7.7

Leveraging Pre-trained Models with Transfer Learning

Part 2: Different Types of Self-Supervised Learning

Sebastian Raschka and the Lightning AI Team

Key idea behind self-supervised learning

Leverage large unlabeled dataset to pre-train the network

2 main categories

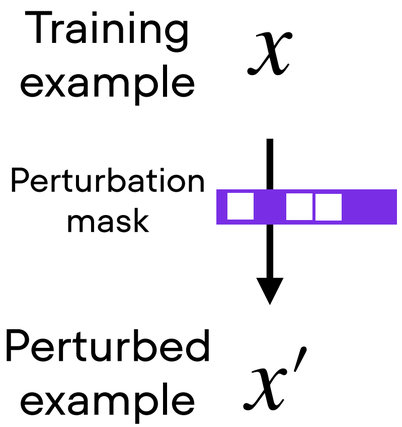
1. Self-prediction
2. Contrastive learning
   (relationship learning)

Self-prediction

Predict masked, augmented, obscured, perturbed features

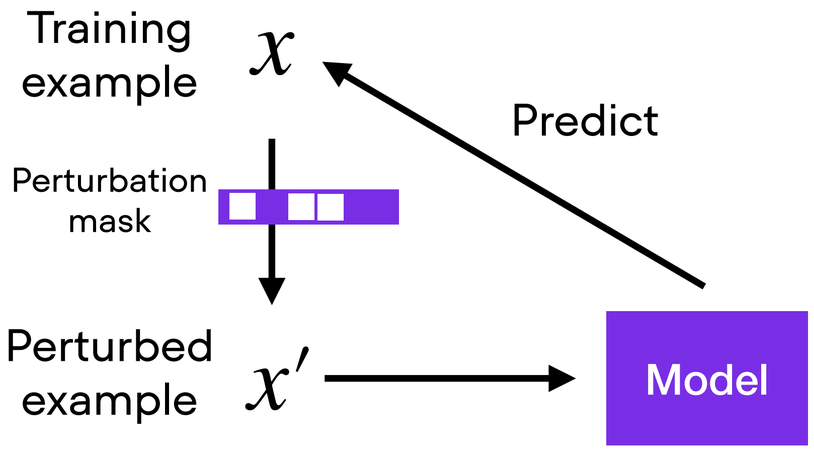
Self-prediction

Predict masked, augmented, obscured, perturbed features

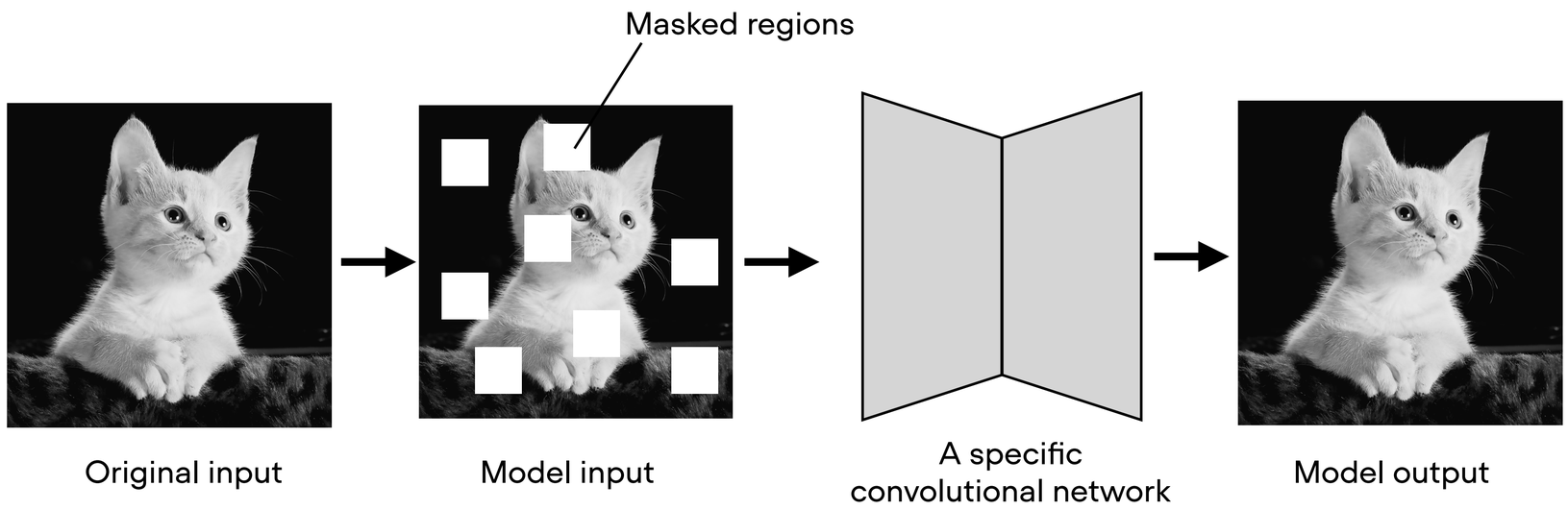


Self-prediction

Predict masked, augmented, obscured, perturbed features

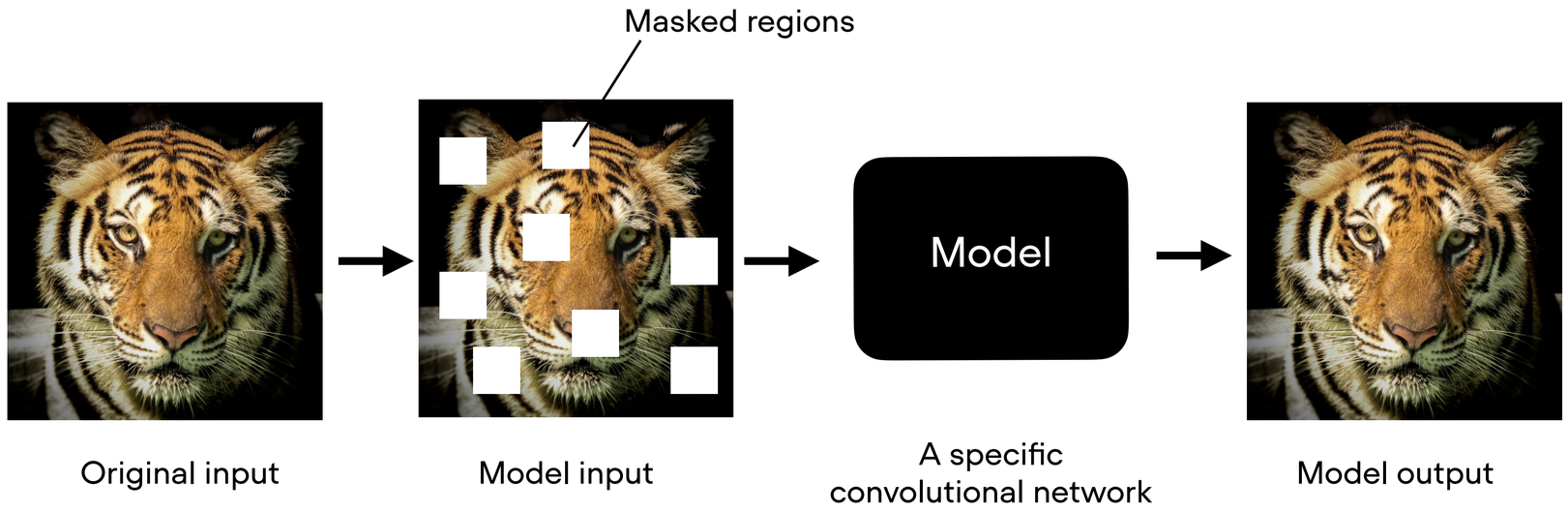


Self-prediction



There are many other types of self-prediction

Self-prediction



There are many other types of self-prediction

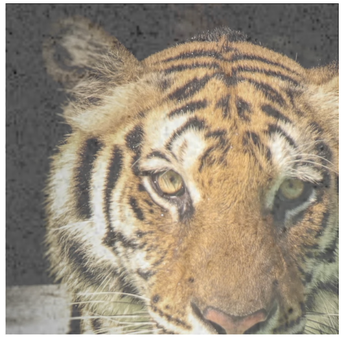
Contrastive learning

Learn the relationship between
similar and dissimilar inputs

Contrastive learning

Dissimilar:
maximize distance
of embedding vectors

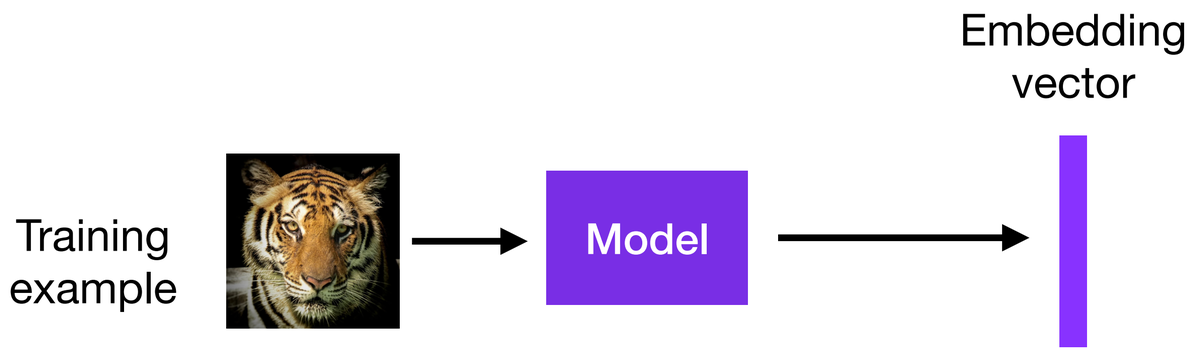
Contrastive learning



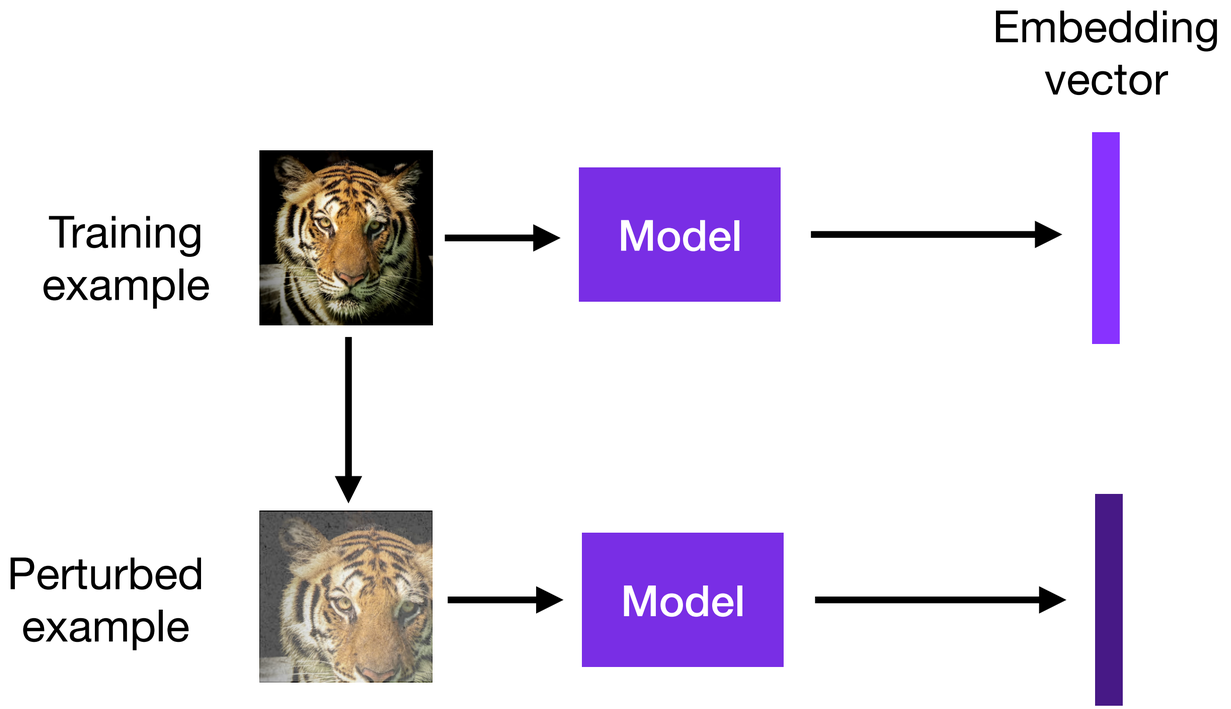
Dissimilar:
maximize distance
of embedding vectors

Similar:
minimize distance
of embedding vectors

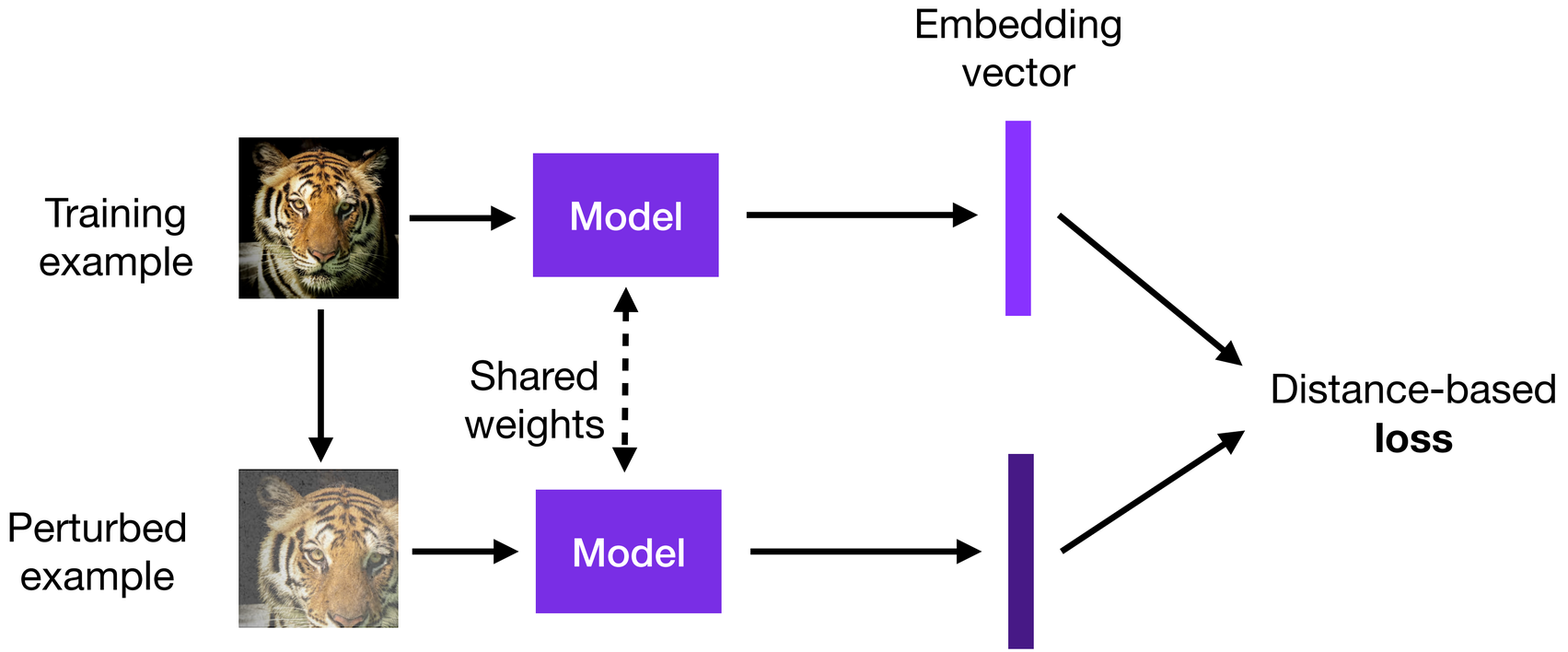
Contrastive learning



Contrastive learning



Contrastive learning



Contrastive learning

There are many variants of contrastive learning

A classic example: SimCLR

A Simple Framework for Contrastive Learning of Visual Representations, https://arxiv.org/abs/2002.05709

Next: Self-supervised learning with SimCLR