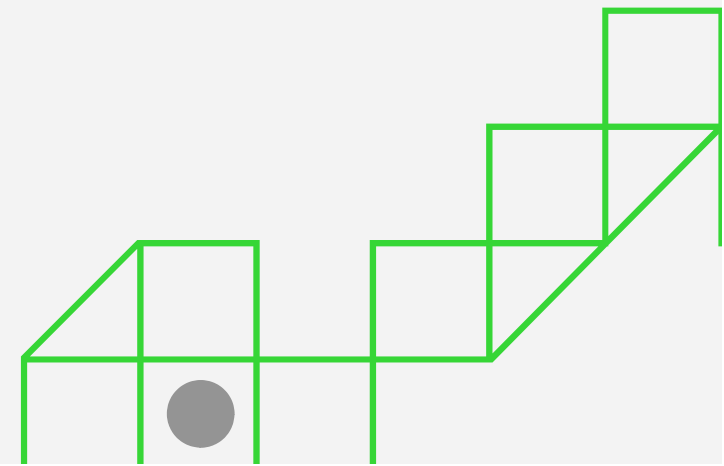
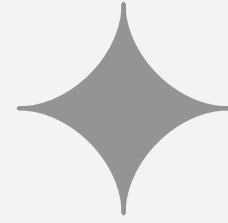




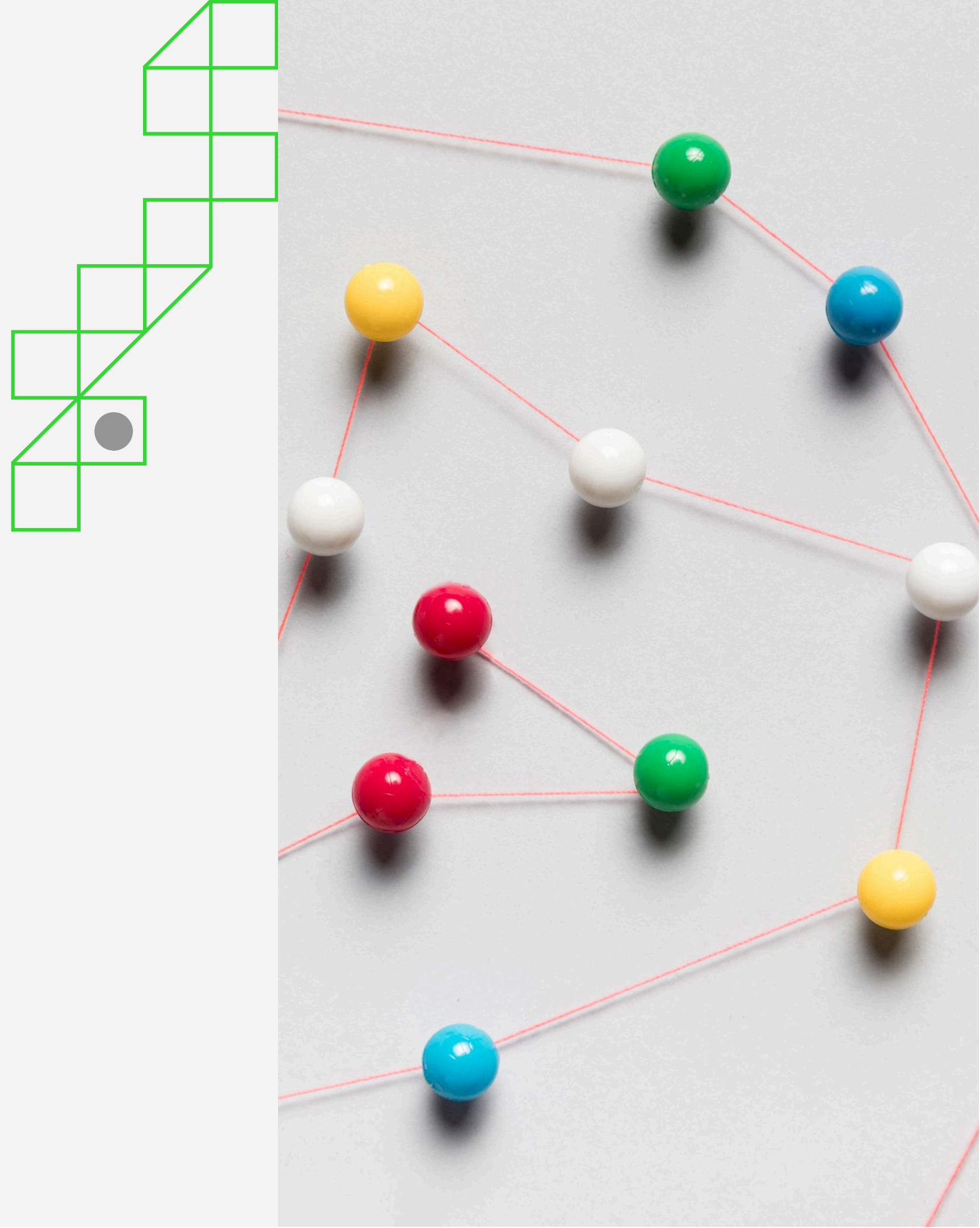
Understanding Transfer Learning: A Comprehensive Introduction





Introduction to Transfer Learning

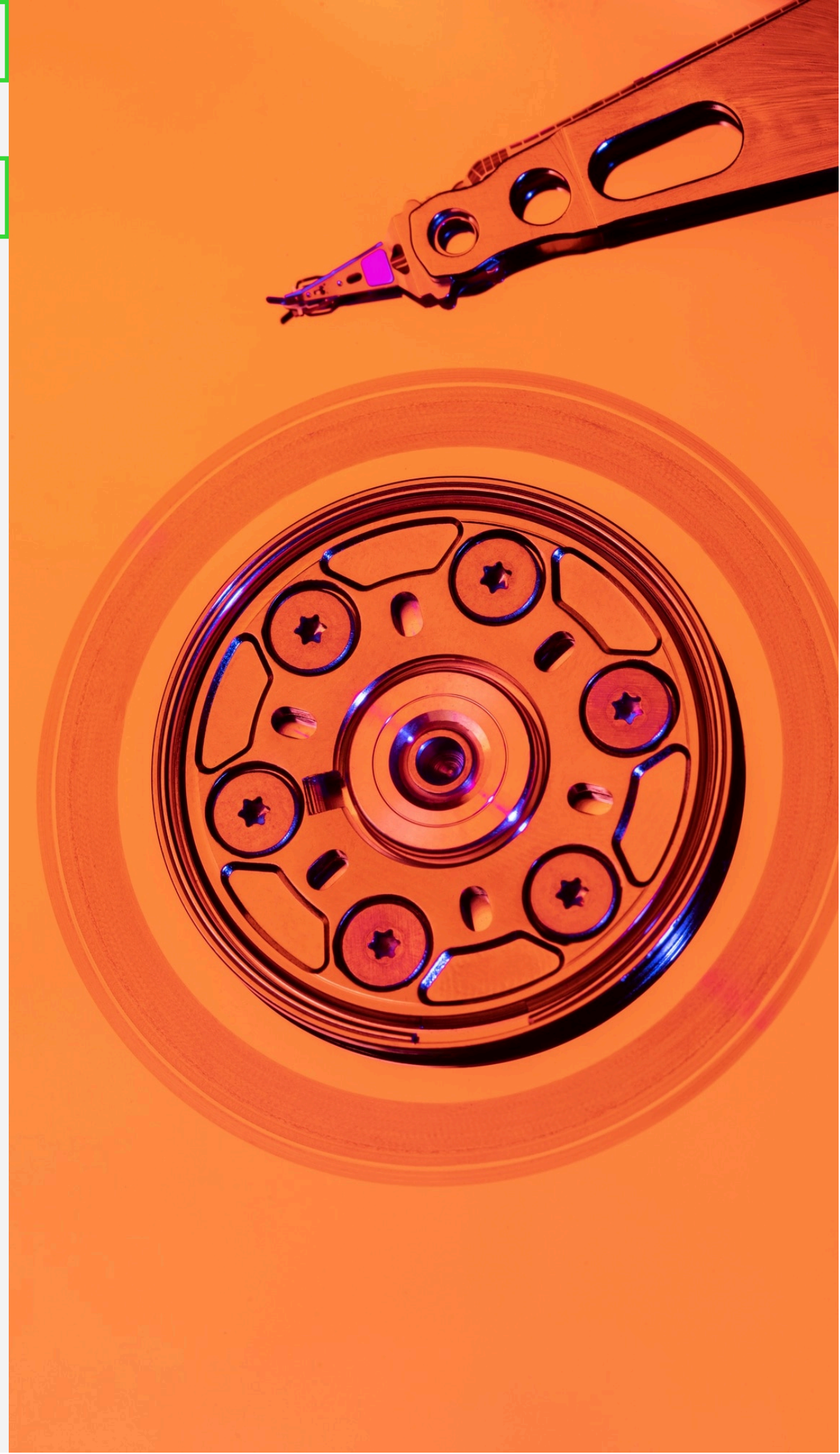
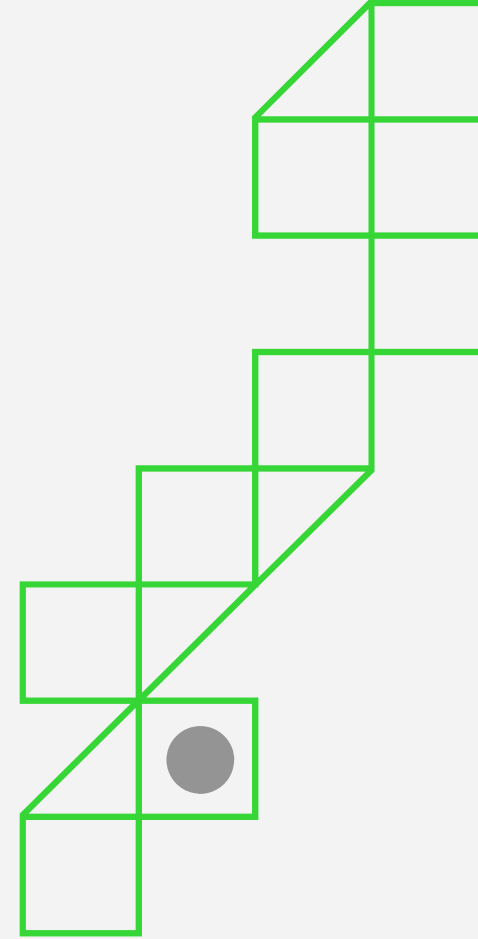
Transfer Learning is a machine learning technique where a model developed for a specific task is reused as the starting point for a model on a second task. This approach helps in leveraging **knowledge** gained from one domain to improve learning in another, making it a powerful tool in AI.





How Transfer Learning Works

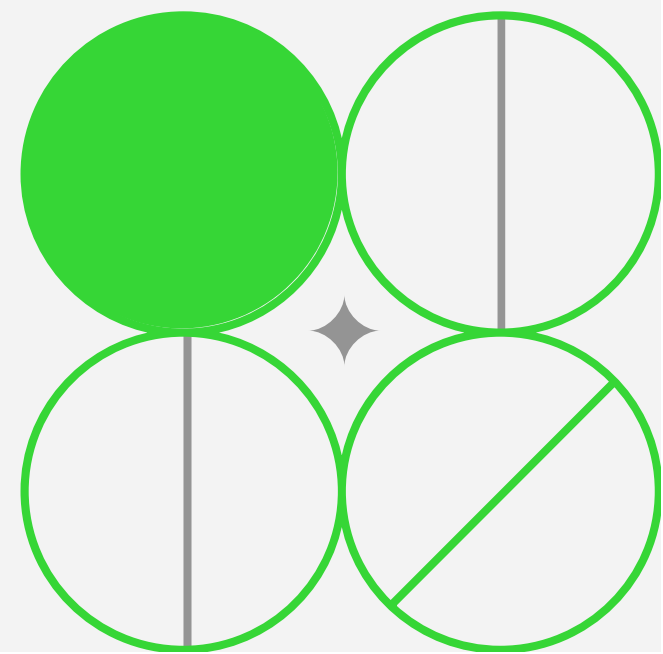
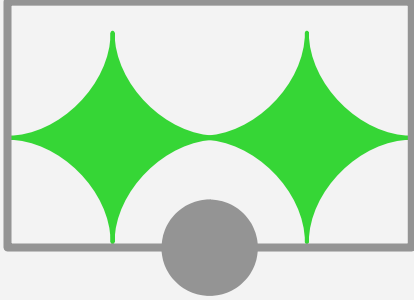
In **transfer learning**, a pre-trained model is fine-tuned on a new dataset. This involves adjusting the model's parameters to better fit the new data while retaining the **features** learned from the original task, which significantly reduces the time and resources needed for training.





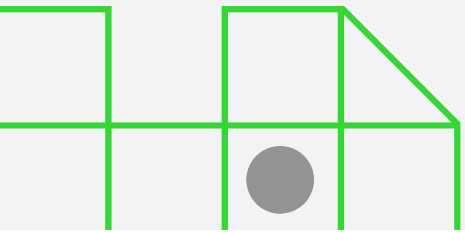
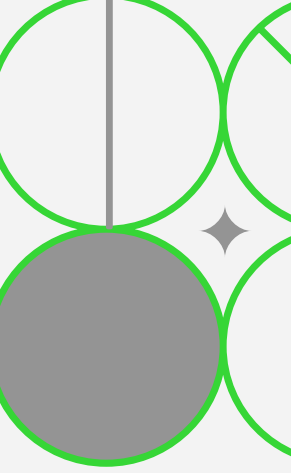
Benefits of Transfer Learning

The main **benefits** of transfer learning include reduced training time, improved performance on smaller datasets, and the ability to leverage **pre-existing** knowledge. This is particularly useful in fields like computer vision and natural language processing, where data can be scarce.



Applications of Transfer Learning

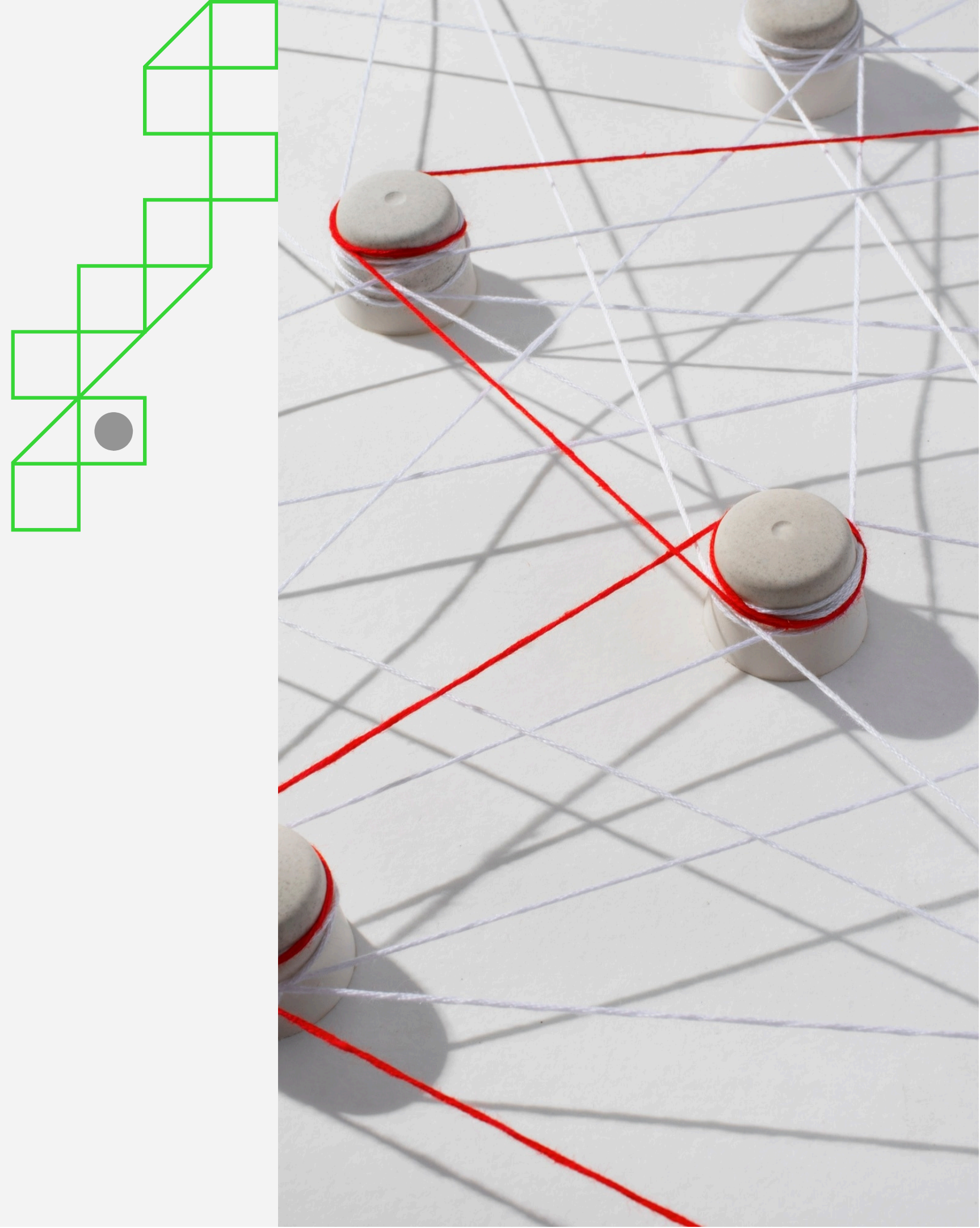
Transfer learning is widely used in various applications such as **image classification**, **speech recognition**, and **natural language processing**. By utilizing previously learned features, models can achieve higher accuracy and efficiency in these tasks, especially when labeled data is limited.





Challenges in Transfer Learning

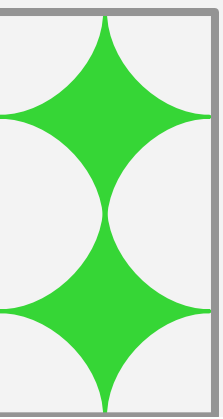
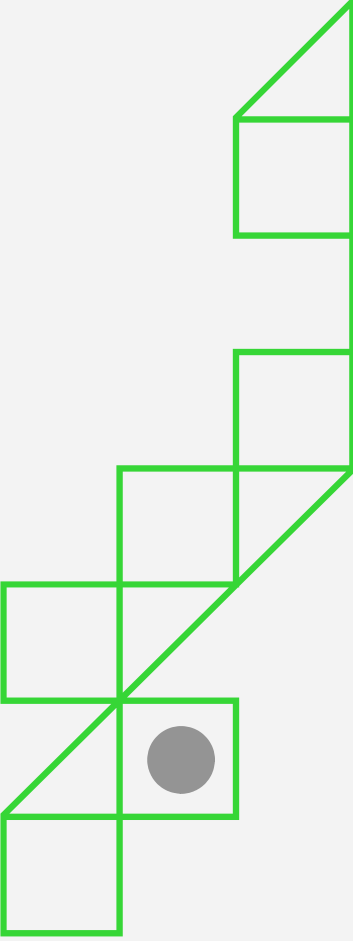
Despite its advantages, transfer learning faces challenges like **domain mismatch** and overfitting. When the source and target domains differ significantly, the model may not generalize well, leading to poor performance. Careful selection of models and datasets is crucial.

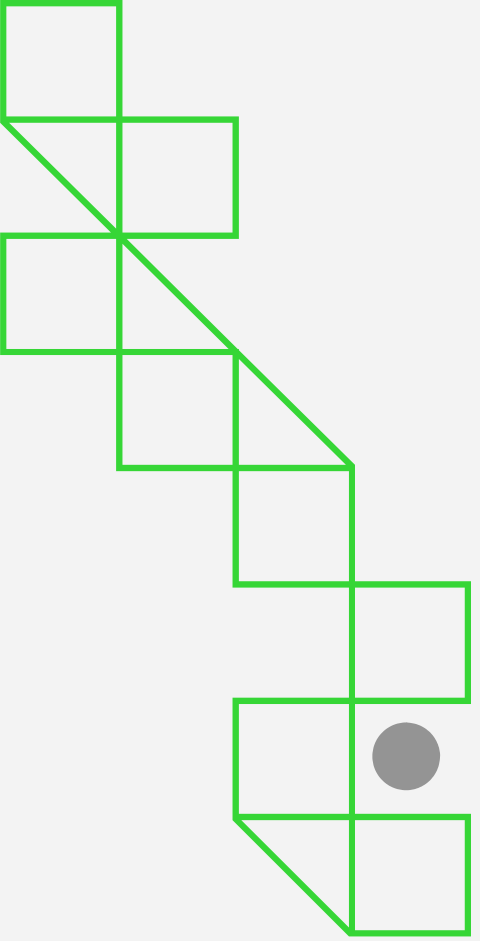




CONCLUSION ON TRANSFER LEARNING

In conclusion, **transfer learning** is a transformative approach in machine learning that enables models to leverage previous knowledge. Understanding its principles, benefits, and challenges can significantly enhance the development of AI systems, making them more efficient and effective.





Thanks!

