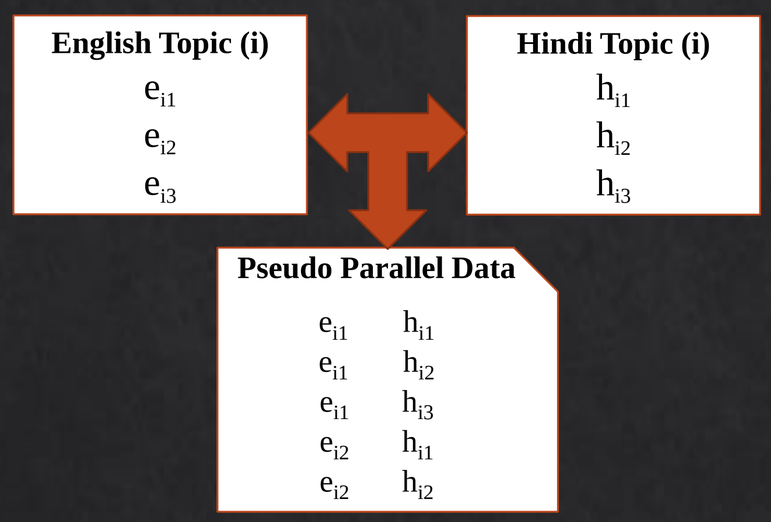
That'll do fine!: A coarse lexical resource for English-Hindi Machine Translation, using polylingual topic models

Motivation

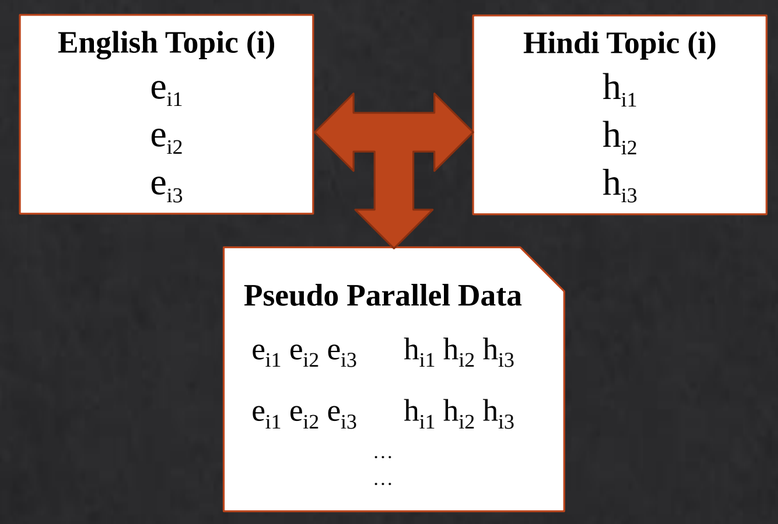
- Parallel corpora are often injected with bilingual lexical resources for improved statistical machine translation (SMT).
- Creation of such resources takes time, effort and are financially intensive.
- SMT performance is affected by the word alignment and reordering done on the training corpora.
- The previous approach (Cartesian approach) to generate pseudo-parallel data fails to provide synonymous words in parallel corpora.

Past Approach



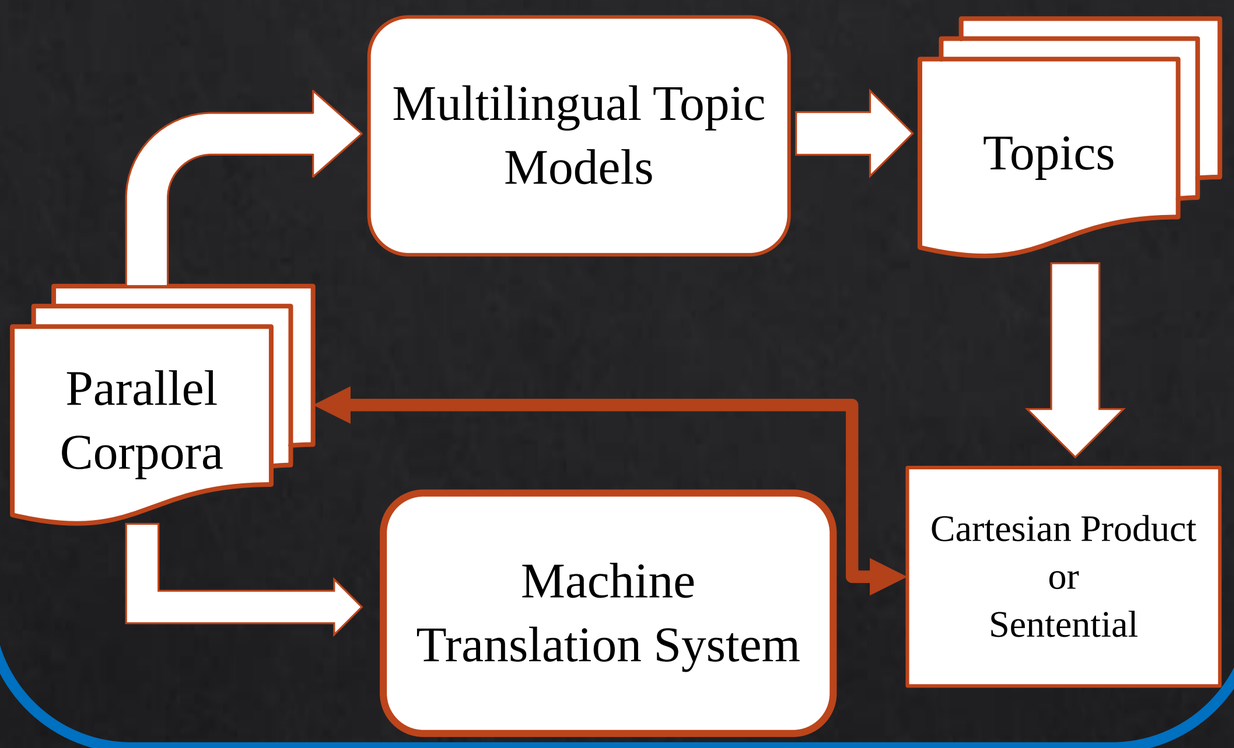
Our Approach

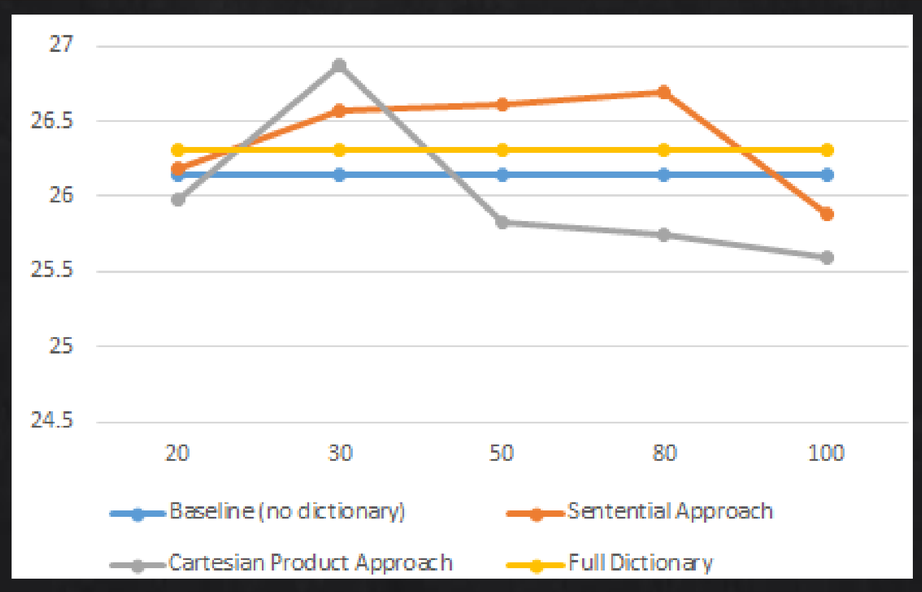
- We use unsupervised topic modelling to generate parallel topics, which can be added to the training corpora.
- We propose the sentential approach for generating pseudo-parallel data.
- Our approach aligns the pseudo-parallel data in one sentence.



- It avoids alignment of non-synonymous parallel data injection to the training corpora.
- It reduces the amount of noisy data, which was the case with Cartesian product approach.

System Architecture





System Evaluation & Results

- We evaluate our system (topic models) output quantitatively with the help of two annotators.

	Hindi	English	Kappa
A1	69.6	70.4	0.838
A2	65.6	68.4	

- We evaluate our system (topic models) output qualitatively with the help of two annotators.
  - Out of the 40 English words present in randomly chosen topics, only 7 words did not have a parallel translation.
  - Similarly, out of the 40 Hindi words, only 6 did not have translation in the corresponding topic.

(here, K=5)	Health	Tourism
No Lexical Resource	26.14	**28.68**
Cartesian Approach	25.98	28.44
Sentential Approach	**26.25**	27.52
Full lexical resource	**26.31**	**29.30**

- The results (BLEU) of four different configurations varying in terms of data which was injected in the MT system training are above.
- The graph on the left depicts a separate run of experiments where we vary the number of topics to be 20, 30, 50, 80, 100.
  - We find that our approach beats the full dictionary approach at 50 and 80 number of topics.

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