

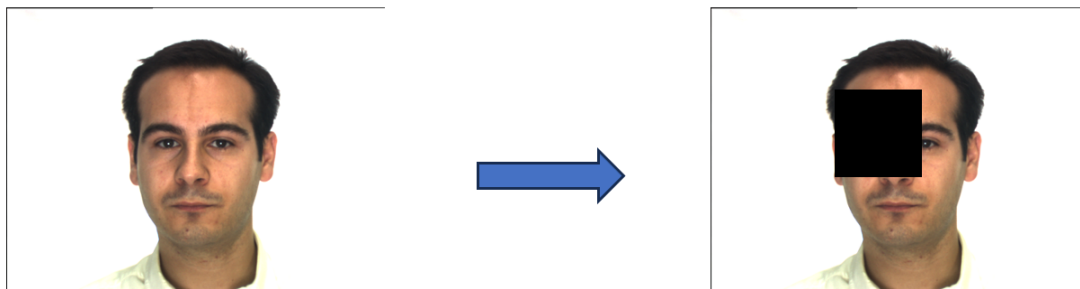
Machine Learning

Practical Sheet 7: Self Supervised Learning

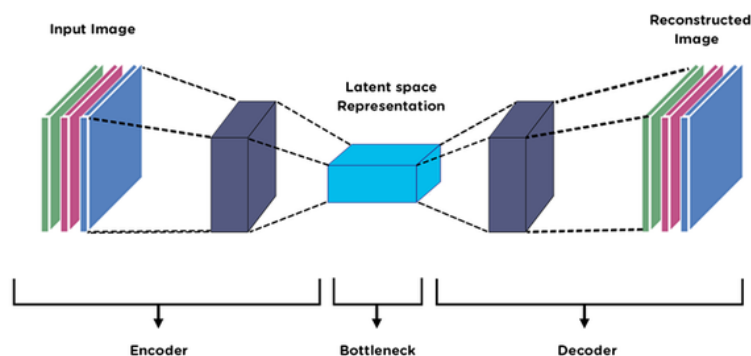


Consider the “[AR.zip](#)” dataset, available at the course web page. It contains 3,315 images, of 136 subjects, each one represented in the RGB color space and having dimensions 576 (rows) x 768 (columns).

1. Implement a Python function that receives one input image and returns a partially occluded version of that image (by a black rectangle)



2. Learn a deep learning-based model, based in an auto-encoder architecture, that receives partially occluded images and returns a prediction of the corresponding un-occluded versions.





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3. For each image in the learning/test set, obtain the corresponding feature representations provided by the “Bottleneck” layer of the model learned in 2).
4. Use t-SNE (t-distributed Stochastic Neighbor Embedding (t-SNE) to obtain 2D representations of the features previously found.
5. Analyze how these features/instances spread in the 2D feature space, according to:
 - a. Gender;
 - b. ID;
 - c. Other features (e.g., Glasses, facial expressions,...)