Recommender Systems Hybrid Experiments

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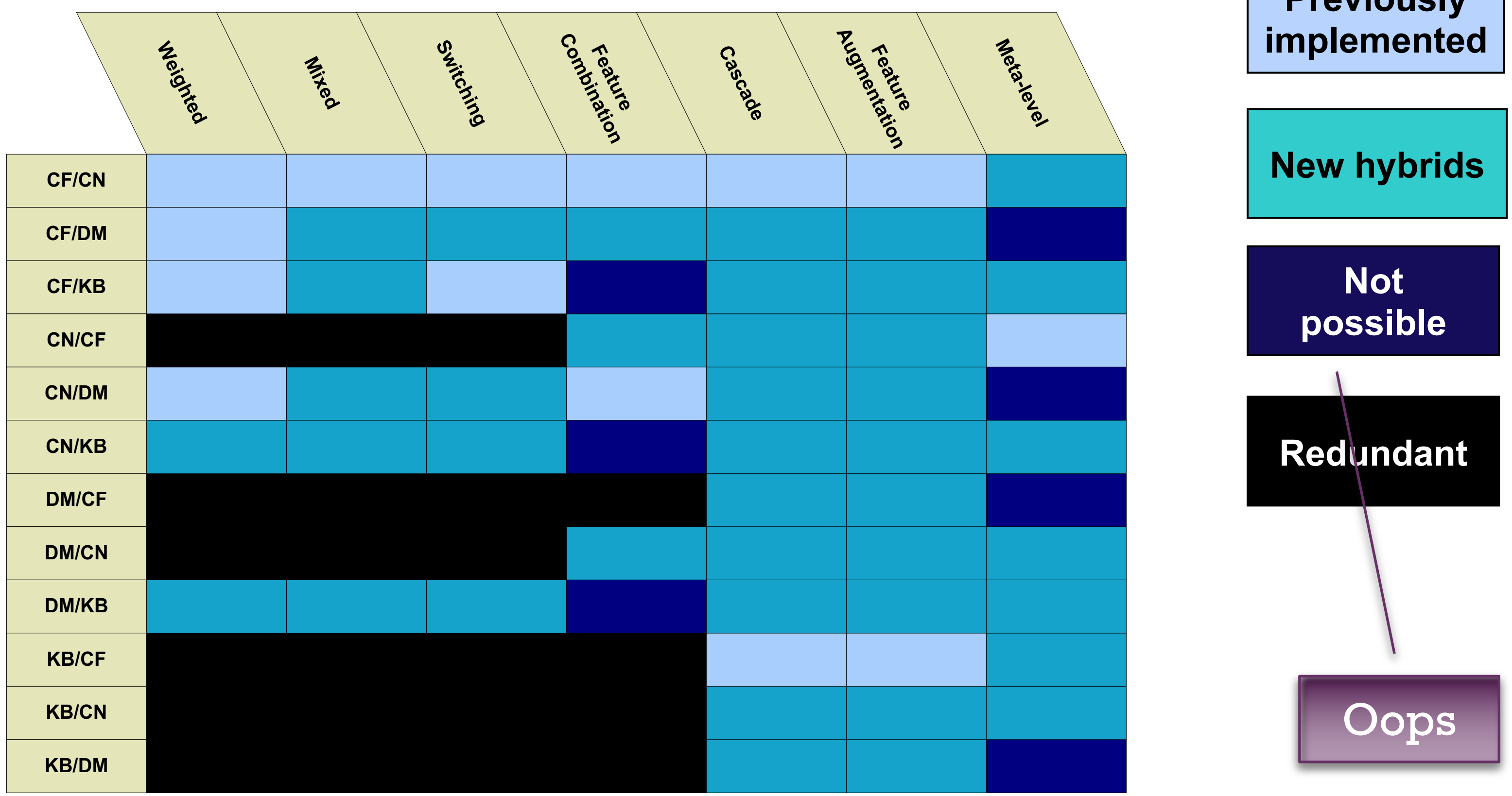
Hybrid design space



Comparative Study

- 41 hybrid designs
  - 24 / 53 spots in matrix
- Entree Chicago data
  - trace of critiquing interactions
  - 50,000 sessions
  - also 20,000 multi-visit sessions
  - about 280k total "ratings"
- 5x 50% partition of sessions
  - 6 conditions
  - 5, 10, 15 ratings in single session
  - 10, 20, 30 ratings in multi-visit sessions

Algorithms

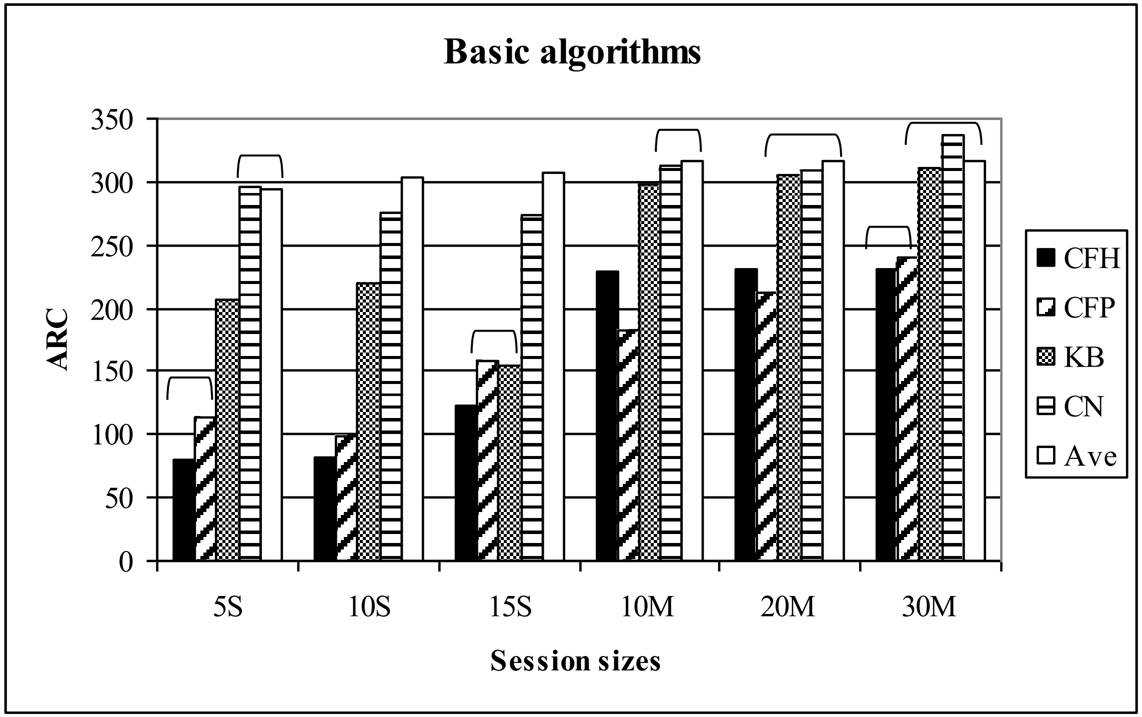
- CFP
  - kNN Collaborative filtering k=50, Pearson's r correlation
- CFH
  - kNN Collaborative filtering k=50, semantic metric
- CN
  - Content-based recommendation, naive Bayes
- KB
  - Knowledge-based recommendation using Entree engine
  - Use a similarity-based query from the last item in the session
    - not the endpoint

Take critique similarity into account

How to evaluate?

- Convert user actions to ratings
  - critiques = negative ratings
  - start / end points = positive ratings
- Many more negative than positive
- Task
  - make a good recommendation based on available data
  - standard metrics not a good fit (prec/recall, MAE)
  - average rank of correct recommendation (ARC)
    - MRR would have been better

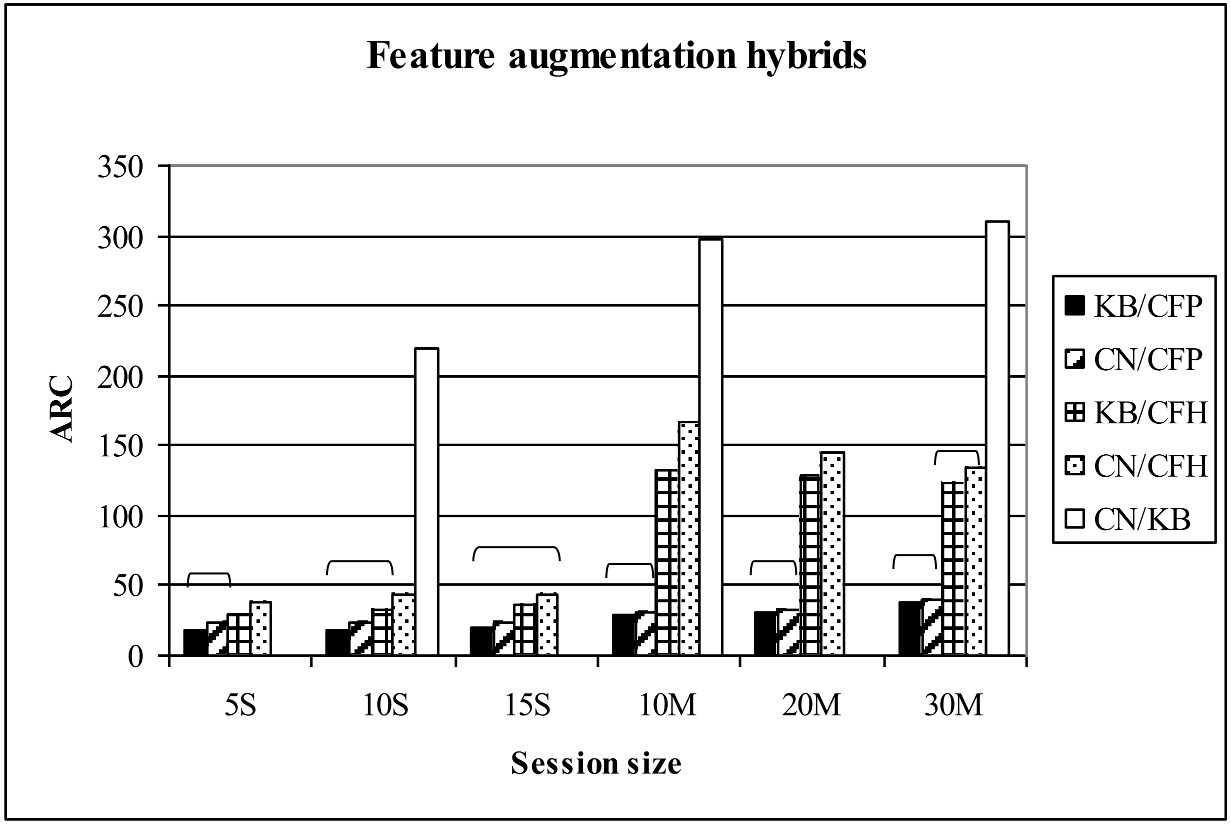
Baseline results



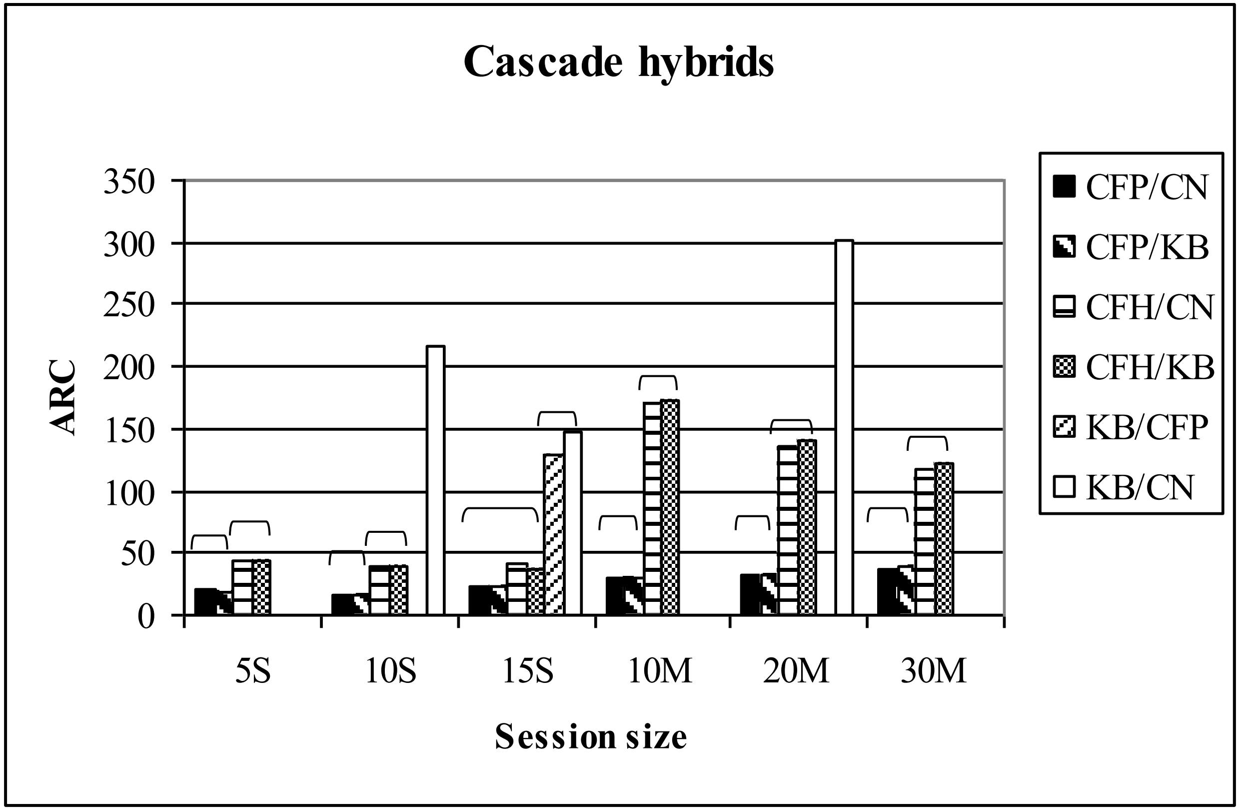
Analysis

- Difficult recommendation task
  - classic cold-start situation
- Stronger recommenders
  - CFH, CFP
- Weaker
  - CN, KB

Feature Augmentation



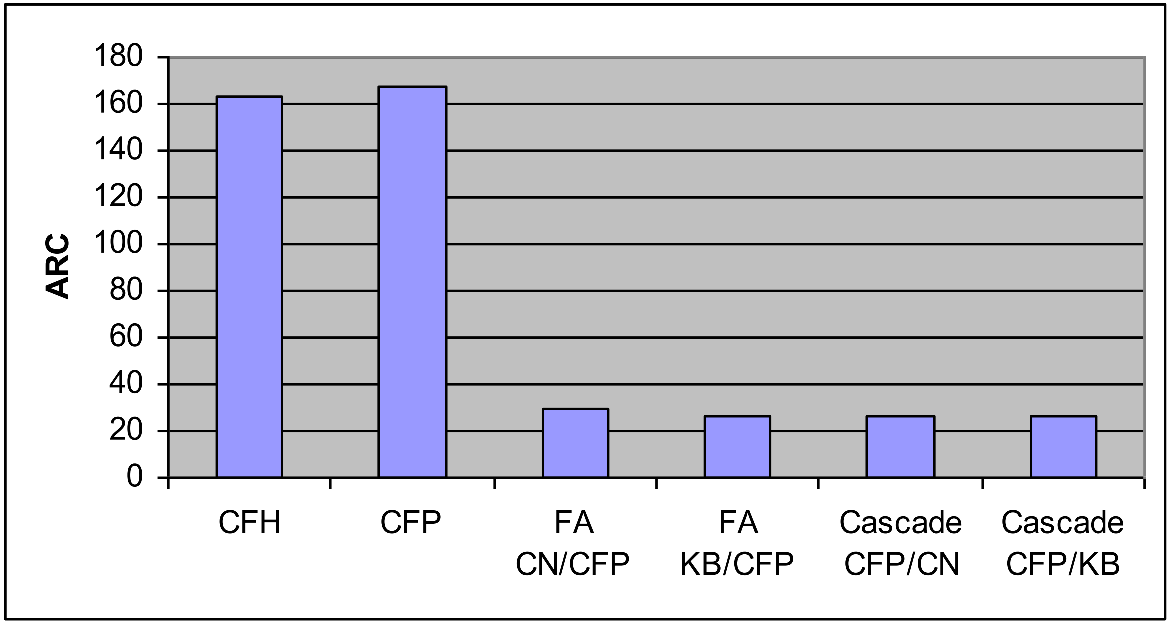
Cascade results



Summary

- Effective
  - Feature Augmentation
  - Cascade
- Ineffective
  - Weighted, Switching, Feature Combination, and Meta

Do Hybrids Work?



Best hybrids?

- Feature augmentation/Cascade
- Why?
  - priority relationship between recommenders
  - makes the most of weak/strong combinations
- Other hybrids?
  - not compatible with this domain/data set

Criteria

- Uniformity of performance
  - across item / user space
- Relative accuracy
  - over training data

	Uniform	~Uniform
Equally accurate	Weighted, Mixed, Meta-level	Switching
Unequal	Weighted, Augmentation, Cascade	Switching, Combination, Augmentation, Cascade