Image Similarity

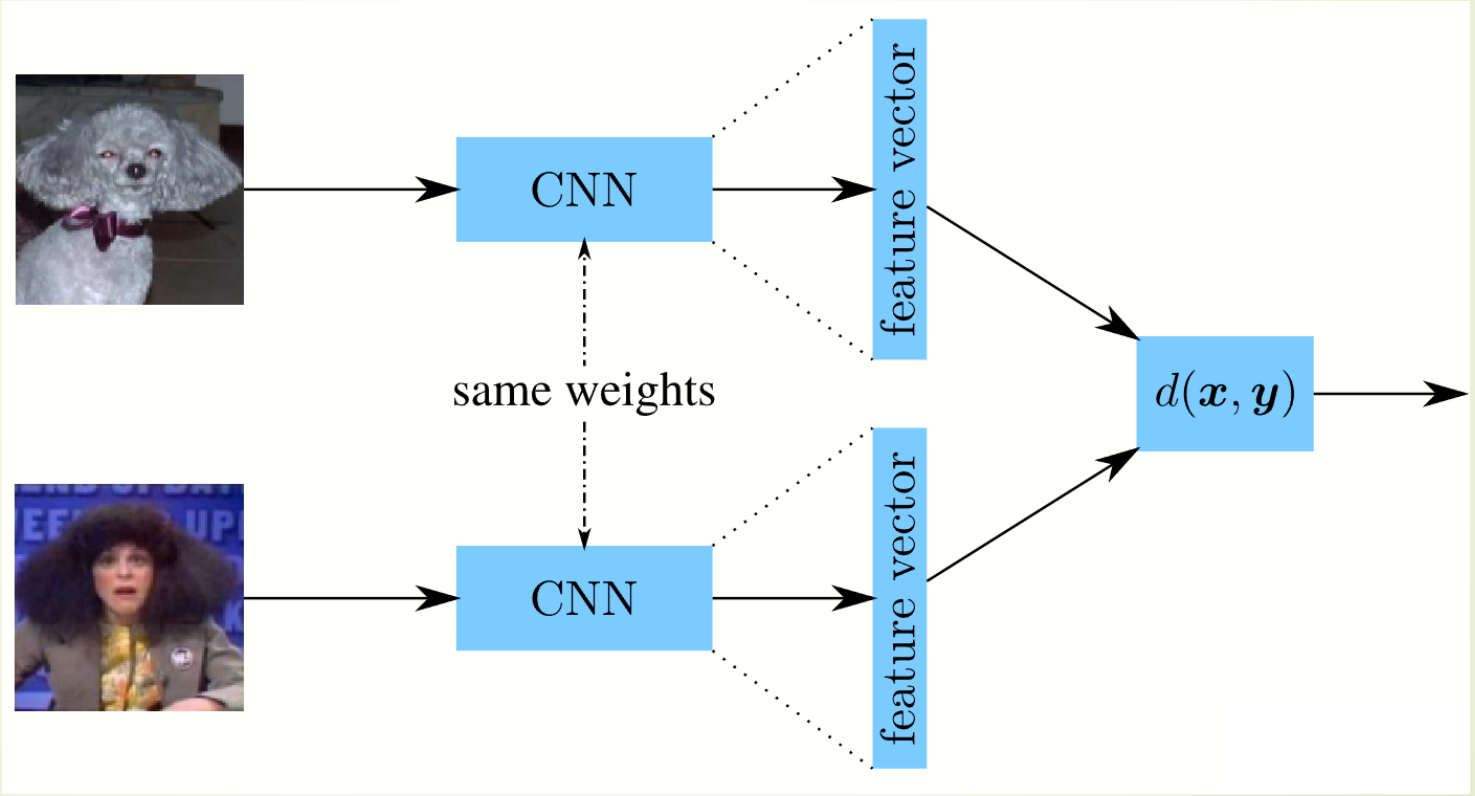
ATAI/DNN Project

Munteanu Victor

Recap

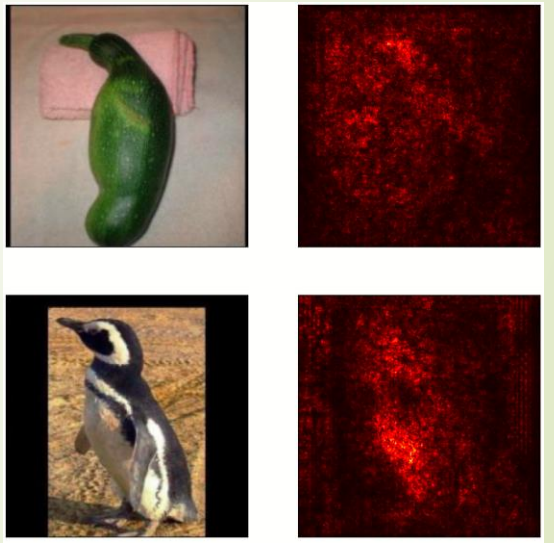
- Find the pair

Siamese Network



Experiments

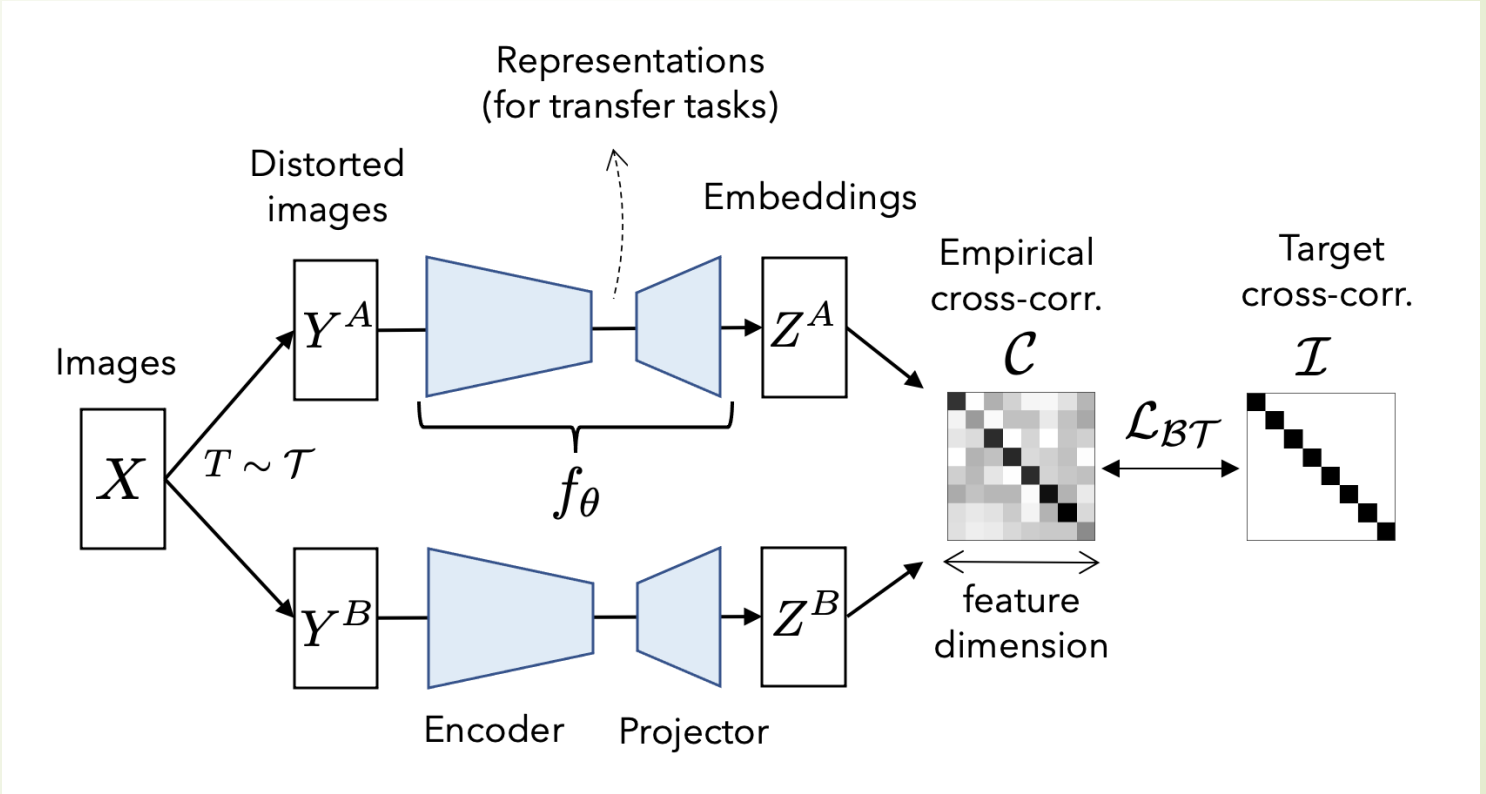
1. Tried to learn the distance function: added adaptive layers, fine-tuned on Totally-Looks-Like dataset to predict the similarity between 2 images.
   - Results: Top-25 metric, the target image was found in the closest 25 images only in 14/1200 cases.
2. Used Saliency maps to visualize the parts of the images based on which the network did the "matching"



Contrastive Learning

- Pretrain using Barlow Twins Loss (similar to SimCLR) on ImageNet
- Add “Projection Layers” on top for an even lower embedding space
  - (from 2000 -> 256)
- Use TripletLoss to finetune the model

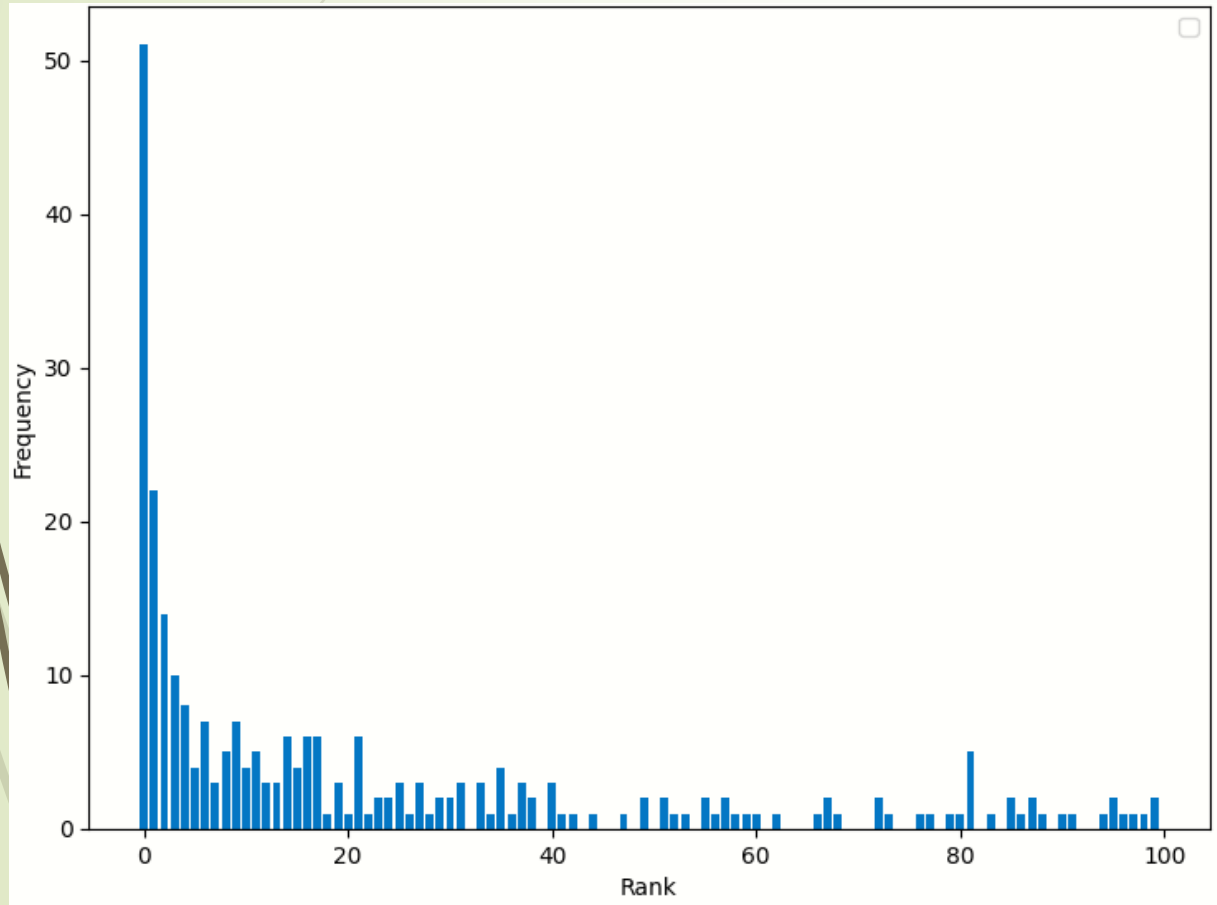
Barlow Twins

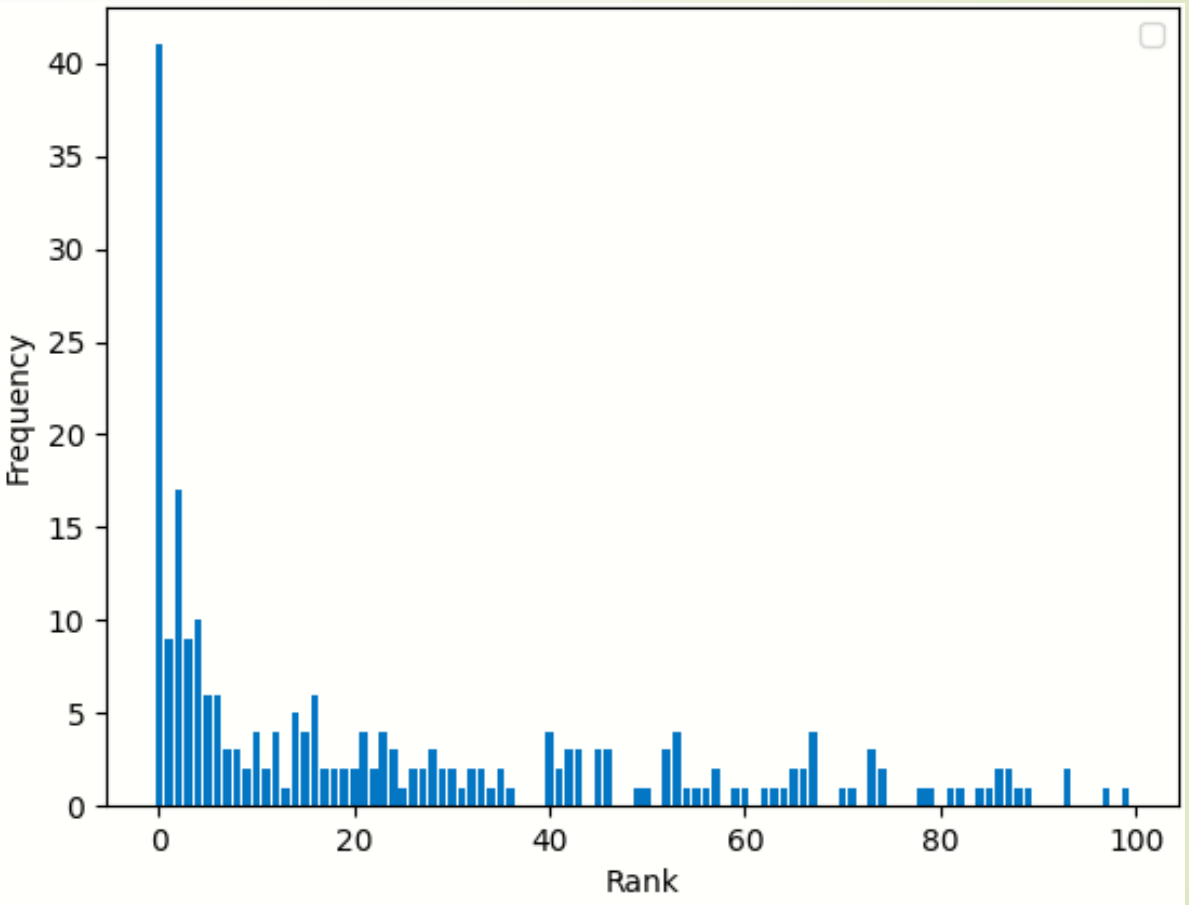


Results

- Only ~1200 images are not matched based on facial features (biased dataset)
- Finetuned on 900 pairs of images
- Used 300 pairs for validation
  - Found 51/325 in the top-1
  - Found 105/325 in the top-5
  - Found 131/325 in the top-10
  - Found 152/325 in the top-15
  - Found 184/325 in the top-25
  - Found 222/325 in the top-50
  - Found 268/325 in the top-100

Barlow Twins vs ImageNet pretraining





Conclusion

- Our results suggest that pretraining Siamese networks using contrastive learning, such as the Barlow Twins Loss, may be a promising approach for image similarity tasks.

Thanks for your attention!