CSE 574 Planning and Learning Methods in AI

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Week 9

Considerations in Human-in-the-Loop

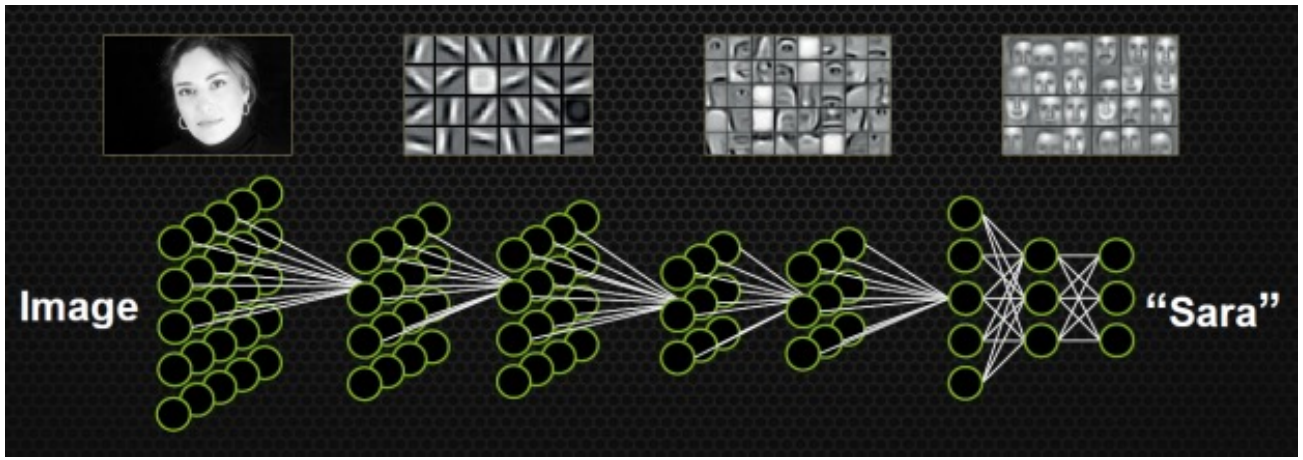
- Ways to get feedback
  - Use simpler feedback whenever possible (binary evaluations are easier than ranking or writing a paragraph but provide less information, making it longer to train)
  - Using the keyboard or touch screen can be easier than the mouse in most cases. Sometimes we have to drive a car/robot and show and that can raise safety concerns
  - Expert feedback can be expensive
- Effect of human bias and error
- Maintaining exploration and exploitation

Considerations in Human-in-the-Loop

- Self-supervised learning (SSL) for scalability
  1. Non-contrastive learning (e.g., by creating a new task)
     - Step 1: Create a new supervised learning task with labels based on the data you have so that the neural network learns basic features in the first few layers

       E.g. 1: Masking and predicting the word, next word prediction, etc. See BERT

       E.g. 2: Rotate the image and try to predict what the angle is
     - Step 2: Supervised fine-tune (the few last layers) with a few lables

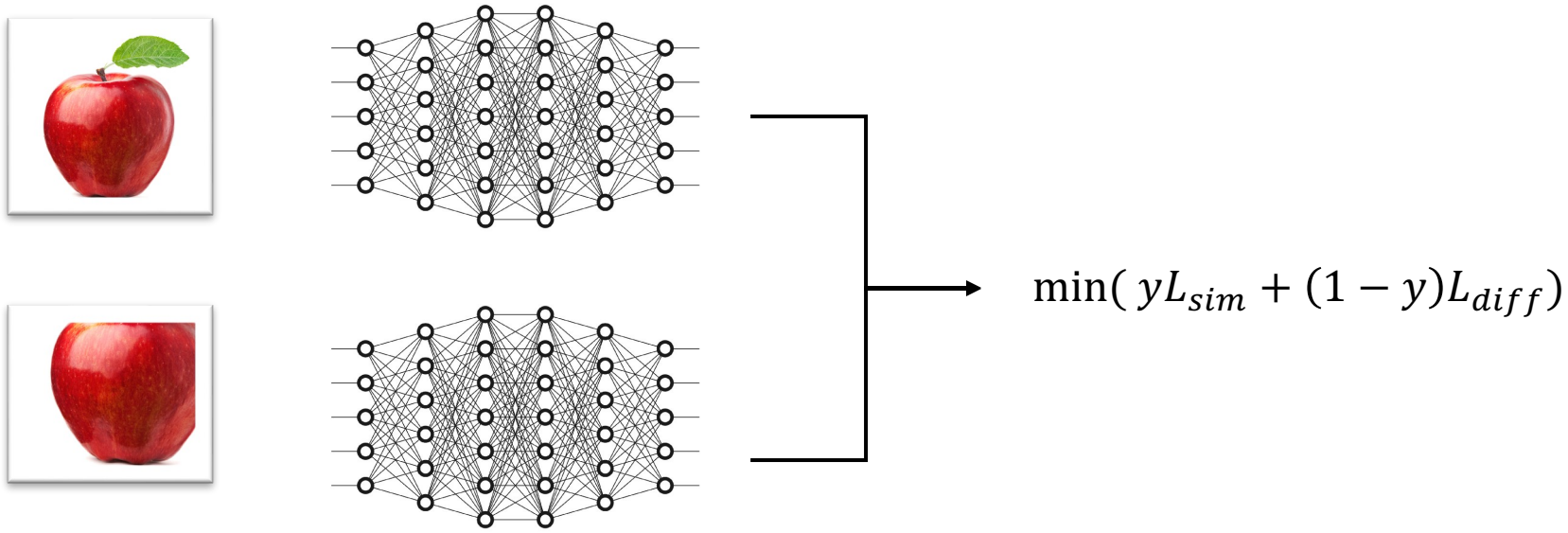


https://developer.nvidia.com/blog/accelerate-machine-learning-cudnn-deep-neural-network-library/

Considerations in Human-in-the-Loop

- Self-supervised learning (SSL) for scalability
  2. Contrastive learning

     E.g. Show positive and negative samples (e.g., full image and part of the same image would be a positive sample) and minimize the loss that maximizes the similarity between positive sample while minimizes the similarity between negative samples



Considerations in Human-in-the-Loop

- *Foundation models* for scalability
- Transfer learning/domain adaptation for scalability