

Serendipitous Recommendation for Scholarly Papers Considering Relations Among Researchers

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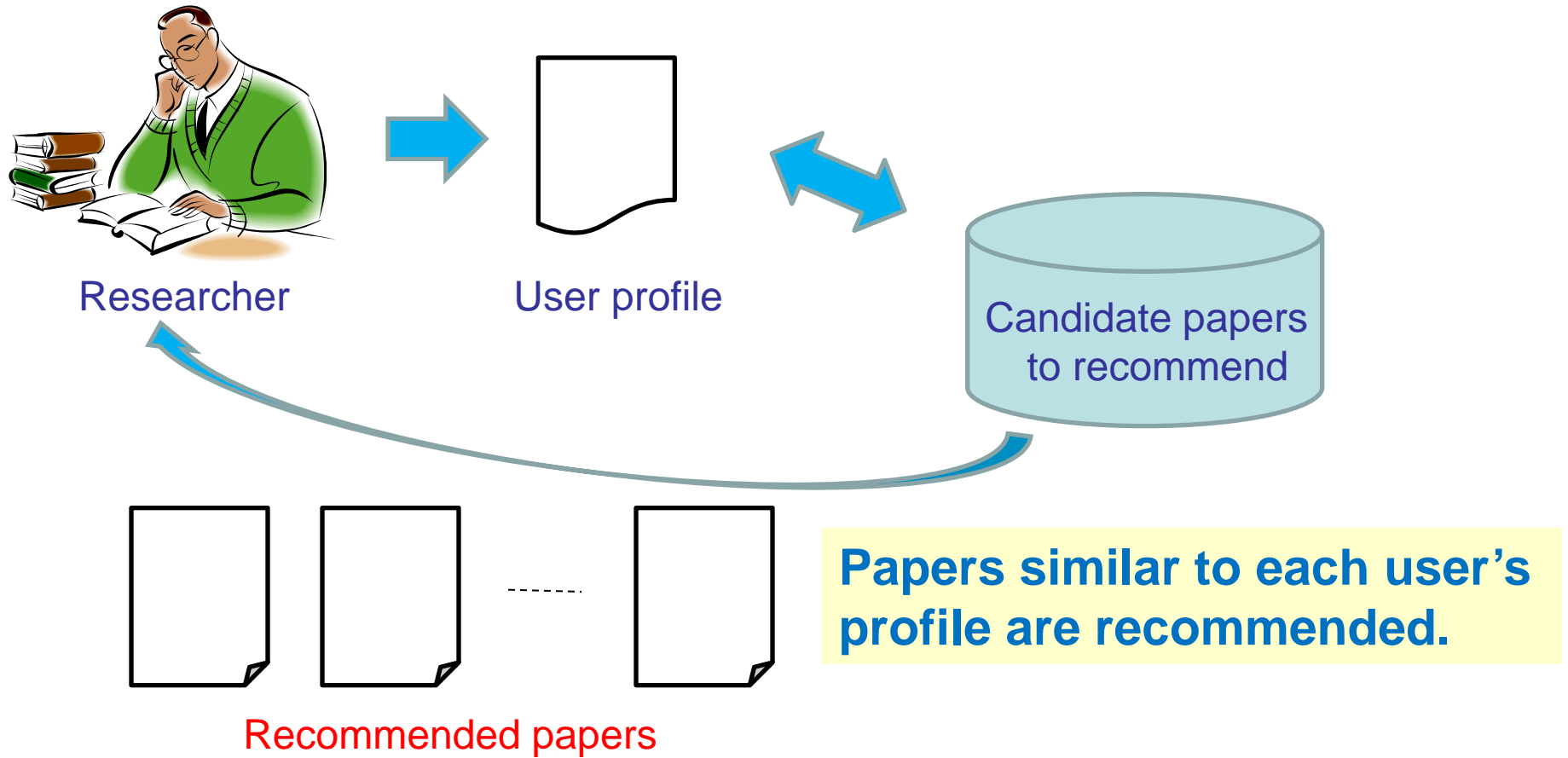


National University of Singapore



Introduction

Content-based Recommendation



Introduction

[Sugiyama and Kan, JCDL'10]



Publication list

[No published papers
in the past]

('11)



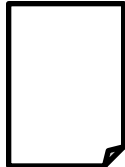
**Broaden their range of
research interests.**

Junior researcher (having only one recently published paper)

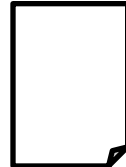


Publication list

('01)



('02)



('11)



**Seek to apply their
knowledge towards
other areas.**

Senior researcher (having several past published papers)

Serendipitous recommendation is important.

Introduction

When we find something serendipitous?

Advice from colleagues



Serendipitous discovery:
Interactions with others
play an important role.

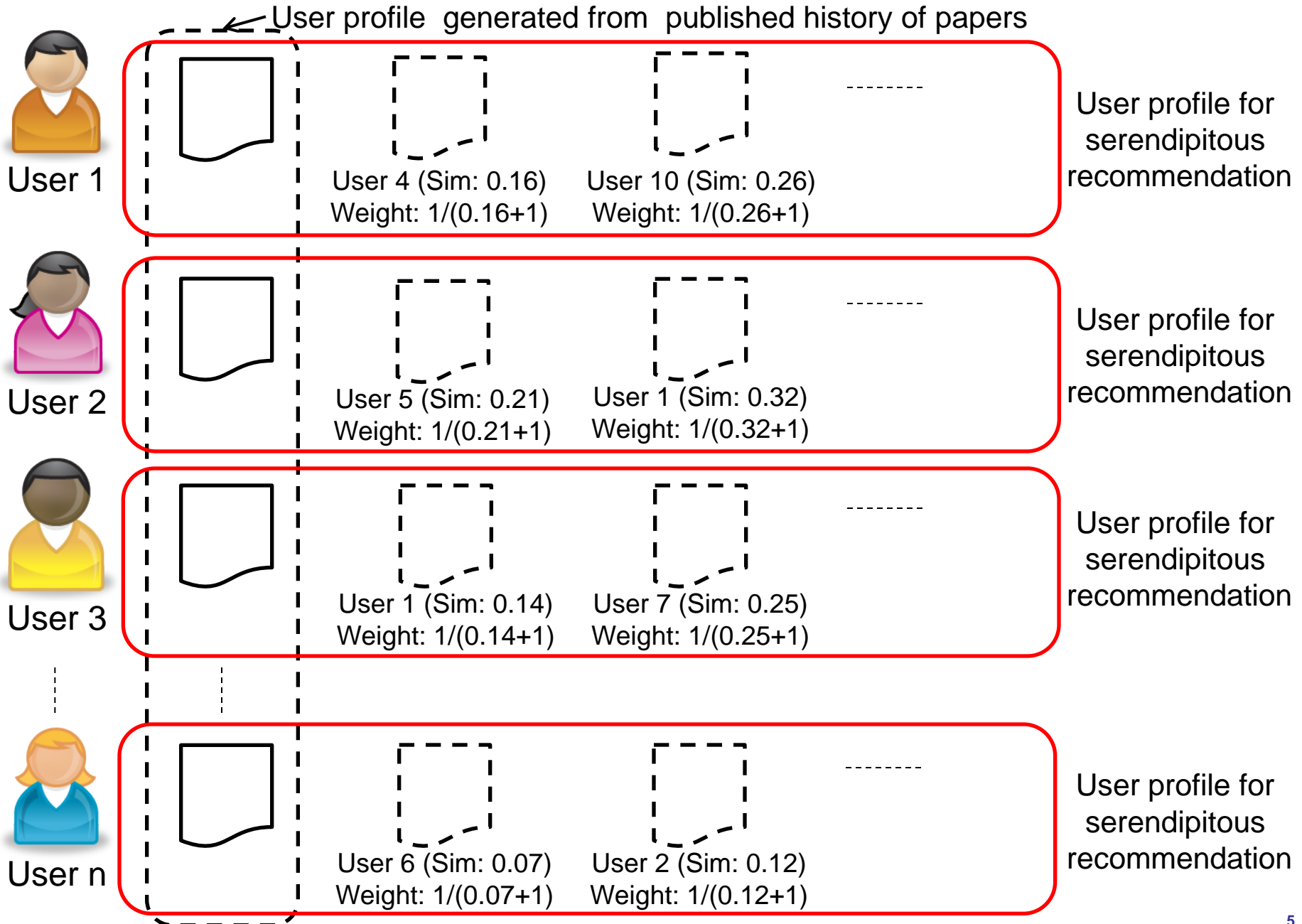
Attend seminars



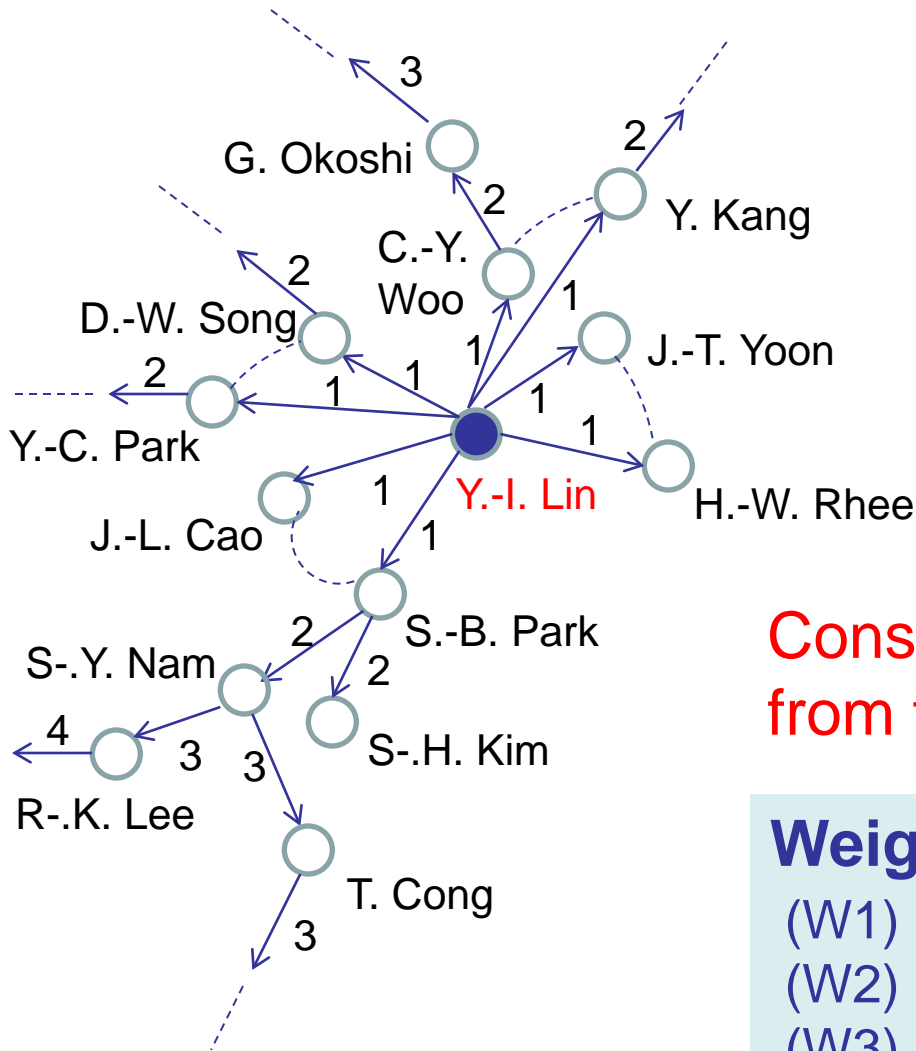
User profile construction
for serendipitous
recommendation with others

- I. Dissimilar users
- II. Co-author network

User Profile Construction via Dissimilar Users (DU)



User Profile Construction via Co-author Network (CAN)

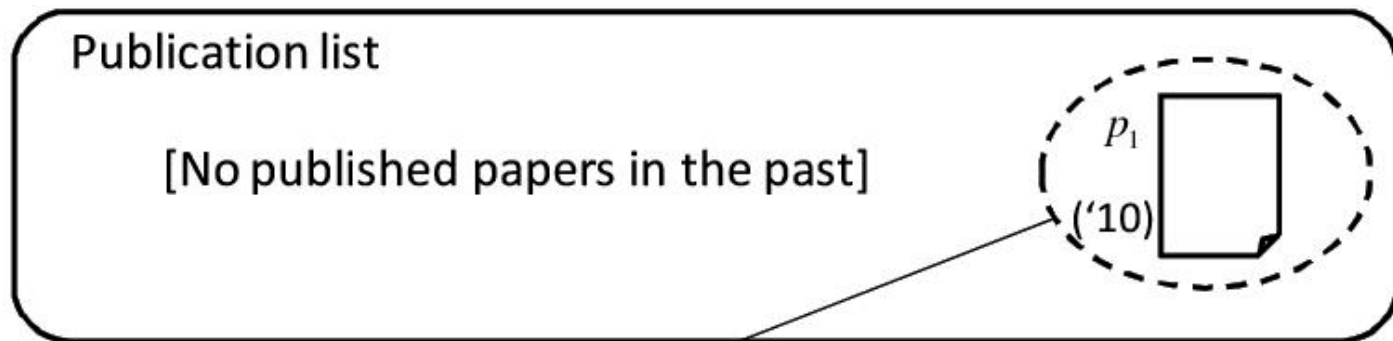


Consider only radial network from the target researcher, “Y.I. Lin”

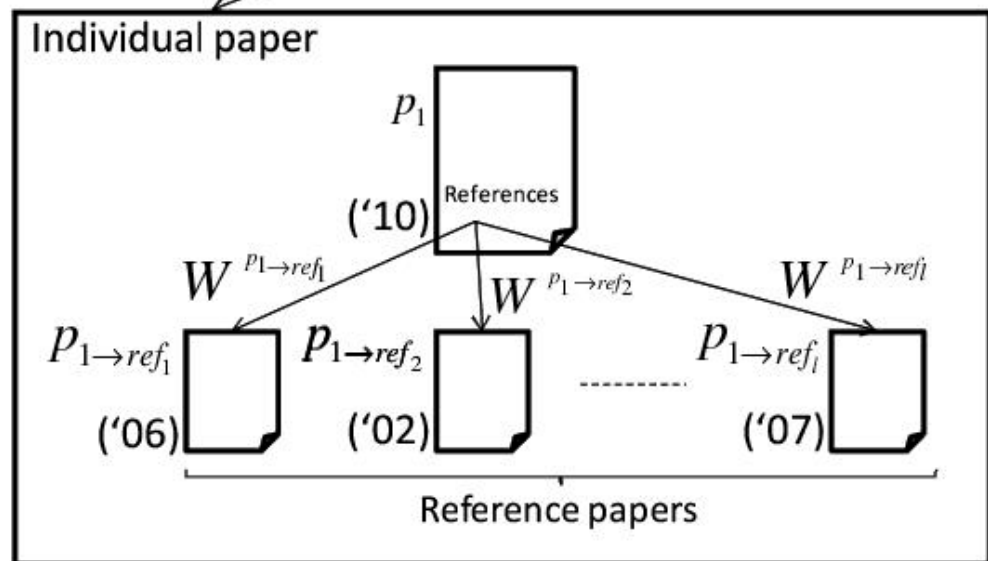
Weighting scheme

- (W1) Linear Combination (LC)
- (W2) Reciprocal of Path Length (RCP-PL)
- (W3) Reciprocal of Similarity (RCP-SIM)
- (W4) Product of W2 and W3 (RCP-PLSIM)

Basic User Profile Construction (Junior Researchers)



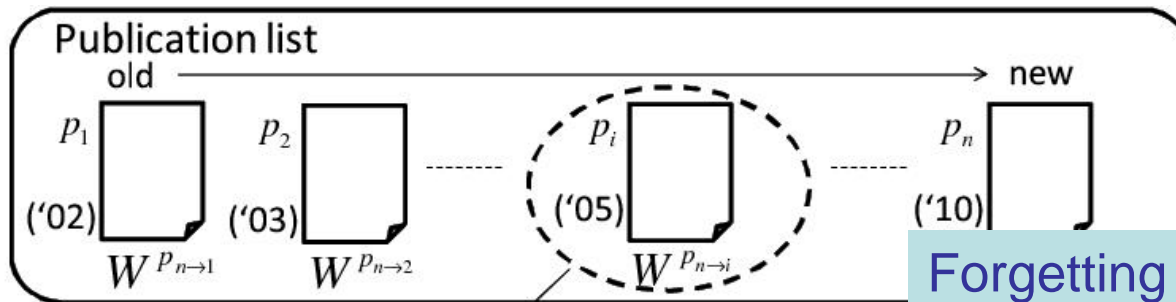
Relation between
reference papers
and P_1



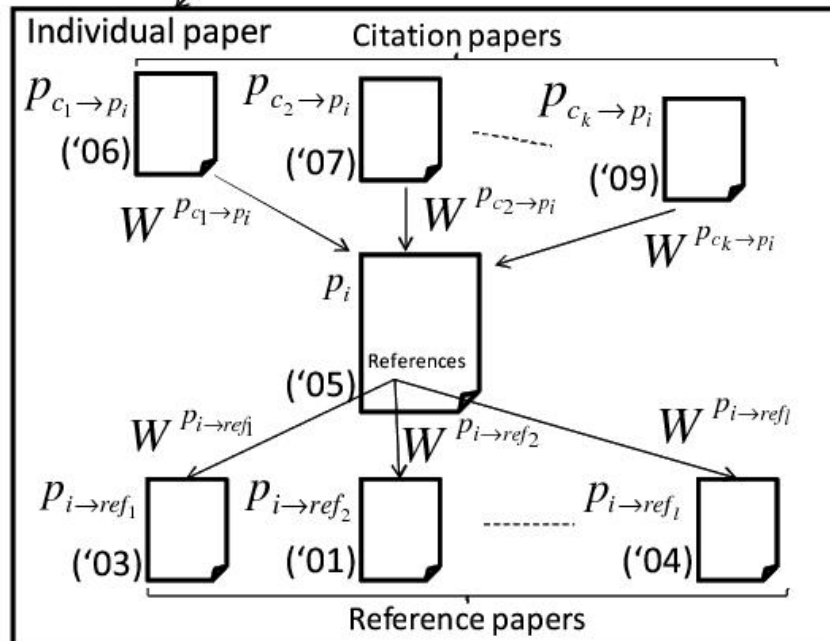
Weighting scheme

- Linear combination
- Cosine similarity
- Reciprocal of published year

Basic User Profile Construction (Senior Researchers)



Relation between citation or reference papers and P_i



Weighting scheme

- Linear combination
- Cosine similarity
- Reciprocal of published year

Experiments

Experimental Data

- **Researchers**

- 15 junior researchers
- 13 senior researchers

NLP and IR researchers who have publication lists in DBLP

- **Candidate Papers to Recommend**

ACL Anthology Reference Corpus [Bird et al., LREC'08]

Includes information about citation and reference papers

Evaluation Measure

- Normalized Item Novelty (nITN@10)

Normalized Item Novelty

Item novelty (*ITN*) [Zhang and Hurley, RecSys'08]

$$ITN = \frac{1}{N} \sum_{j=1}^N d(\mathbf{P}_u^{srdp}, \mathbf{F}^{P_{rec j}})$$

Monotone increasing

\mathbf{P}_u^{srdp} : User profile

$\mathbf{F}^{P_{rec j}}$: Feature vector of the candidate paper to recommend

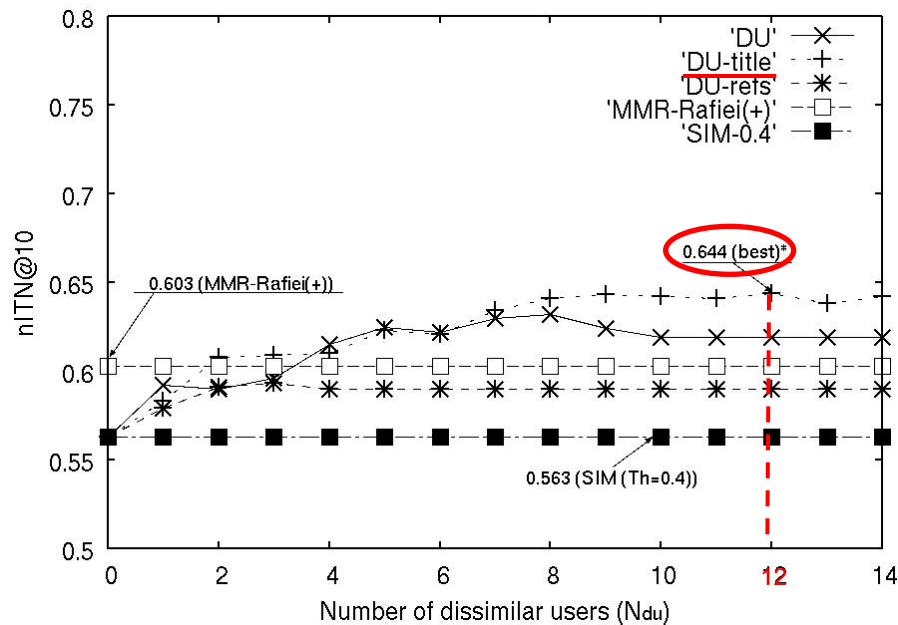
Normalized item novelty (*nITN*)

$$nITN = \frac{1}{N} \sum_{j=1}^N \frac{d(\mathbf{P}_u^{srdp}, \mathbf{F}^{P_{rec j}})}{\max d(\mathbf{P}_u^{srdp}, \mathbf{F}^{P_{rec j}})}$$

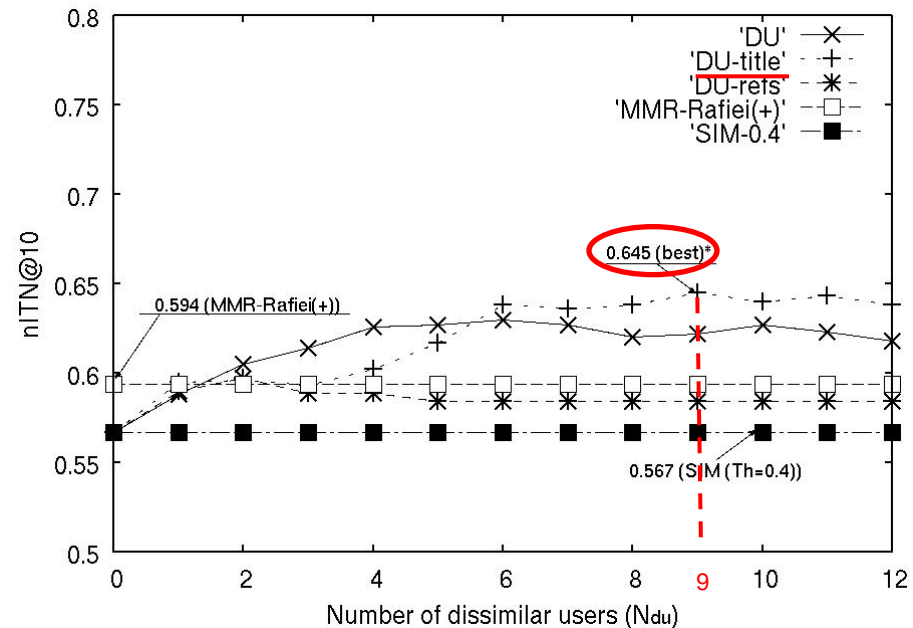
Avoid monotone increasing

Results with Dissimilar Users (DU)

[Item novelty@10]



[Junior researchers]

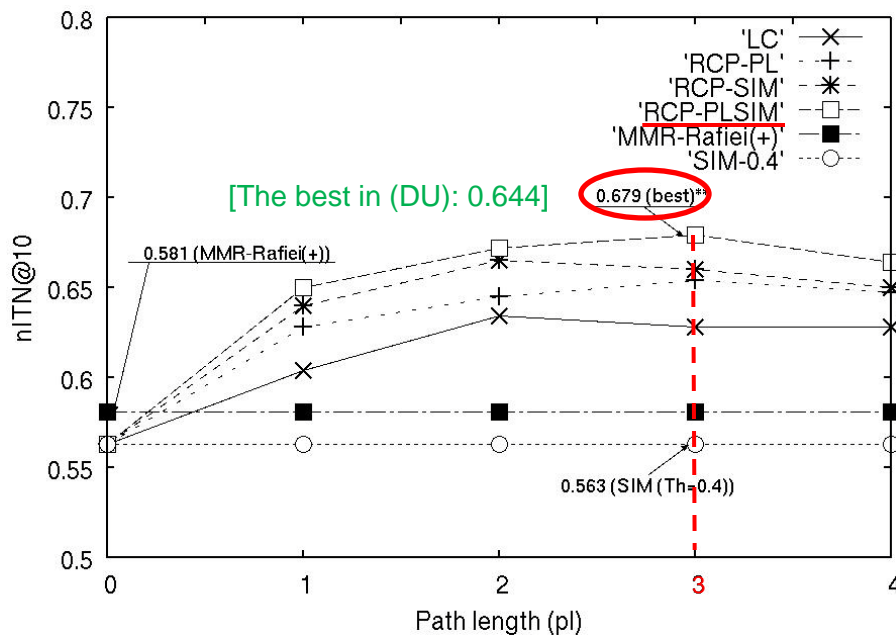


[Senior researchers]

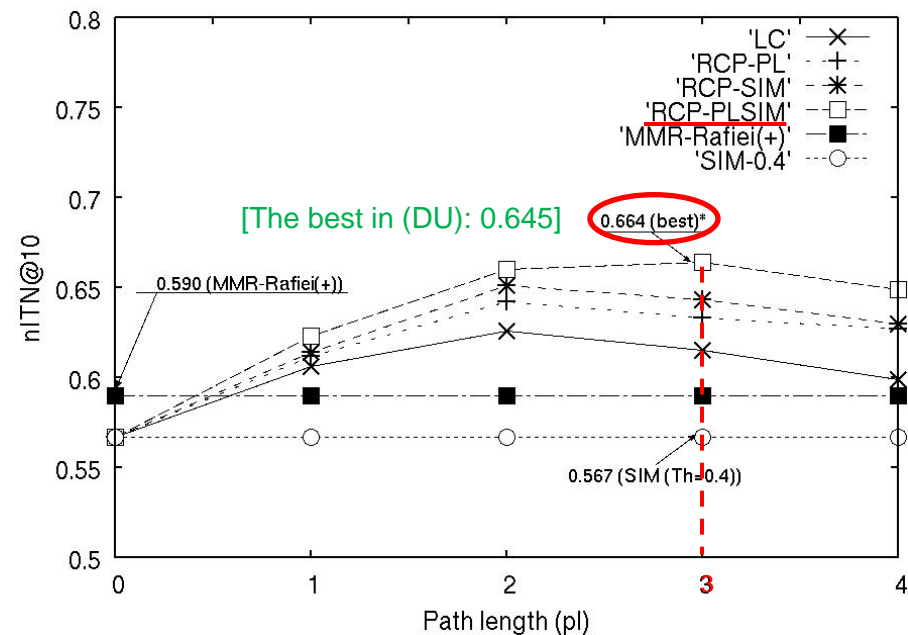
User profiles that contain a variety of topics can be constructed by using more dissimilar users.

Results with the Co-author Network (CAN)

[Item novelty @ 10]



[Junior researchers]



[Senior researchers]

(CAN) is more effective approach to constructing user profile for serendipitous recommendation rather than (DU).

Examples of Serendipitous Recommendation

	Recommended topics
Junior researcher (Major research topic: discourse analysis)	<ul style="list-style-type: none">• Noun phrase chunking• Collocation• Term Recognition
Senior researcher (Major research topic: sentiment analysis)	<ul style="list-style-type: none">• Knowledge acquisition• Relation extraction in named entities• Relation extraction in <u>biomedical text</u>

It is highly possible that he can discover something new and helpful.

Conclusion

- Propose constructing user profile for serendipitous recommendation that considers relations among researchers
 - Dissimilar users
 - Co-author network
- Observe serendipitous nature of the recommendation

Future Work

- Construct user profile that provides highly accurate recommendation of serendipitous papers
- Expand the kinds of candidate papers to recommend

Thank you very much!