Contrastive learning(대조 학습)

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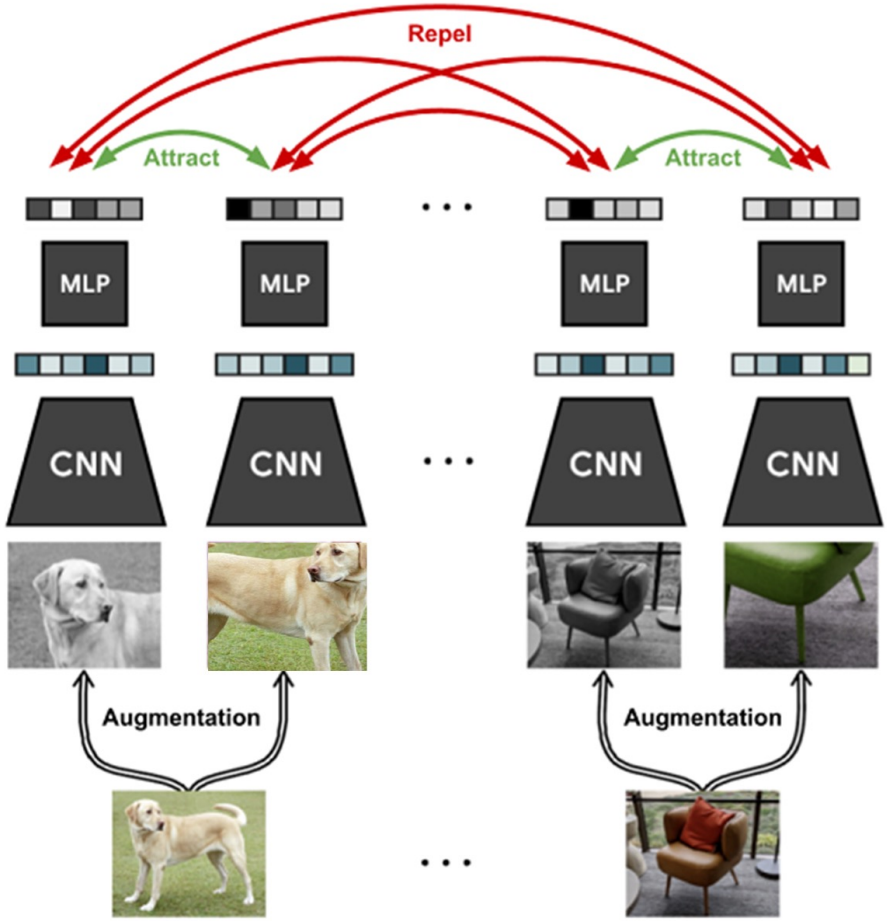
Contrastive learning

- 주요 특징
  - Self-supervised representation learning
  - Contrastive learning is an approach to learning that focuses on extracting meaningful representations by contrasting positive and negative pairs of instances.
- 주요 알고리즘
  - SimCLR
    - Chen, T., Kornblith, S., Norouzi, M., & Hinton, G. (2020, November). A simple framework for contrastive learning of visual representations. In International conference on machine learning (pp. 1597-1607). PMLR.
  - SimCSE
    - Gao, T., Yao, X., & Chen, D. (2021). Simcse: Simple contrastive learning of sentence embeddings. arXiv preprint arXiv:2104.08821.

SimCLR

- 구조



Downstream tasks

SimCLR

Anchor image

Positive pair

Negative pair

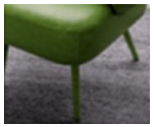
SimCLR

- Loss

Noise Contrastive Estimation Loss

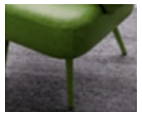
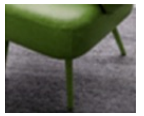
$$l(i,j) = -log\frac{exp(s_{i,j})}{\sum_{k=1}^{2N} l_{[k!=i]} exp(s_{i,k})}$$

Loss( , )

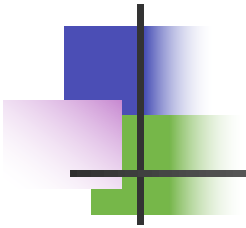
$$= -\log\left(\frac{e^{sim(\text{  }, \text{  })}}{e^{sim(\text{  }, \text{  })} + e^{sim(\text{  }, \text{  })} + e^{sim(\text{  }, \text{  })}}\right)$$

SimCLR

- Total loss

Loss( , )+Loss( , )+Loss( , )+ Loss( , )

2x2



Q & A