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Real-world Translator Retrieval Framework

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Agenda

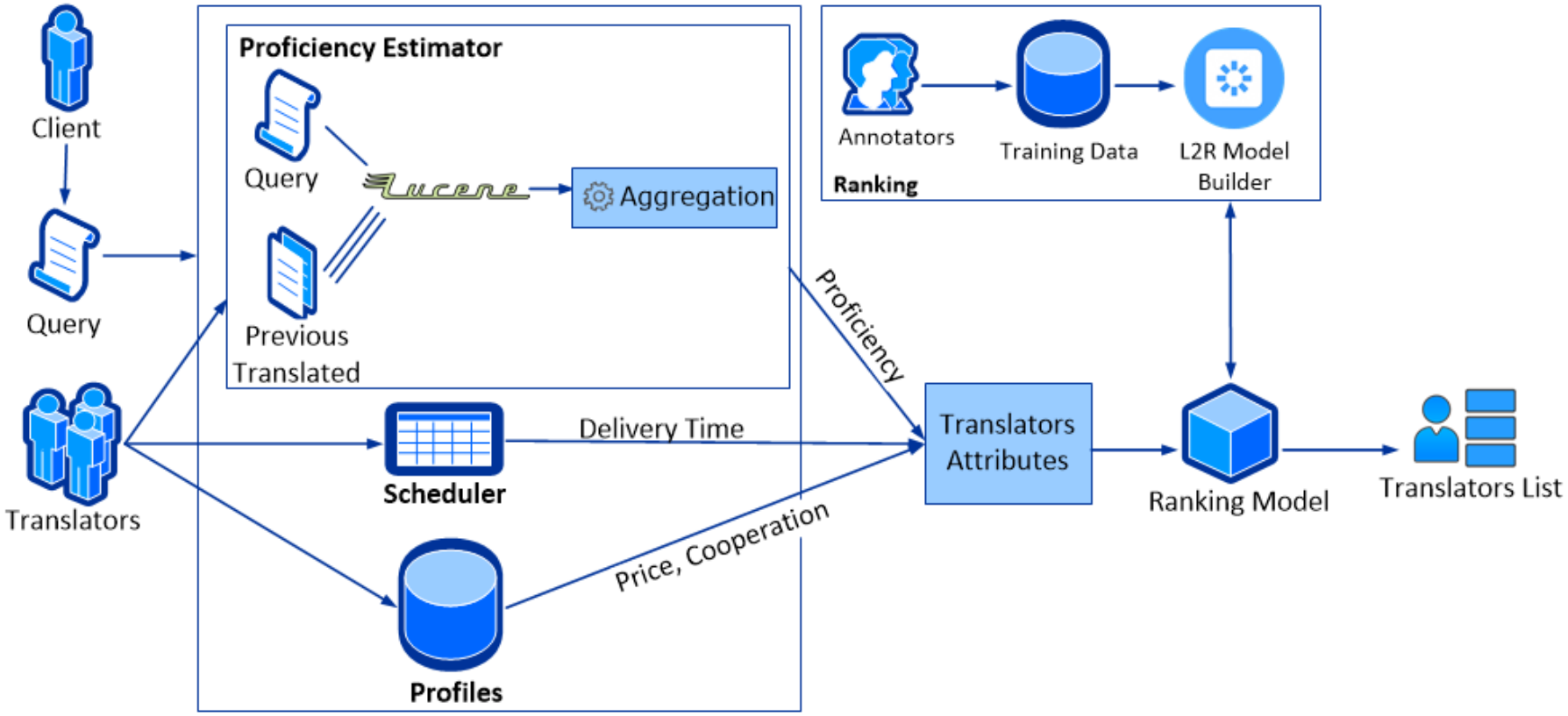
- Motivation
- Translation Expert Retrieval Platform
- Proficiency Estimator
  - Document Aggregation Methods
  - Experimental Results
- Translator Search
  - Data Annotation
  - Learning to Rank Methods
  - Experimental Results
- Conclusion

Motivation

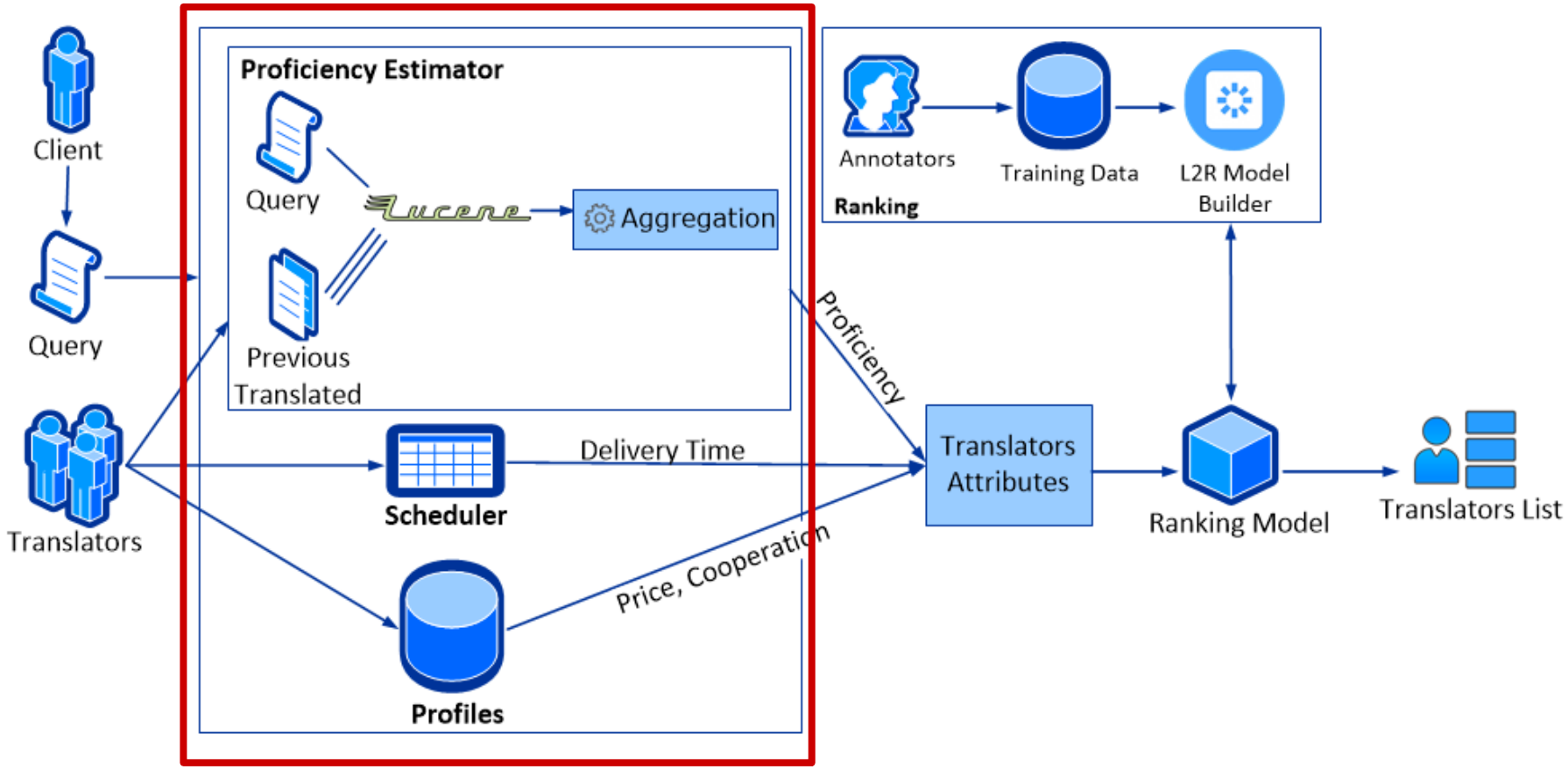
- A real-world, unmet, need:
  - Translation expert retrieval
  - Specific issues:
    - Proficiency estimation
    - Factor in other real-world aspects

- Context:
  - Existing online platform
  - Freelance translators

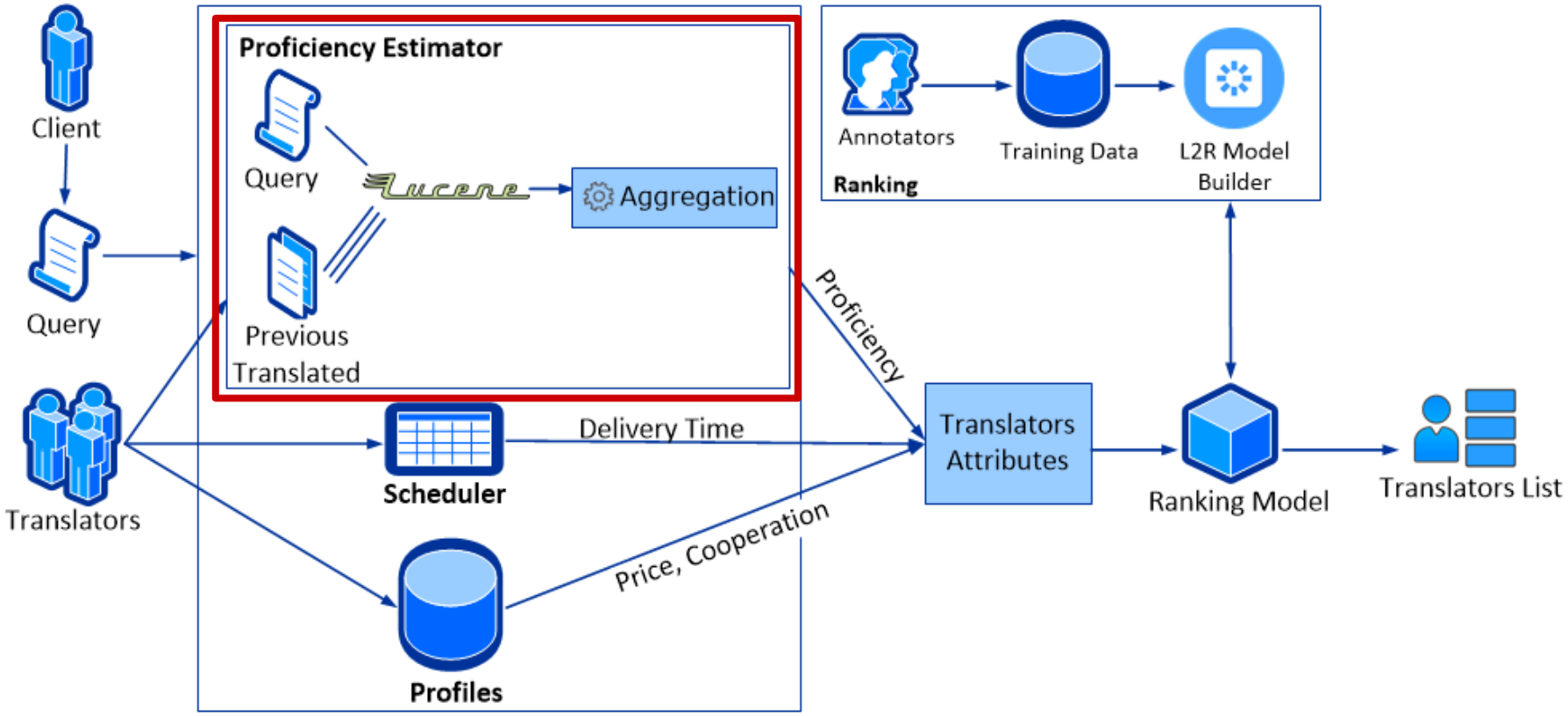
Translation Expert Retrieval Platform



Translation Expert Retrieval Platform

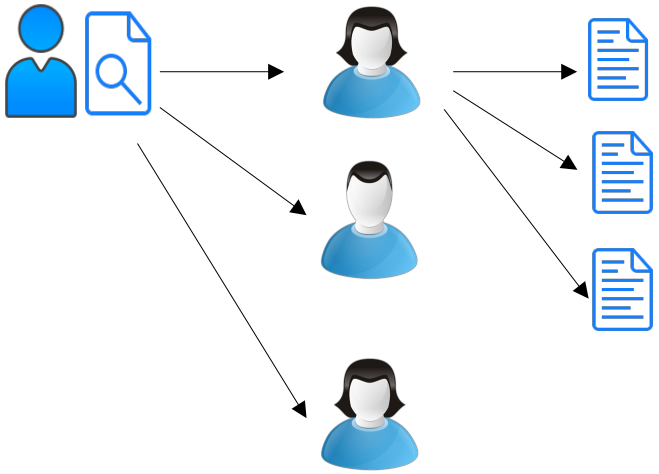


Translation Expert Retrieval Platform



Proficiency Estimator

- 10 language combinations
- 20 to 30 potential translators for each order
- Using Lucene for document similarity
- How to aggregate the documents in order to estimate translator's proficiency?



Document Aggregation Methods

- Top1
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- GP2
  - Cummins et al. (2010)
  - Study on expert search task of TREC
  - GP2 formula achieved by Genetic Programming
  - Effect of document's rank among all

Aggregation Methods – Golden Data

- 181 purchased orders
- The quality of each translation is assessed by a proof-reader
- Assessment from 1 (very poor) to 5 (great) from different translation aspects

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- Proof-readers' assessments as golden-data
- Comparing the correlation of each algorithm with the golden-data
- Correlation coefficient
  - Pearson rho
  - Kendall tau

Aggregation Methods – TOP1

- Example of five purchased orders
- Proof-readers' assessments vs. TOP1

Purchased Order ID	TOP1	Assessment
O1	14.291	4.8
O2	0.765	4.6
O3	0.339	4.4
O4	1.345	3.8
O5	9.588	4
...	...	...

Aggregation Methods – TOP5

- Example of five purchased orders
- Proof-readers' assessments vs. TOP5

Purchased Order ID	TOP5	Assessment
O1	11.284	4.8
O2	0.615	4.6
O3	0.133	4.4
O4	1.232	3.8
O5	8.083	4
...	...	...

Aggregation Methods – GP2

- Example of five purchased orders
- Proof-readers' assessments vs. GP2

Purchased Order ID	GP2	Assessment
O1	0.101	4.8
O2	0.11	4.6
O3	0.088	4.4
O4	0.081	3.8
O5	0.91	4
...	...	...

Proficiency Estimator - Results

		Top1	Top5	GP2
r_s	Correlation Test	0.052	0.089	0.145
	p-Value	0.4866	0.2295	0.05038
τ	Correlation Test	0.034	0.059	0.102
	p-Value	0.5157	0.2562	0.05263

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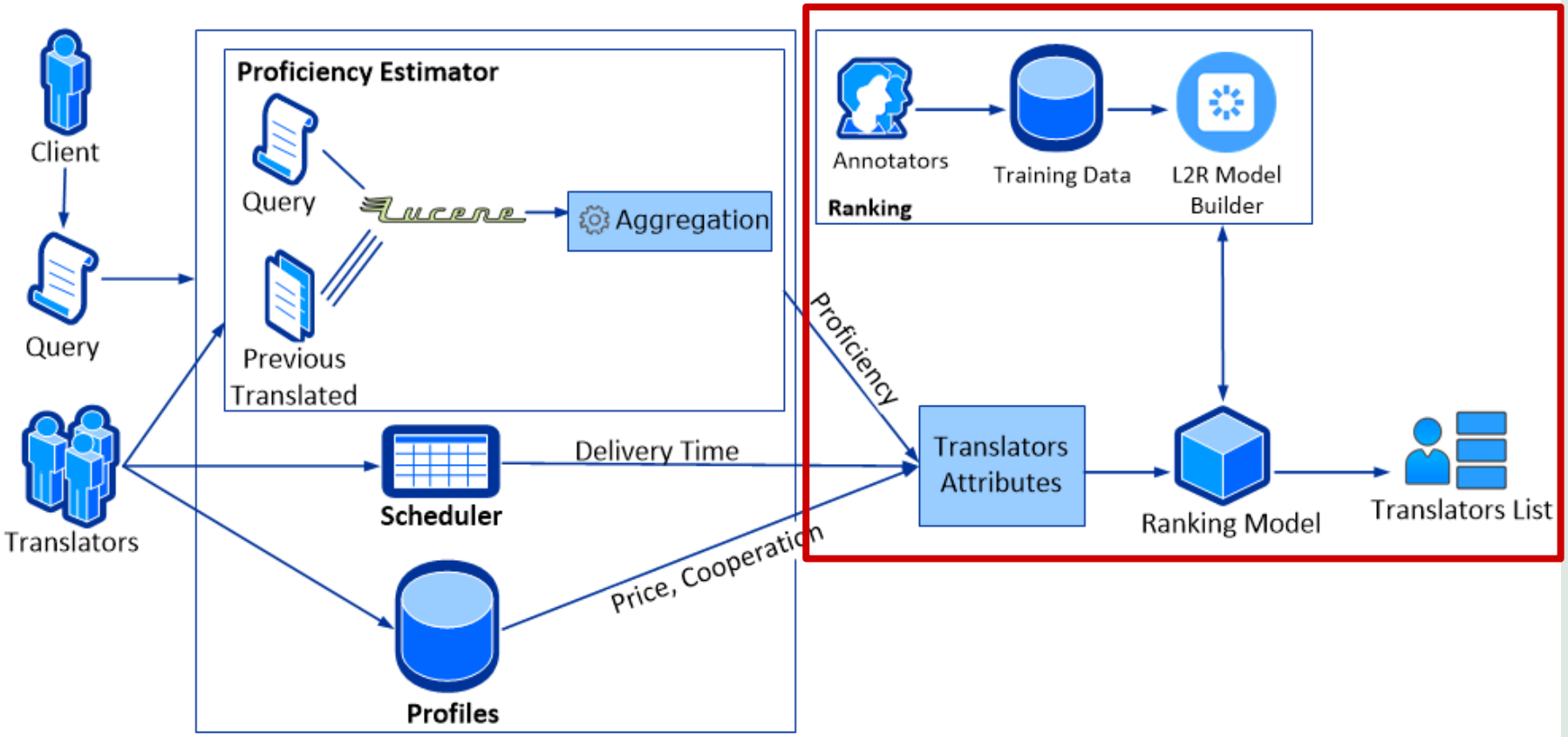
- Both measures show similar behaviors
- GP2 is least likely to be independent of proof-readers' assessments
- GP2 has the best correlation though still weak

Translation Expert Retrieval Platform



Data Annotation

- Annotation system presents three translators, randomly
- Each with four criteria (price, delivery time, proficiency and number of cooperations)
- Translators' pictures and names are removed
- 8 annotators familiar with company's business
- Annotators rank the three translators
- 400 annotated lists (1200 records)
- Annotated data available on github

Data Annotation

1 Enter order details

2 Select translator(s)

Select translator(s)

German

Studienblatt_1129057_2013W.pdf

Select a translator to proceed to the next step:

Preferences

Translator	Cooperation	Text matching	Delivery date	Price net
1  -	once		1/14/2014 2:56:04 AM	€ 39.95
2  -	not yet		1/14/2014 6:45:00 AM	€ 41.15
3  -	once		1/15/2014 3:05:55 AM	€ 125.98

Source language : English

Target language	Delivery date	Price net
German		€ 0
	Total amount	€ 0.00
	Discounts	€ 0.00
	VAT	€ 0.00
	Sum	**€ 0.00**

Angebot als PDF herunterladen

NEXT

Learning to Rank

- Pointwise: *linear regression*
- Pairwise: *RankNet, RankBoost, LambdaRank, LambdaMART*
- Listwise: *AdaRank, ListNet*

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  - NDCG
  - ERR
- 5-Fold Cross Validation

Learning to Rank

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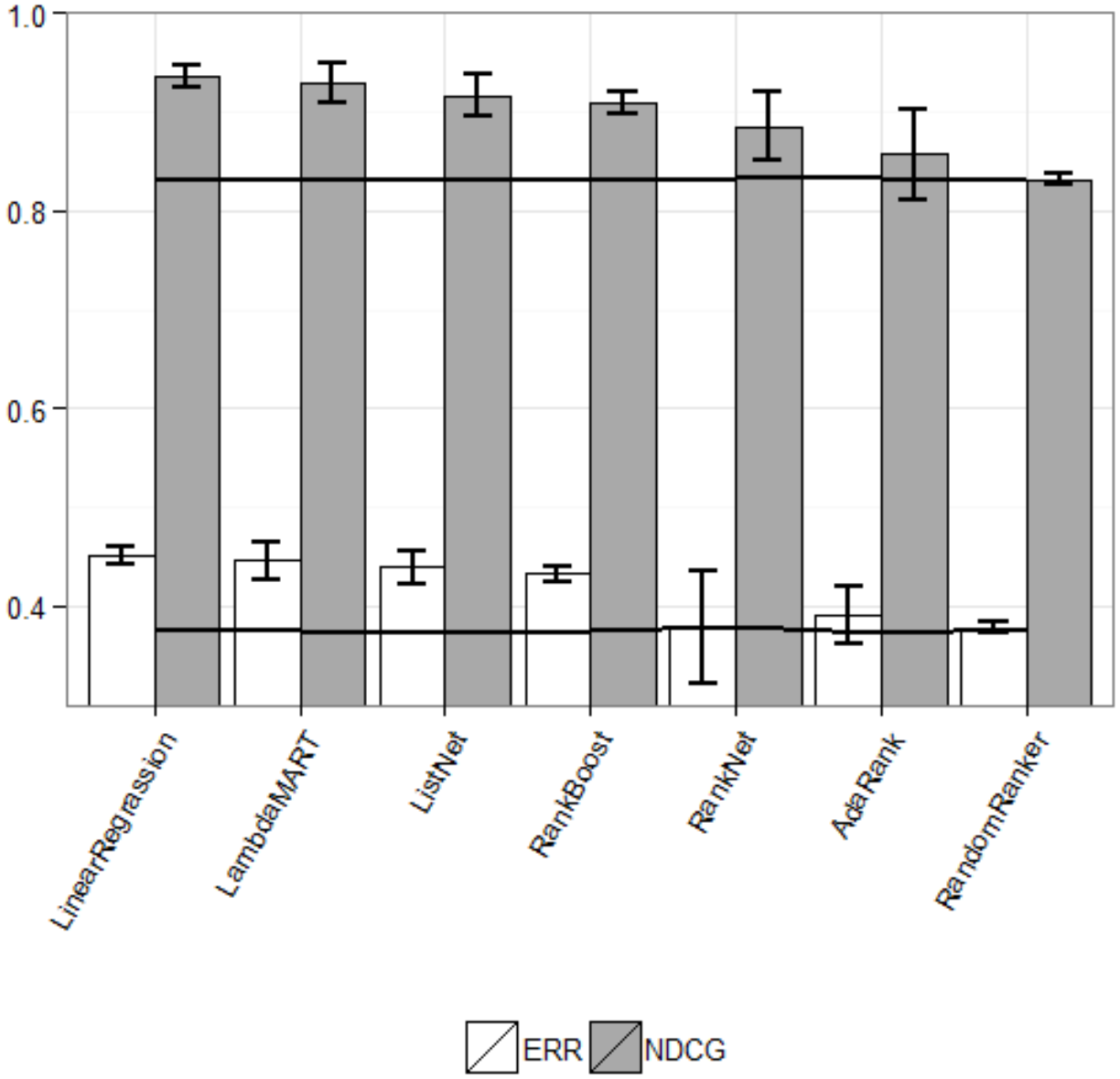
- Pairwise: *RankNet, RankBoost, LambdaRank, LambdaMART*
- Listwise: *AdaRank, ListNet*
- Evaluation
  - NDCG
  - ERR
- 5-Fold Cross Validation
- Two baselines
  - Random generated data
  - Random ranker

Learning to Rank - Experimental Results



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- Linear Regression shows the best performance

Learning to Rank - Experimental Results

- Linear Regression shows the best performance
- Feature comparison based on linear regression coefficients

Feature	Value
Price	2.002
Duration	0.057
Proficiency	-0.048
Number of Cooperation Times	-0.313

Learning to Rank - Experimental Results

- Linear Regression shows the best performance
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- Price and duration much more important
- Proficiency not effective, maybe because it's guaranteed by the company

Conclusion

- Expert-Translator Retrieval
  - Price
  - Duration
  - Proficiency
  - Number of cooperation times
- Proficiency estimator
  - Document aggregation
  - GP2 algorithm
- Ranking model
  - Linear Regression
- Price and time more important

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Thank you!
Questions?