

## HIGHLIGHTS

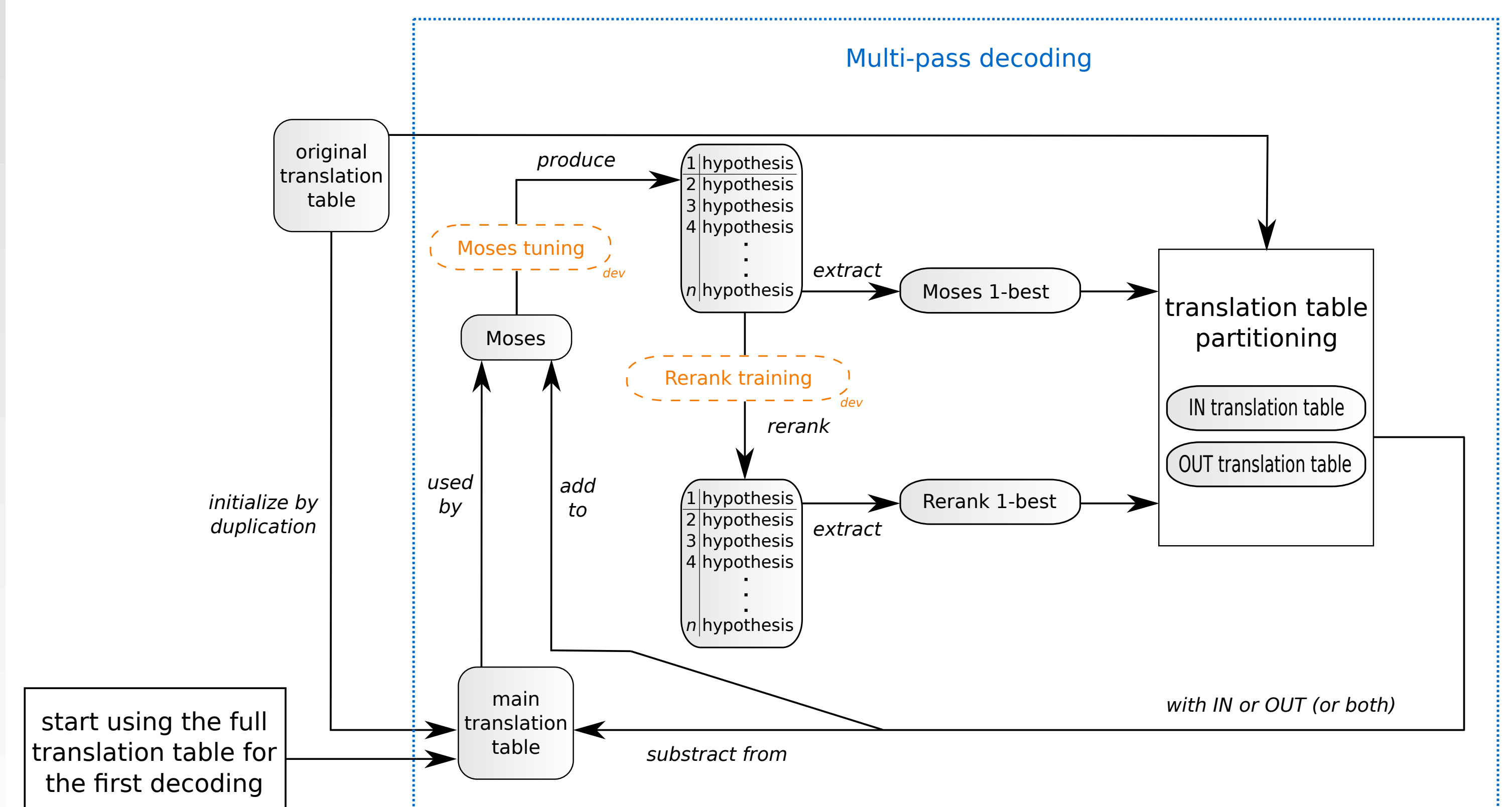
### Using complex features in SMT

- some complex features are not easily integrable during decoding:
  - need of a complete hypothesis (e.g syntactic features)
  - computational cost (e.g neural network models)
  - not available during a first decoding (e.g word posteriors)
- such features are usually used through single-pass reranking

### Main ideas

- exploit a reranking pass result during decoding
- isolate in separate translation tables the possibly misused bi-phrases to better optimize their feature weights

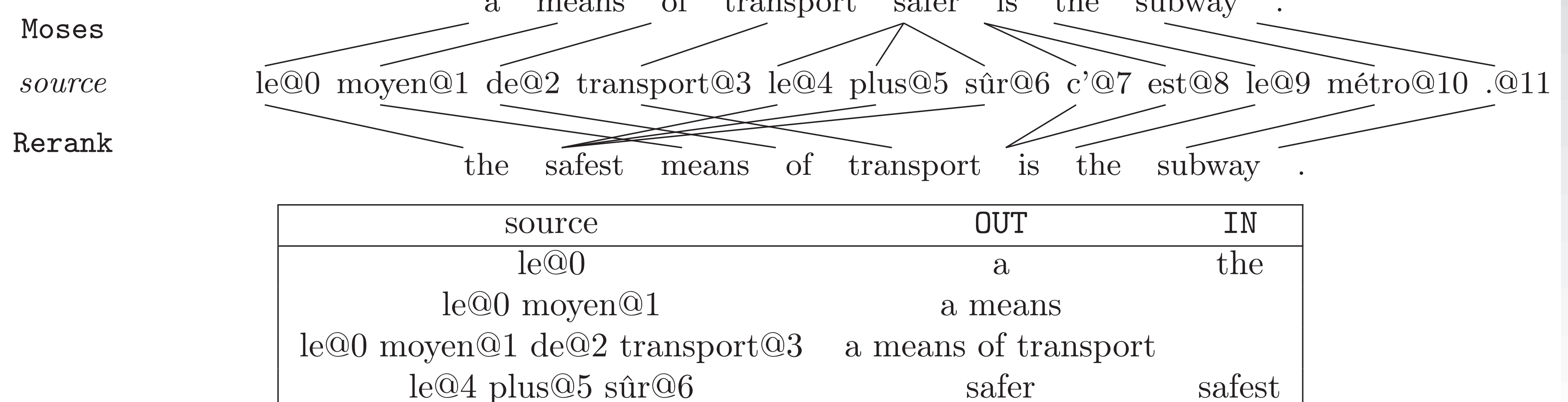
## THE MULTI-PASS DECODING PROCEDURE



## IN AND OUT TRANSLATION TABLES

- IN:** contains bi-phrases of the reranking 1-best not in the decoder 1-best
- OUT:** contains bi-phrases of the decoder 1-best not in the reranking 1-best
- extracted bi-phrases are removed from the original translation table
- IN or OUT (or both) are added to the next decoding pass

## TRANSLATION TABLE PARTITIONING WITH LOCATED TOKENS



## EXPERIMENTAL SETTINGS

- Moses tuned with kb-mira
- reranking system (Rerank) trained with kb-mira using the Moses 1,000-best
- complex features used during reranking:

Features	medical		news	
	En→Fr	Fr→En	En→Fr	Fr→En
Moses	38.8	37.1	31.1	28.6
+ MosesNorm	38.9	37.2	31.1	28.7
+ NeuralNet	41.9	38.9	32.5	29.8
+ POSLM	39.2	37.7	31.1	28.9
+ WPP	39.1	37.1	31.2	28.6
+ POSTagRatio	38.9	37.3	31.1	28.8
+ Syntax	38.8	37.2	31.2	28.9
+ IBM1	39.1	37.2	30.9	28.8
Rerank	42.8	40.1	32.5	29.9

## MULTI-PASS DECODING RESULTS FOR ALL CONFIGURATIONS

Configuration		medical En→Fr		medical Fr→En		news En→Fr		news Fr→En	
		test	# iter.	test	# iter.	test	# iter.	test	# iter.
baseline	Moses	38.8	-	37.1	-	31.1	-	28.6	-
	Rerank	42.8	-	40.1	-	32.5	-	29.9	-
OUT	Moses	41.8	4	38.7	3	31.8	1	29.2	1
	Rerank	43.8	4	40.5	3	32.9	1	30.3	1
IN	Moses	43.2	4	39.9	3	32.4	2	29.3	2
	Rerank	<b>44.2</b>	4	<b>41.0</b>	3	<b>33.2</b>	2	<b>30.4</b>	2
IN and OUT	Moses	42.4	4	38.7	3	32.1	2	29.2	2
	Rerank	43.5	4	40.6	3	32.9	2	<b>30.4</b>	2

- IN alone gives the best results
- "IN and OUT" performs between the configurations using IN and OUT alone
- most configurations converge quickly (between 1 and 4 iterations)

## CONCLUSION & FUTURE WORK

### Conclusion

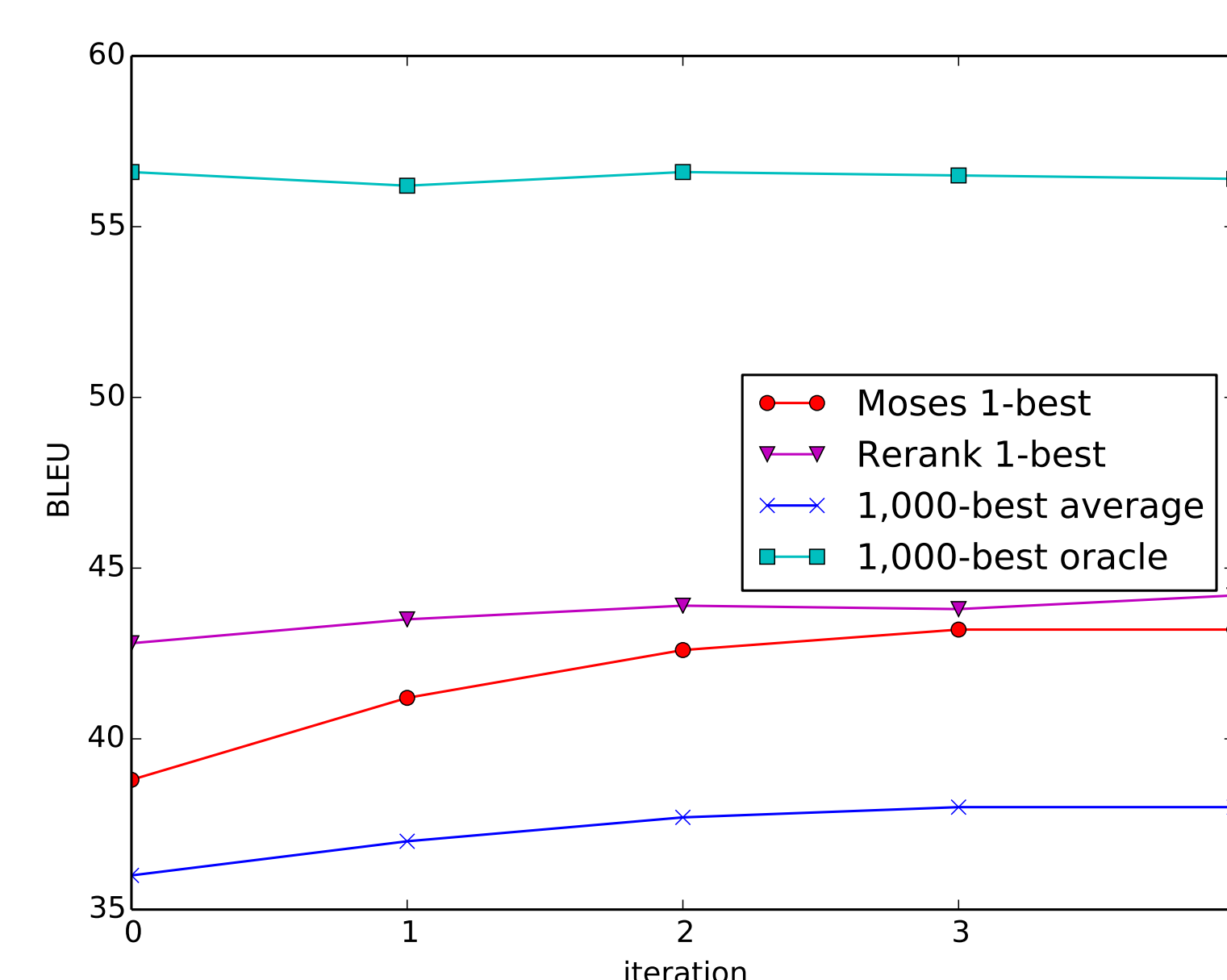
- strong and consistent improvements for all configurations
- simple criterion to iteratively partition the translation table
- makes a better use of complex features than single-pass reranking

### Future work

- add features to the new translation tables to use more informations about the reranking result during decoding
- use the result of a rewriting system (Marie and Max, 2014) to guide the decoder
- enhance the diversity in the  $n$ -best list (Chatterjee and Cancedda, 2010; Gimpel et al., 2013) to train a better reranking system
- add more complex features to the reranking pass

## INCREASING OF THE $n$ -BEST QUALITY

- analysis for the IN configuration (medical En→Fr):



- quickly reduces the gap between Moses and Rerank BLEU scores
- 1,000-best average BLEU increases over the iterations