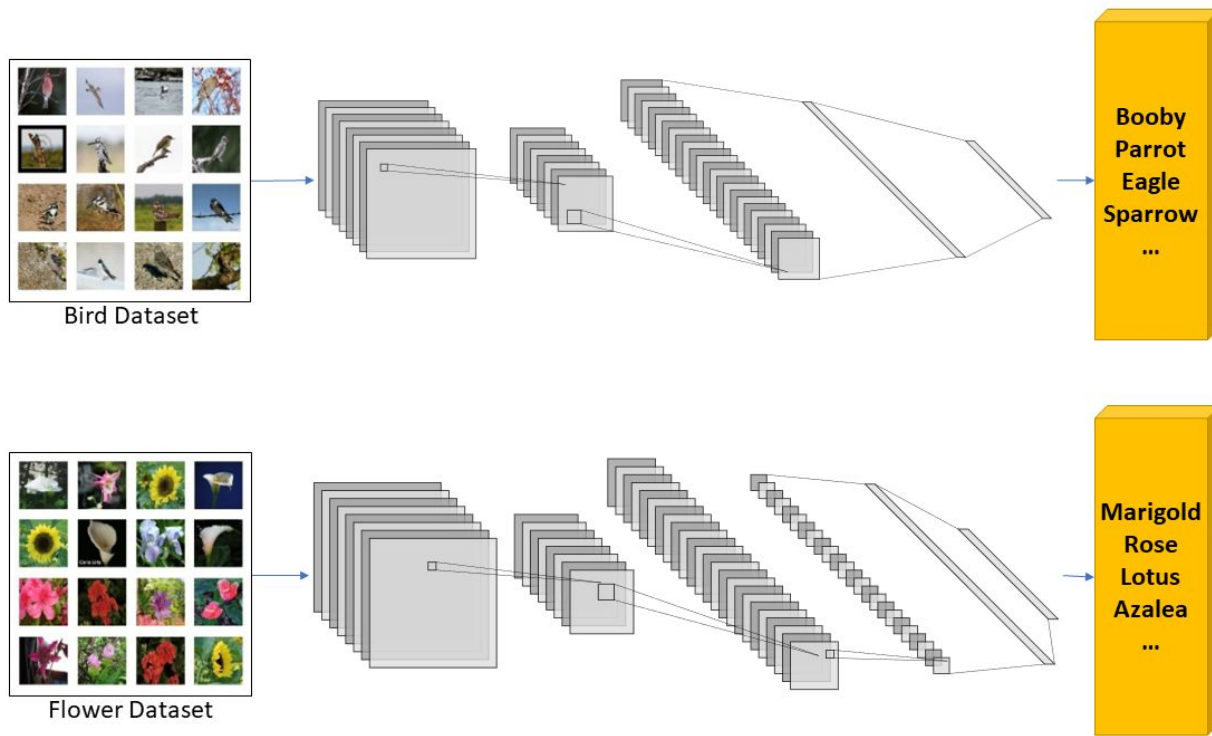


Neural Network and Deep Learning



Transfer Learning

Traditional Learning



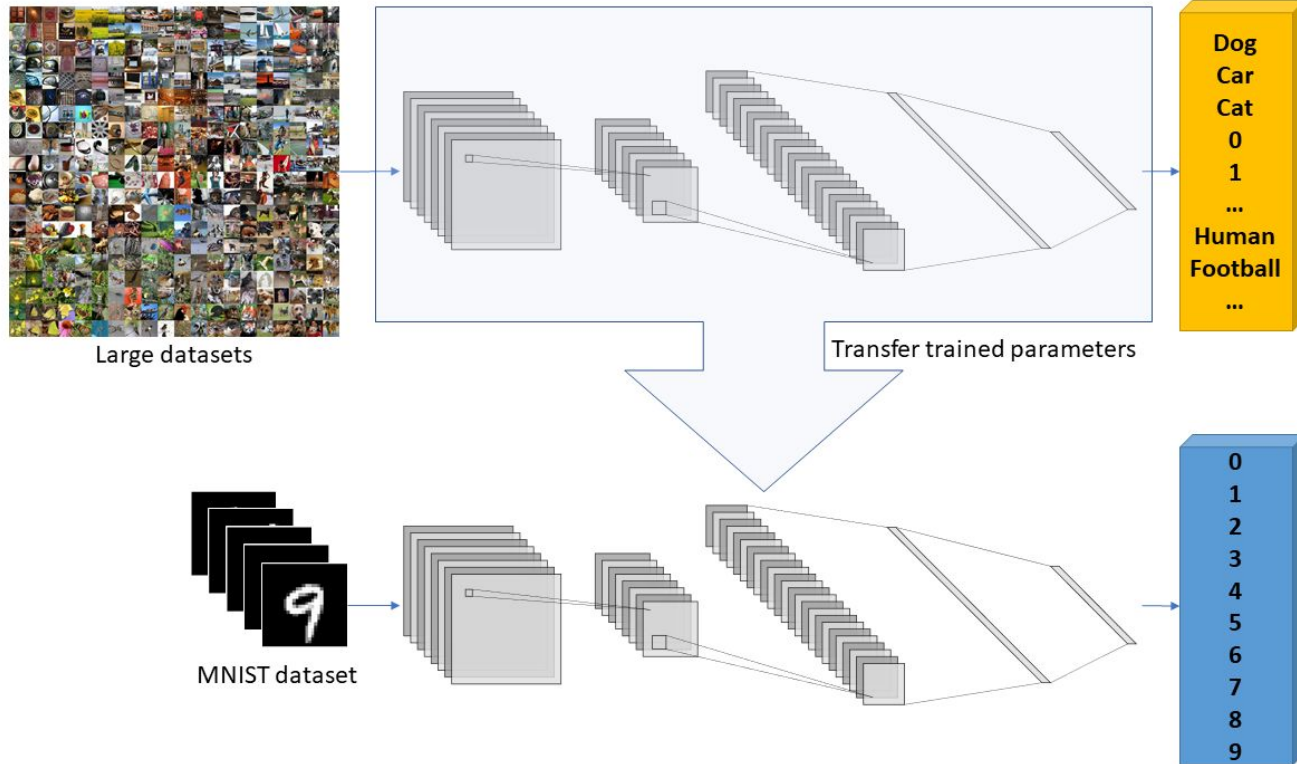
What is Transfer Learning?

Definition: Reusing a pre-trained model on a new problem.

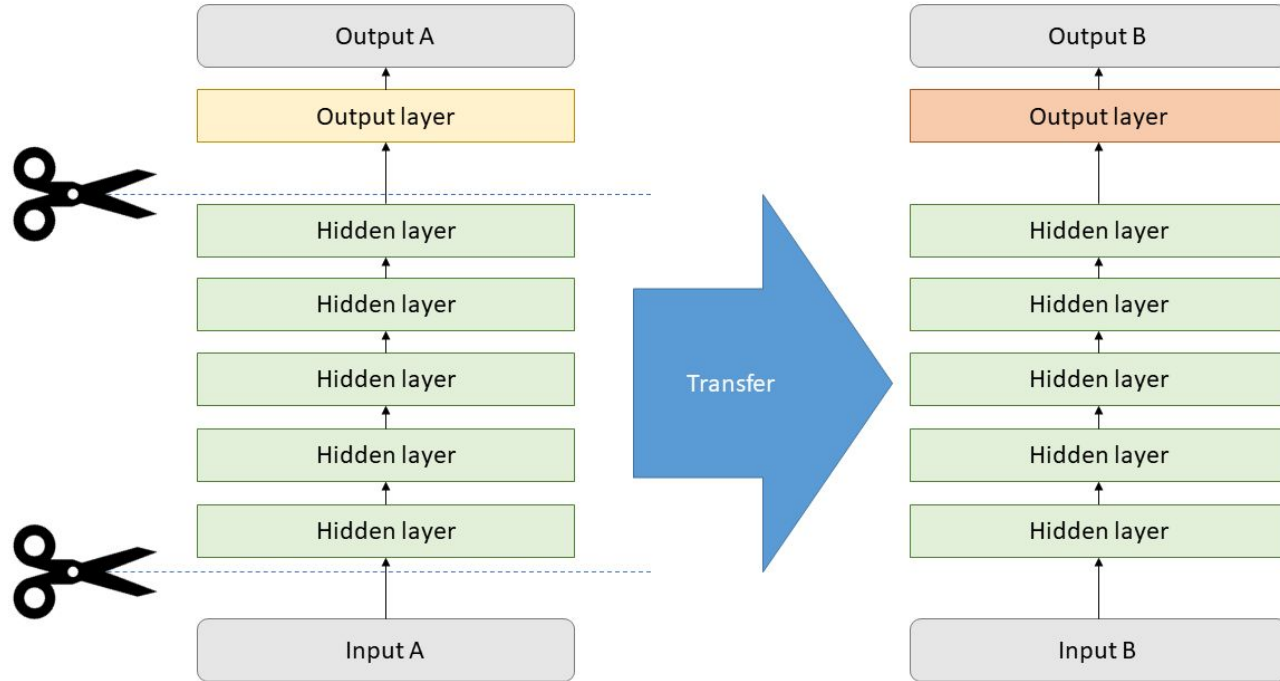
Key Idea: Models trained on large datasets (e.g., ImageNet) can serve as the foundation for new tasks with fewer data.



Transfer Learning



Transfer Learning



Why Transfer Learning?

Efficiency: Saves time and computational resources.

Improved Performance: Leverages knowledge from pre-trained models, often resulting in better performance on small datasets.

Common Use-Cases:

- Image classification
- Natural language processing
- Object detection

Key Considerations

Data Similarity: How similar is the source task (pre-trained model) to the target task?

Model Selection: Choose a model that aligns with the complexity and nature of the target problem.

Avoid Overfitting: Monitor for overfitting when transferring to small datasets.

Freezing and Fine-Tuning in Transfer Learning

Freezing (Feature Extraction)

Keeping the weights of most layers of a pre-trained model unchanged, while only training the newly added layers specific to the target task.

Use Case: Useful when the new dataset is small or similar to the original dataset of the pre-trained model.

Fine-Tuning

Unfreezing some or all layers of the pre-trained model and retraining them along with the new layers on the target task's dataset.

Use Case: Beneficial when the new dataset is large or significantly different from the dataset used to pre-train the model.

Hand On

