Applying Expert for Recommending Items

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Introduction

Source : www.executivechase.in, www.blu-amp.com

Introduction (cont.)

Collaborative filtering

users

items	w	x	y	z
a	4	3		
b		4		1
c			3	4
d	2	4		

Source : sal-garcia.com , limn.it

Introduction (cont.)

Friends

Experts

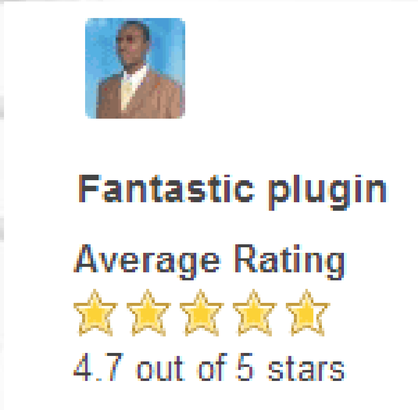
Source : www.tictacphoto.com , www.dooddot.com

Introduction (cont.)

Frequency of Rating

Social Network

User/Movie	Movie 1	Movie 2	Movie 3	Movie 4	Movie 5
User 1	1				3
User 2	5		4		
User 3		4			5
User 4				4	
User 5		4	3	5	
User 6	2		3	5	4



User Rating

Source : blogs.worldbank.org , powerelite.blog.163.com/blog/static , www.inkthemes.com

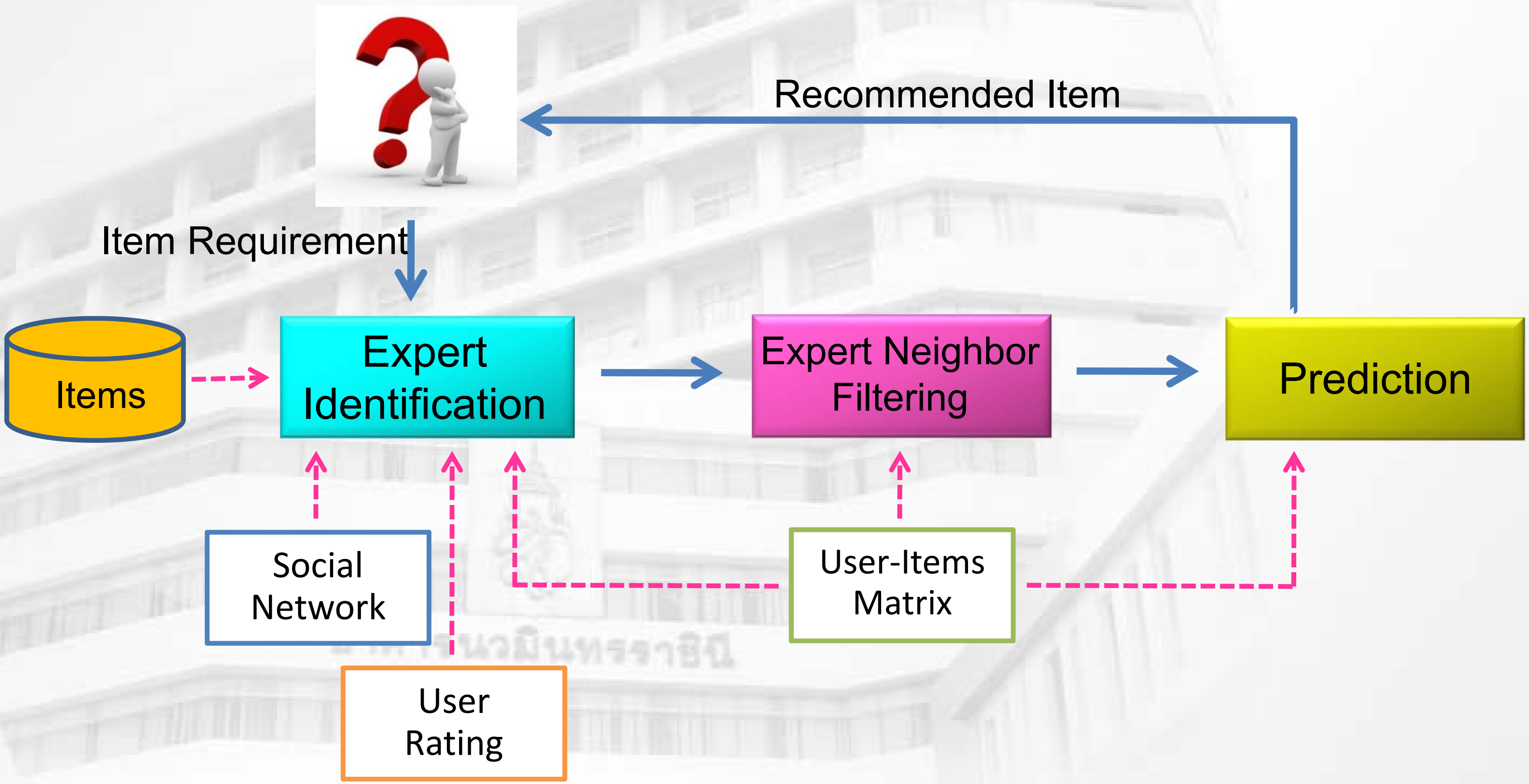
Related Work

- Recommender System
  - Collaborative filtering
  - Content-based filtering
  - Hybrid filtering
- Friends VS Experts

Related Work

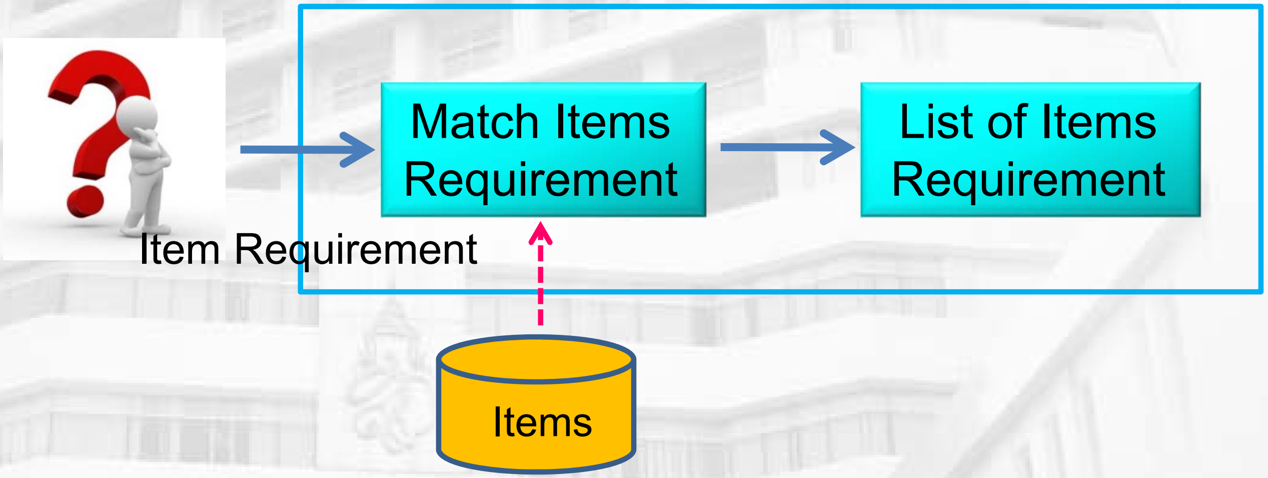
- Applying Experts in Recommender system
  - Recommend expert
  - Develop recommender system
- Experts Identification
  - Reputation (Social Network)
  - Himself (Frequency of Rating)
  - Another person (User Rating)

Proposed Approach



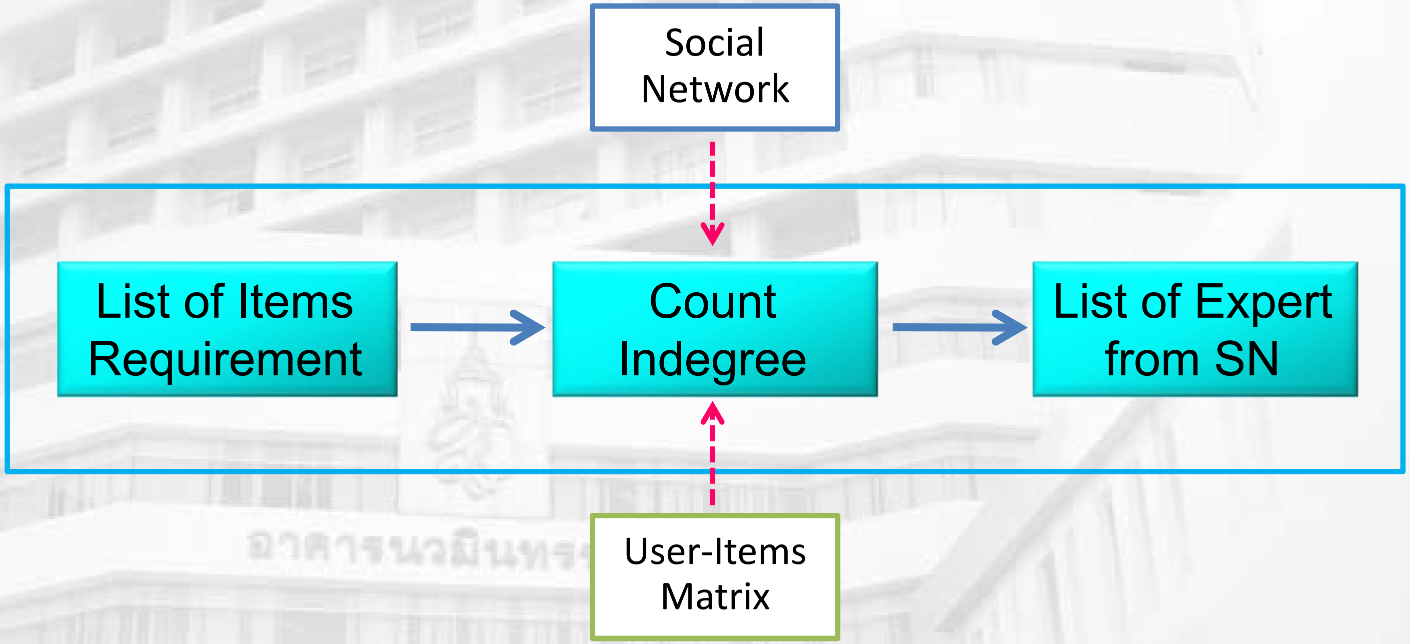
Proposed Approach (cont.)

Expert Identification



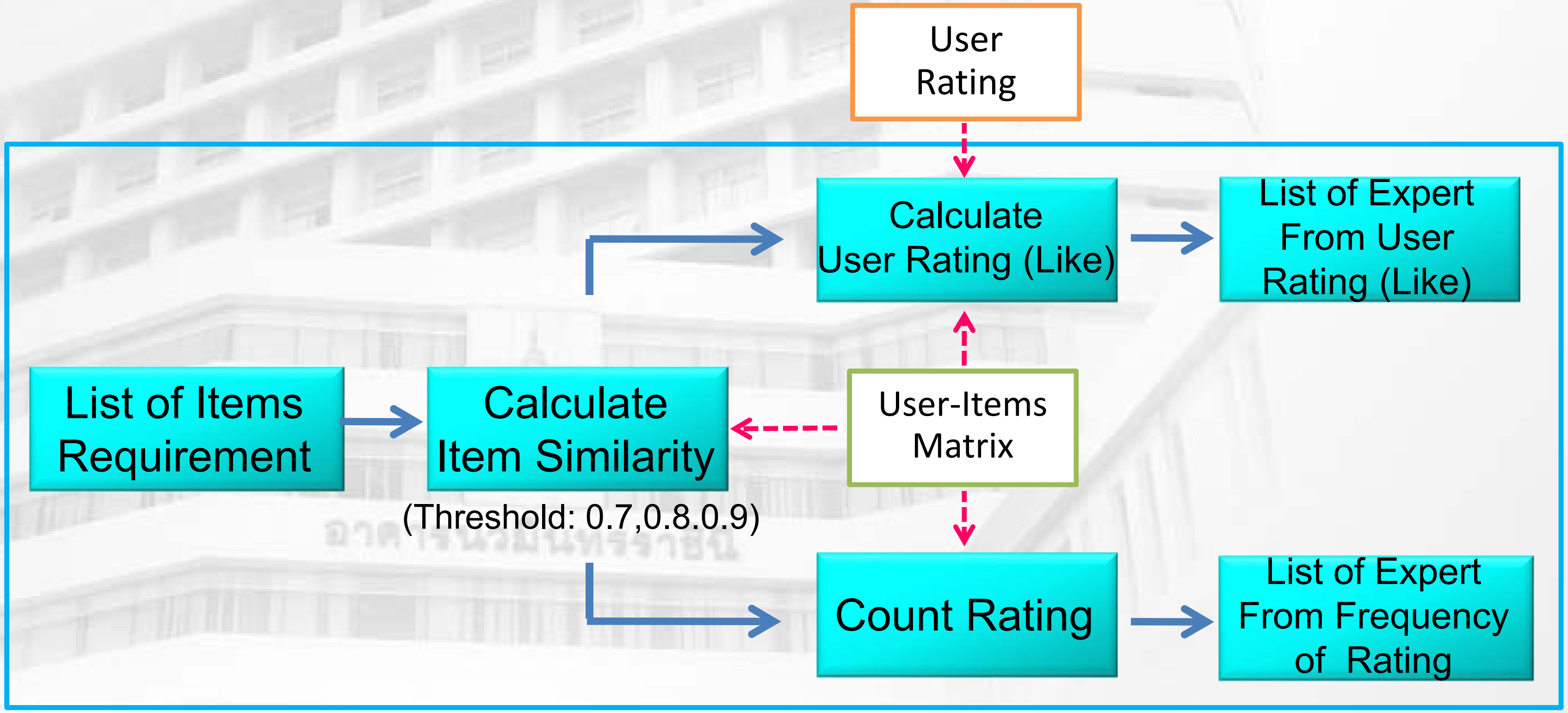
Proposed Approach (cont.)

Expert Identification (cont.)



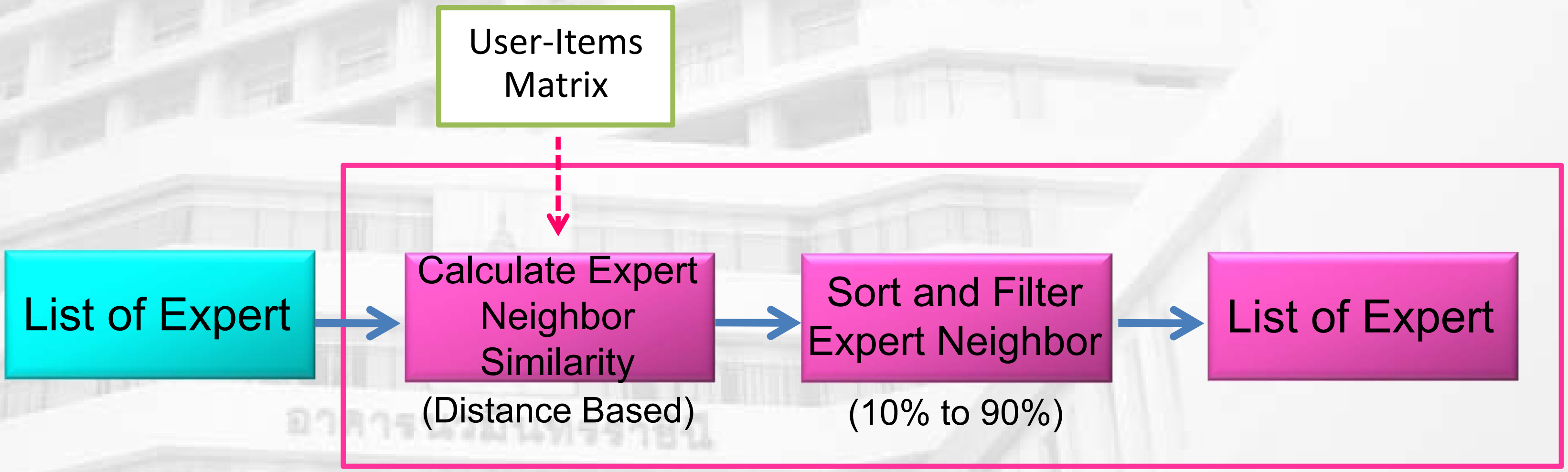
Proposed Approach (cont.)

Expert Identification (cont.)



Proposed Approach (cont.)

Expert Neighbor Filtering



Proposed Approach (cont.)

Prediction

User-Items Matrix

List of Expert → Predict Result → Result of Prediction → 

$$P_{a,x} = \overline{R_a} + \frac{\sum_{b=1}^{N}(Similarity_{a,b} \times (R_{b,x} - \overline{R_b}))}{\sum_{b=1}^{N}(Similaity_{a,b})}$$

[1,5]

Recommended Item

Proposed Approach (cont.)

Comparison

Evaluation :

– Expert Identification based on Social Network
– Expert Identification based on Frequency of Rating *
– Expert Identification based on User Rating*

* with Item Similarity threshold 0.7,0.8,0.9

Proposed Approach (cont.)

Comparison

Consideration:

- Mean Absolute Error (MAE)
- Root Mean Square Error (RMSE)
- Accuracy (%)
- Precision
- Recall

Experiment

Experimental Setup

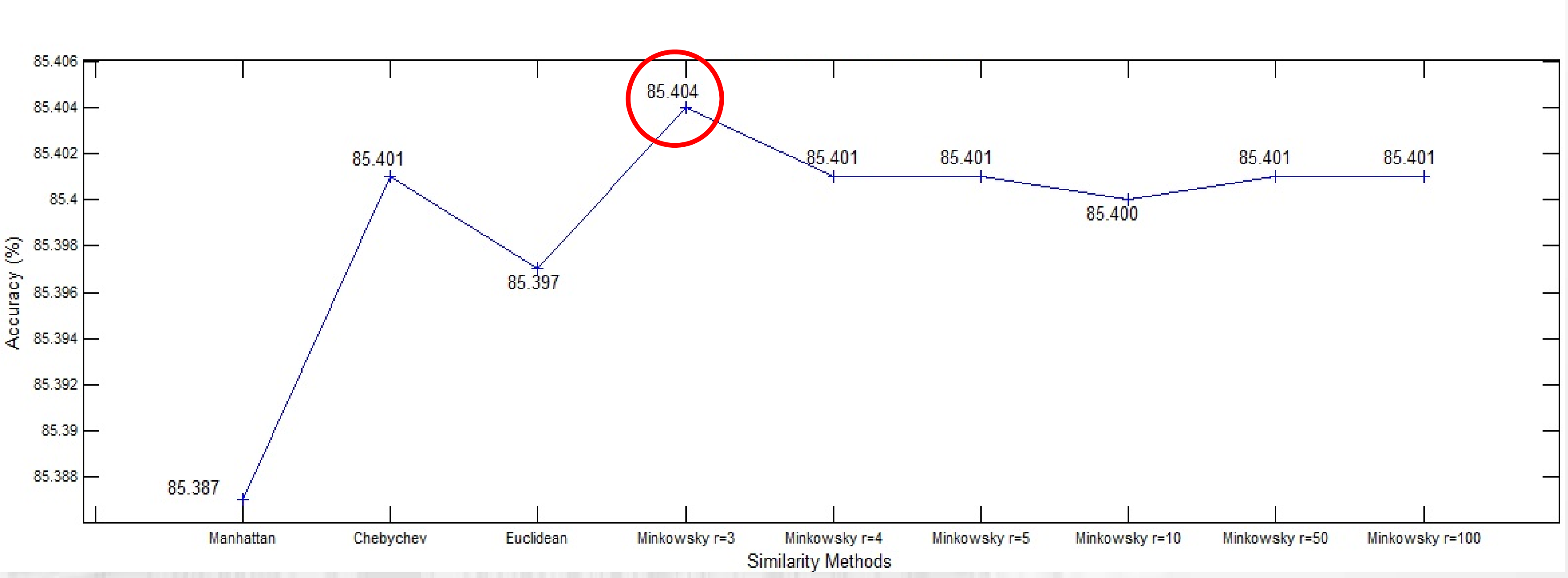
– Epinion dataset
(user 20,355 ; Item 30,738 ; Transaction 532,837)

– Divide data 5 folds

– Similarity Measure :
Distance based Similarity Measure
(Manhattan , Chebychev , Euclidean , Minkowsky)

Experiment (cont.)

Experimental Results (cont.)



Experiment (cont.)

Experimental Results

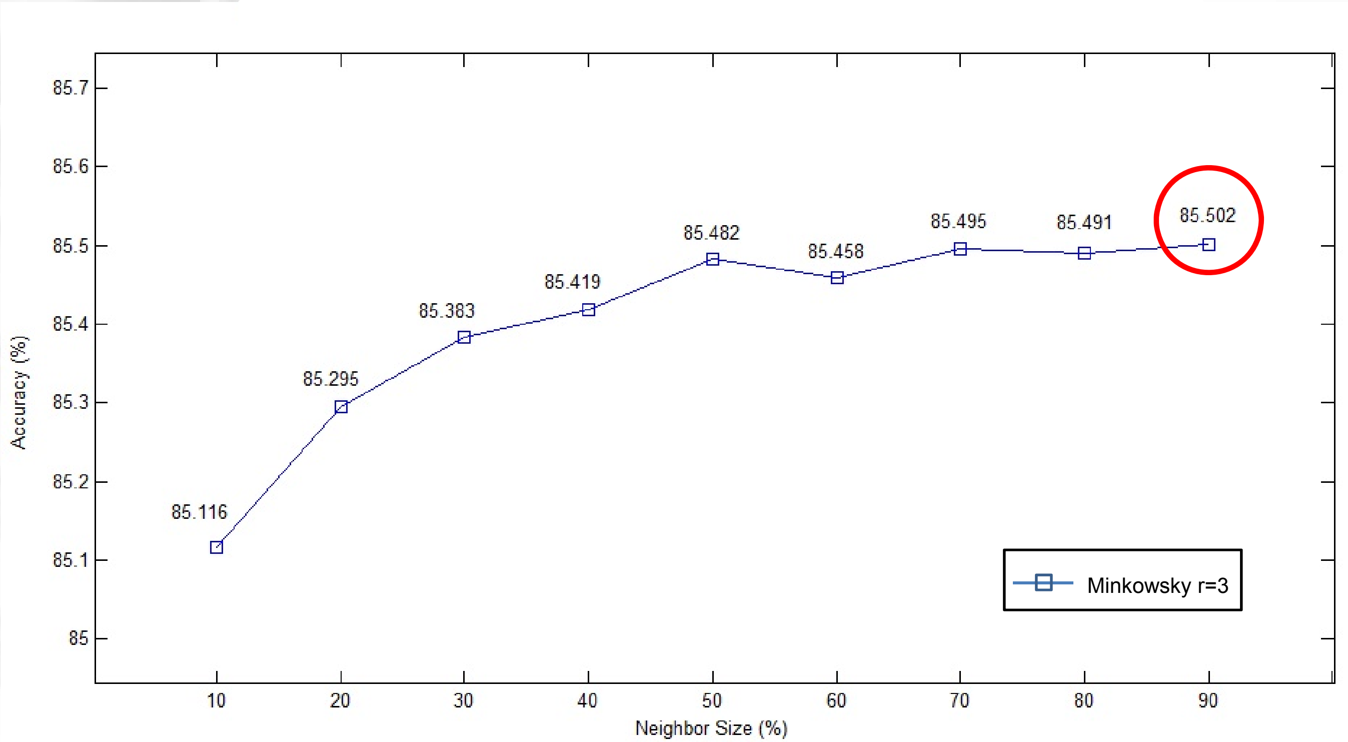
Experimental Results from Minkowsky Similarity (r=3)

Similairty by Minkowsky (r=3)	ESN	EF (0.7)	EF (0.8)	EF (0.9)	EL (0.7)	EL (0.8)	EL (0.9)
Average MAE	0.147	**0.146**	0.146	0.146	0.148	0.147	0.147
Average RMSE	0.383	0.382	0.382	0.382	0.384	0.384	0.384
Average Accuracy (%)	85.297	**85.404**	85.402	85.402	85.236	85.251	85.268
Average Precision	0.979	0.984	0.984	0.984	0.978	0.978	0.979
Average Recall	0.866	0.864	0.864	0.864	0.867	0.867	0.866

* ESN : Expert from SN ,
EF: Expert from Frequency of Rating ,
EL : Expert from User Rating (Like)

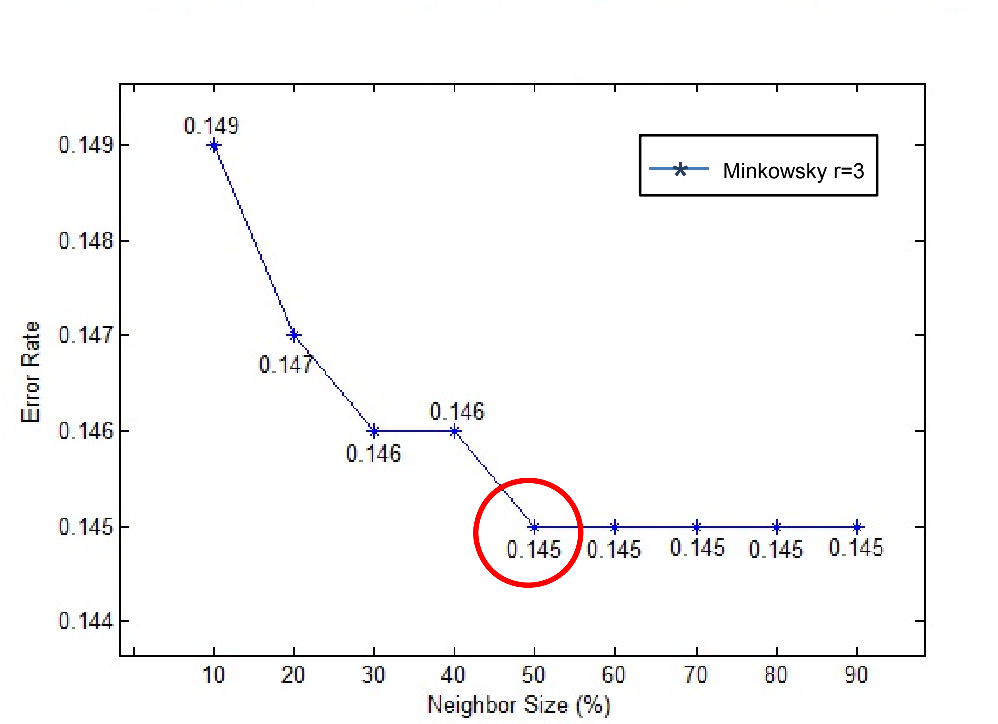
Experiment (cont.)

Experimental Results (cont.)



Experiment (cont.)

Experimental Results (cont.)

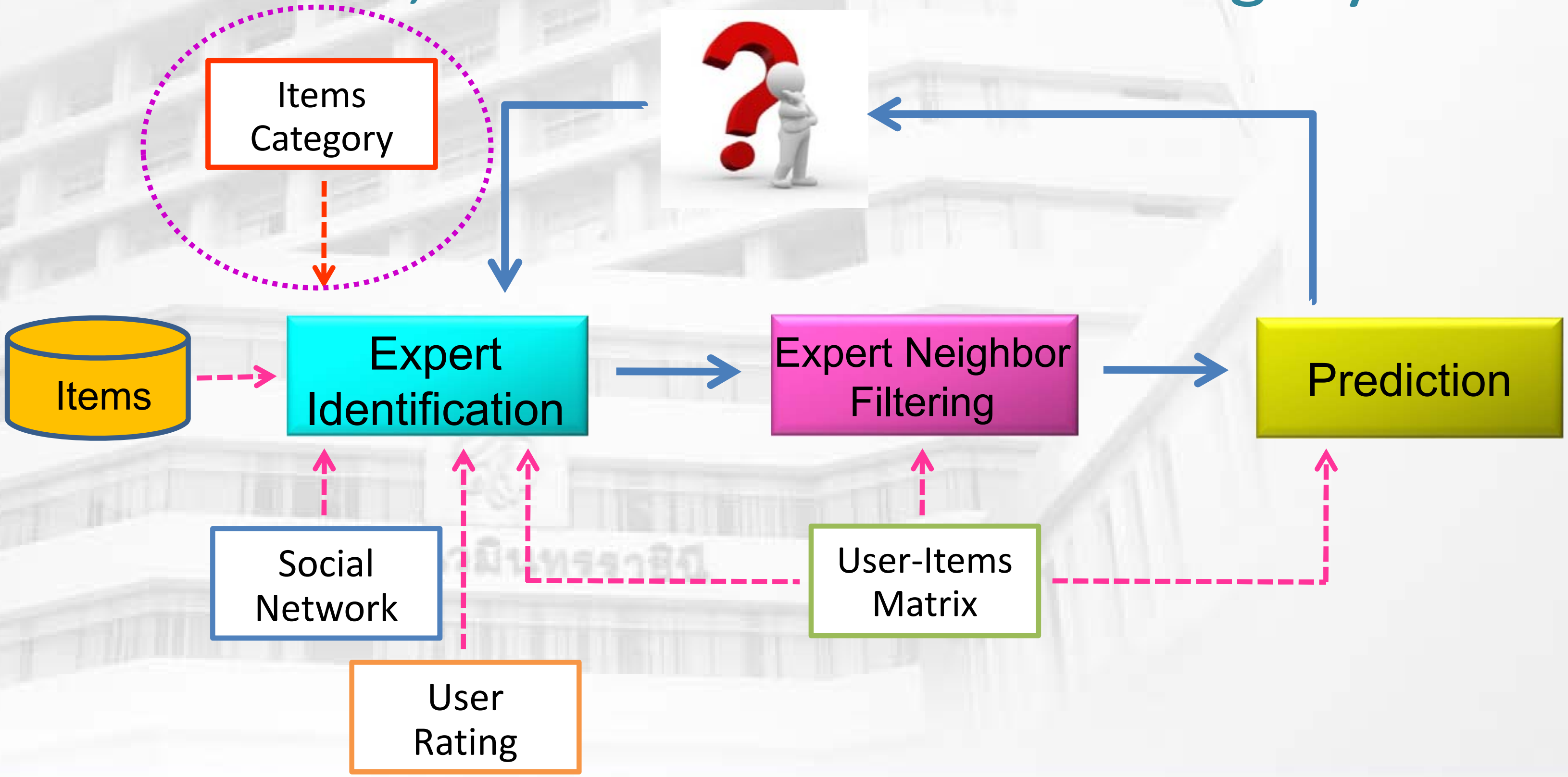


Conclusion

- The contribution of this research is present an applying expert for recommending items
- Percentage of Accuracy are more than 80%
- The error rate of approximately 0.14
- Experts from frequency of rating method is more accurate than other methods

Conclusion (cont.)

- Future work, combination items category



for your attention.

Source : www.linkedin.com