An Architecture for Scientific Document Retrieval Using Textual and Math Entailment Modules

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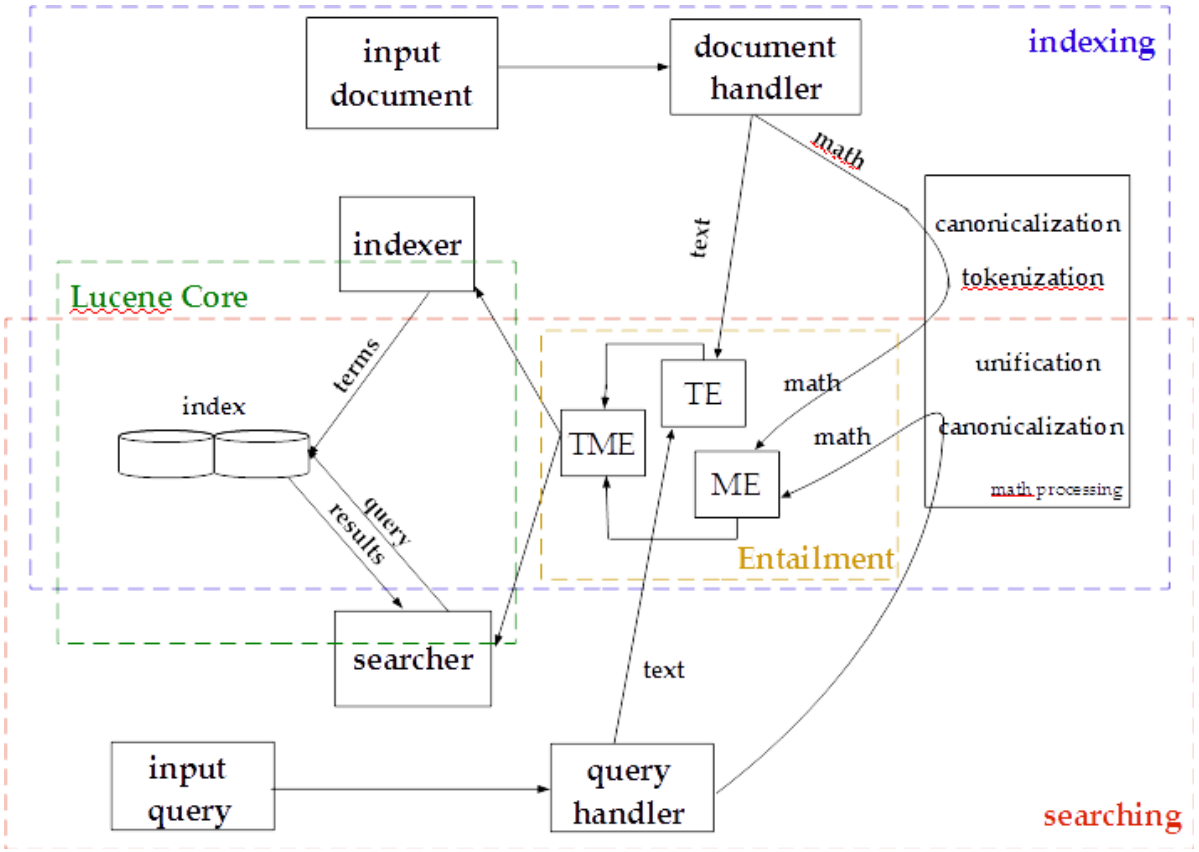
Objective & Goals

- Scientific document retrieval by using Entailment and Distributional Semantic Similarity

- Goal: to increase quality of retrieval (precision and recall) by handling natural language variations of expressing semantically the same in texts and/or formulae.

System Architecture



Semantic Similarity Measure

- Pre-trained word and phrase vectors of Google News dataset (about 100 billion words). The LSA word-vector mappings model contains 300-dimensional vectors for words and phrases.
- Gensim: Python framework for vector space modeling.
- Gensim for this experiment, and computed the cosine distance between vectors representing text chunks – sentences.
- Semantic Textual Similarity @ SemEval Tasks

Result

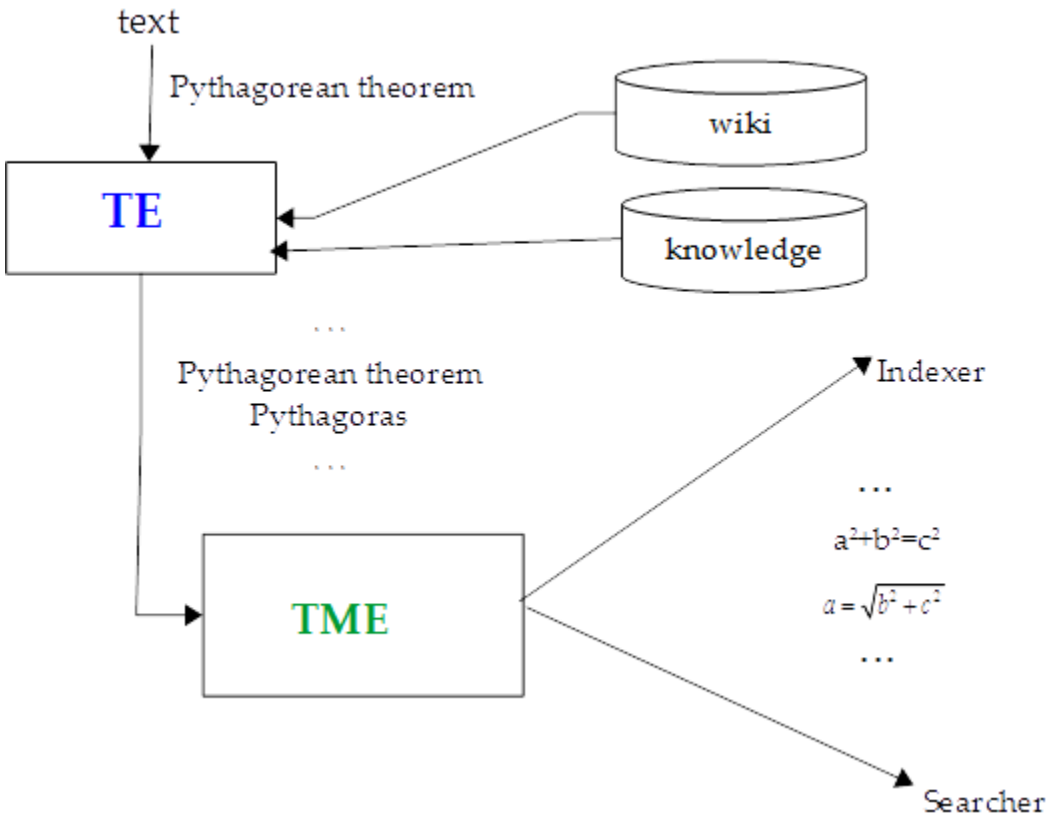
Table 1: SemEval-2014 Task 10: Multilingual Semantic Textual Similarity Test Result

Corpus	Winner score and team/run name		Our score
Deft-forum	0.5305	NTNU-run3	0.42812
Deft-news	0.7850	Meerakat_mafia-Hulk	0.67999
Headlines	0.7837	NTNU-run3	0.60985
Images	0.8343	NTNU-run3	0.71402
OnWN	0.8745	MeerkatMafia-paringWords	0.79135
Tweet-news	0.7610	DLS@CU-run1	0.76571

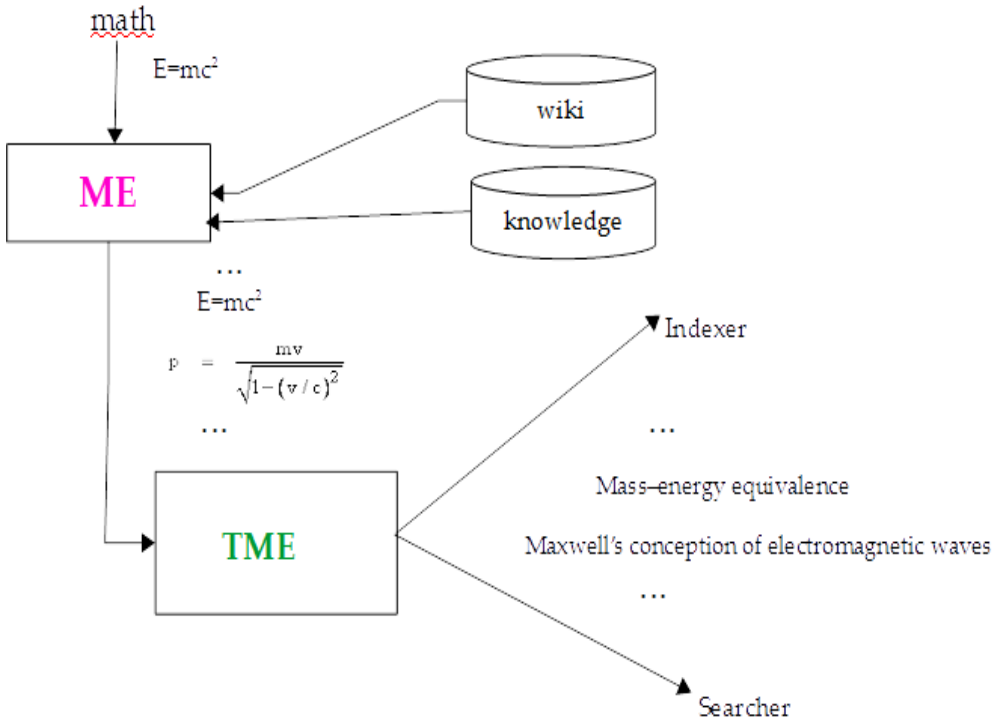
Table 2: SemEval-2013 Task 6: Semantic Textual Similarity Test Result

Corpus	Winner score and team/run name		Our score
Headlines	0.7838	UMBC_EBIQUITY-saiyan	0.62501
OnWN	0.8431	deft-baseline	0.71165
FNWN	0.5818	UMBC_EBIQUITY-ParingWords	0.38353
SMT	0.6181	UMBC_EBIQUITY-ParingWords	0.32951

TE & TME Module for Text



TE & TME Module for Math



Future Tasks

- We will build word and phrase vectors from Wikipedia articles.
- We will test on SemEval STS test data by using this generated vector from Wikipedia articles.
- We will also participate in STS evaluation track at SemEval 2015 Task.

thank you
danke
рахмат
謝謝
ngiyabonga
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Баярлалаа
спасибо
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