

Navigation-by-Preference

A New Conversational Recommender with Preference-based Feedback

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Goal:

- To investigate the role of a *preference-based* conversational recommender using unstructured item representation to help user reveal her short-term preferences, while minimizing the effort of reaching an item of interest.

Motivation:

- The process by which a user selects an item to consume (e.g. a movie to watch) is often an iterative one which motivates the use of conversational systems.
- Most conversational recommenders navigate through items that have structured representations using user's *preferences or critiques*.
- Preference* (where user simply selects one of the current recommendations) is the simplest form of feedback. This simplicity for the user means ambiguity for the system with no explicit feedback about the features.
- Preference-based* item navigation for unstructured representations (set of keywords) is not explored until now.

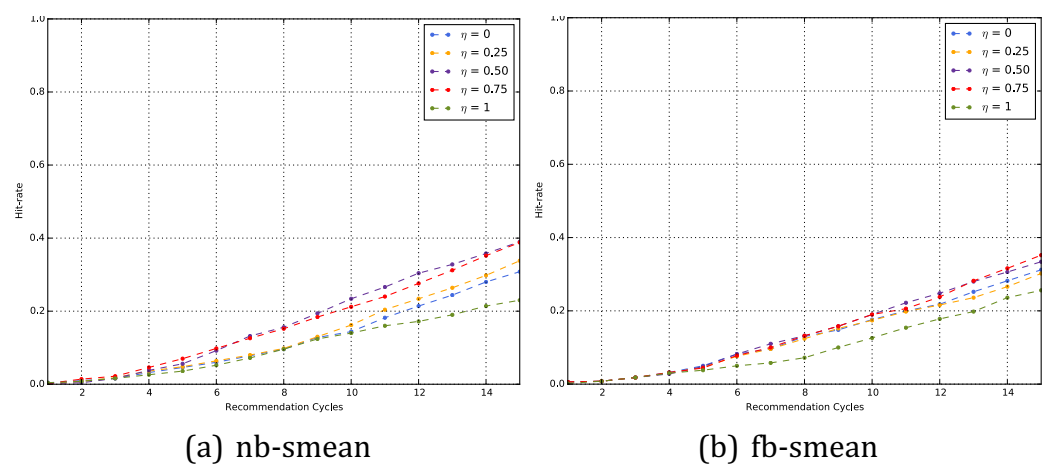
Methodology:

- We have proposed Navigation-by-Preference (*n-by-p*): a conversational recommender that:
 - uses preference-based feedback.
 - works on unstructured item representations.
 - is highly configurable in combining user's long-term with her short-term preferences.
- We have modeled the recommendation problem as a maximum set-cover problem and have proposed two versions of *n-by-p*:
 - feature-based (fb)*: we aim to cover a seed item's set of features.
 - neighbour-based (nb)*: in which we aim to cover the seed's set of neighbours (i.e. similar items).
- The basic idea of *n-by-p* can be understood from the figure below.



Experimental Results:

- We ran an offline experiment on a movie domain dataset, with simulated users, that selected the best of 60 different configurations for each of the two versions of *n-by-p*.
- The graphs show the performance of both the approaches with one of the best version of *n-by-p*: *weighted similarity-mean (smean)*.
- It can be seen that the *hit-rate* increases as system receives more user feedback over the course of interaction; however, the slope is greater for *neighbour-based smean (nb-smean)*.



- Then, we used a web-based system to conduct a user trial with a novel protocol.
- In a between-subject trial, we evaluated the best performing systems from both the versions and compared them against their corresponding short-term only versions ($\eta = 0$).
- 204 (51 for each system) participants finished the trial.

n-by-p version	Faml. (%)	Rel. (%)	Srdp. (%)	Effc. (%)	Sats. (%)
nb-smean@0.5	62.8	76.5	64.7	62.7	64.7
nb-smean@0.0	54.9	49	41.2	49	58.9
fb-smean@0.75	52.9	68.6	43.1	51	62.7
fb-smean@0.0	52.9	58.8	37.3	47	58.8

Conclusion & Future Work:

- Both online and offline experiment results showed that the neighbour-based configuration:
 - which combines short-term preferences with long-term preferences,
 - that uses both positive and negative feedback, and
 - that uses previous rounds of feedback,produces more accurate and serendipitous recommendations without greater effort from its users.

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