Bucky’s Smart Pub

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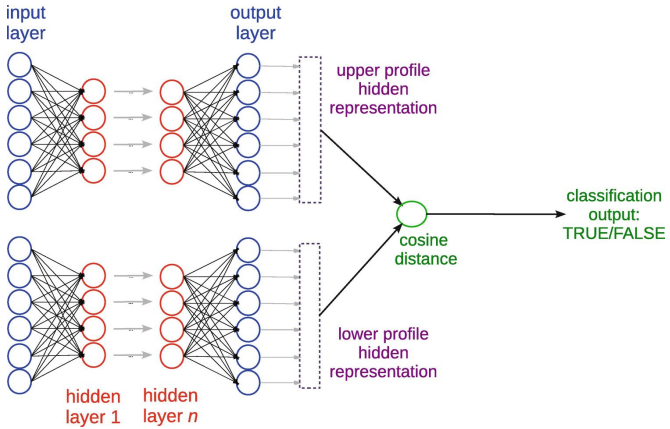
Overview

- Use ML to efficiently learn a user's preferences
- Ranking and recommendation systems
- Two parts:
  - Siamese neural network for learning pairwise ranking
  - Active learning algorithm for selecting training points
- Bucky's Smart Pub: Bucky the Bartender's goal is to learn patrons' beer preferences quickly and accurately without getting them too drunk

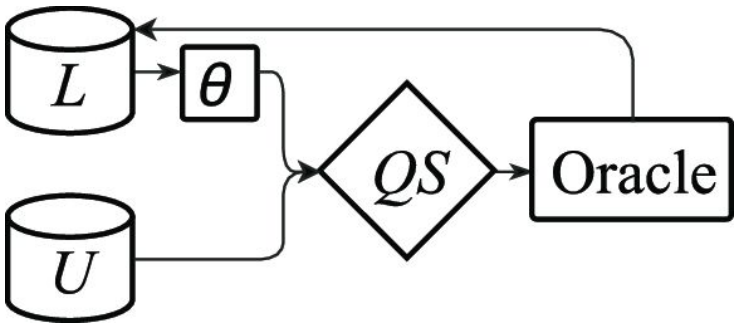
Siamese Neural Network

- Siamese networks use the same weights for two different inputs
- Training input:
  - Pair of points being ranked: (point_i, point_j)
  - Pairwise ranking: {+1, -1}
- Model
  - Two layers, X^ and L^, of shapes (1,D) and (D,L)
  - Output of model, L^ @ X^, is learned preference, LP
  - score(p) = norm(P - LP)
  - Pred = +1 if score(point_i) > score(point_j), else -1



Active Learning

- A dataset of N points has N!(N-2)! Pairwise combinations
- Easy to learn preference by viewing all rankings, but not always possible
  - User cannot watch every movie on Netflix or drink every beer at the bar
- Some points carry more information than others
- Approach
  - Select initial set of training points, T
  - Put the rest of the points in a set E
  - While there are points in E:
    - S = [score(e) for e in E]
    - Selection = E[argmin(s)]
    - Pop selection from E to T
    - Train model(T)



Bucky's Smart Pub application

- API and website to allow users to interact with model
  - Watch progress
  - Get live recommendations
  - Give model feedback
- Add users to the pub and watch Bucky learn their preferences
- API calls ran in background so users do not have to wait