Language Identification XXL

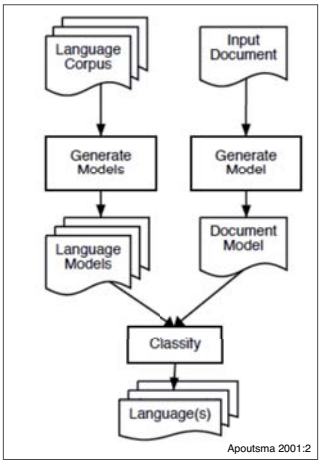
George Kakish, Ulzhan Kadirbayeva, Galina Sigwarth, Maria Semenchuk
Department of Computational Linguistics, University of Heidelberg

1. Overview

Language identification is an important pre-processing step for many NLP systems
We developed software for the language identification of electronic text documents.

- Language Corpus and Input Document based on Wikipedia
- Data of 76 Languages are used
- The system structure permits expansion of training corpus with further data
- Input and output occur with Web-Interface
- Approaches: Step-By-Step [1], Ranking [2] and Vector Space Model [3]
- Classification Methods: probability distribution(Bayes Decision Rule), Ad-hoc Ranking (Out-Of-Place Measure) and Vector Space Model

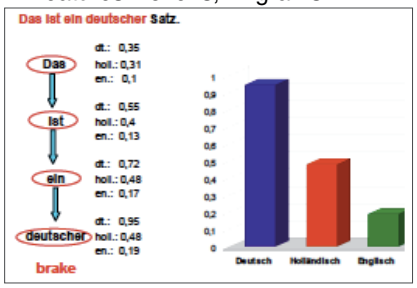
2. Process



3. Approaches

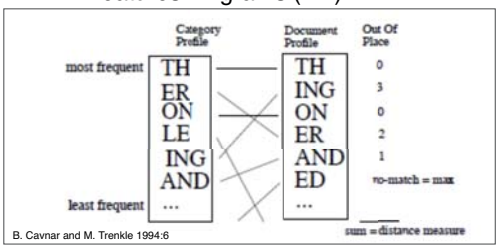
Step-By-Step

- Determination of the most probable language with Bayes Decision Rule
- Features: Tokens, Bi-grams



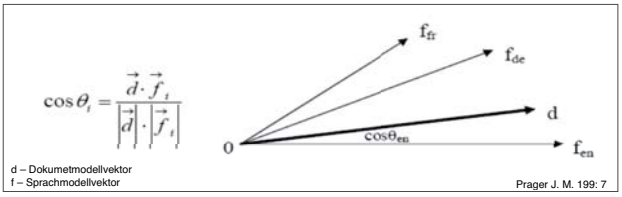
Ad-hoc Ranking

- Comparison of the document model with the language model by Out-Of Place Measure
- Features: N-grams (2:4)

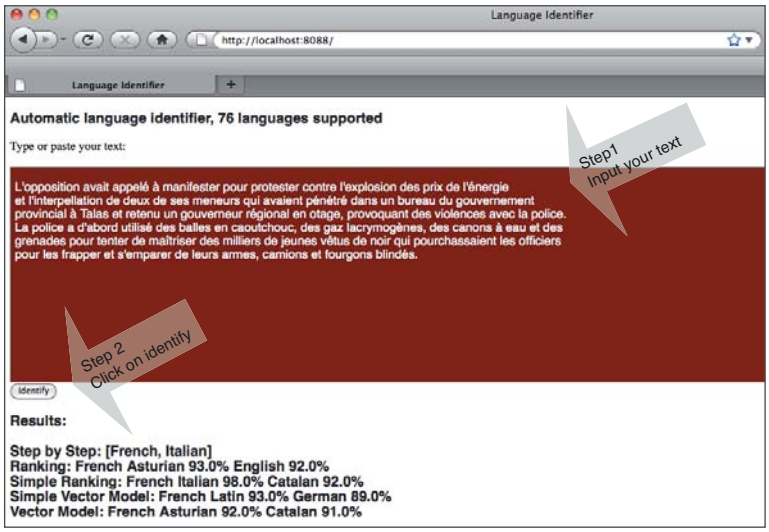


Vector Space Model

- Determination of similarity between the document model vector and the language model vectors by Cosine Distance
- Features: N-grams (2:4) + Tokens

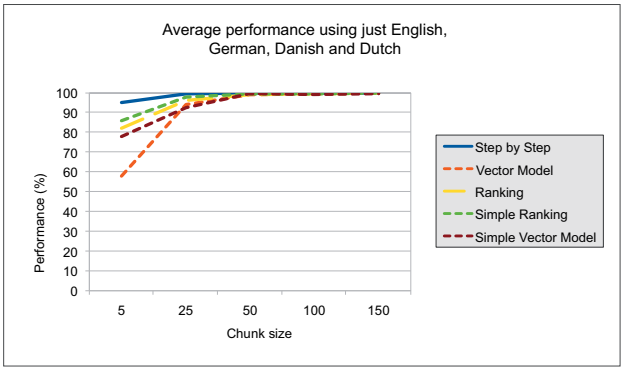


4. Web Interface



5. Evaluation

Average performance using just English, German, Danish and Dutch					
	chunk size in words				
Methods	**5**	**25**	**50**	**100**	**150**
Step by Step	95,2	99,7	100	100	100
Vector Model	58	94,2	99,2	99,7	100
Ranking	82,2	96,2	99,2	99,7	100
Simple Ranking	86	97,7	99,5	99,7	100
Simple Vector Model	78	92,7	99,7	99,2	99,5



6. Conclusion

- 200 KB test data and 500/1000 KB training data for each language are used
- 1000 KB data produces better results as 500 KB
- Method based on combination of features did better than methods that employed single features
- Step-By-Step method performed better for all chunk sizes
- Success of the identification is indirectly proportional to the number of languages in corpus; the more the languages the worse the results
- Documents often include words in more than one language, which complicates the correct language identification

7. References

- Language Identification With Confidence Limits (David Elworthy,1998)
- N-Gram-Based Text Categorization (William B.Cavnar and John M. Treacle, 1994)
- Linguini: Language Identification for Multilingual Documents (Prager,J. M., 1999)