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Automatic Categorization of Job Postings

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Context & Objectives

Context :

- Recruiters need to assess job posting performance on job search web sites
- But all sites have different ways to reference job postings

Objectives :

- Be able to identify the job occupation whatever the posting
- Improve the categorization efficiency thanks to a processing adapted to the particularity of job postings

Corpus

- French corpus of 700 job postings (baseline method : 1060 terms)
- Two-level classification : focus on 4 categories / 14 occupations

Sales / Business Development		Marketing / Product	
Business Development / New Accounts	Telesales	Marketing Communications	Marketing Production
Sales Support / Assistance	Field Sales	Product Management	
IT / Software Development		Accounting / Finance	
Network and Server Administration	IT Project Management	Bookkeeping / General Ledger	Corporate Accounting
Software / System Architecture	Systems Analysis	Claims Review and Adjusting	

Method : Posting Representation & Classification

Method : Multi-term word identification

- Identify repeated segments to take into account multi-term words

Method : Title term weighting

- Title terms are weighting twice

Method : χ^2 statistic tresholding (650 terms)

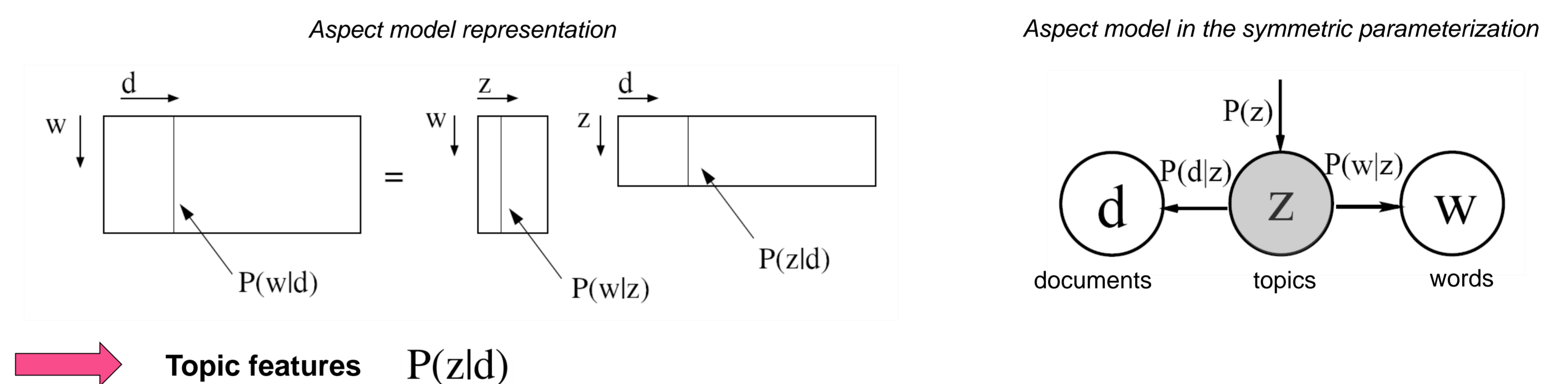
- Selection of occupation most specific terms

Method : Baseline (preprocessing and first selection)

- Filter out duplicates
- Lemmatisation (with TreeTagger)
- Filter out prepositions, adverbs, pronouns...
- Document frequency tresholding (df > 10)
- Term frequency representation

Method : Probabilistic Latent Semantic Analysis

- Objectives : Address the issue of polysemy and synonymy
Representation of documents in the latent semantic space
- Statistical model : Latent variable model for co-occurrence data (« Aspect model »)



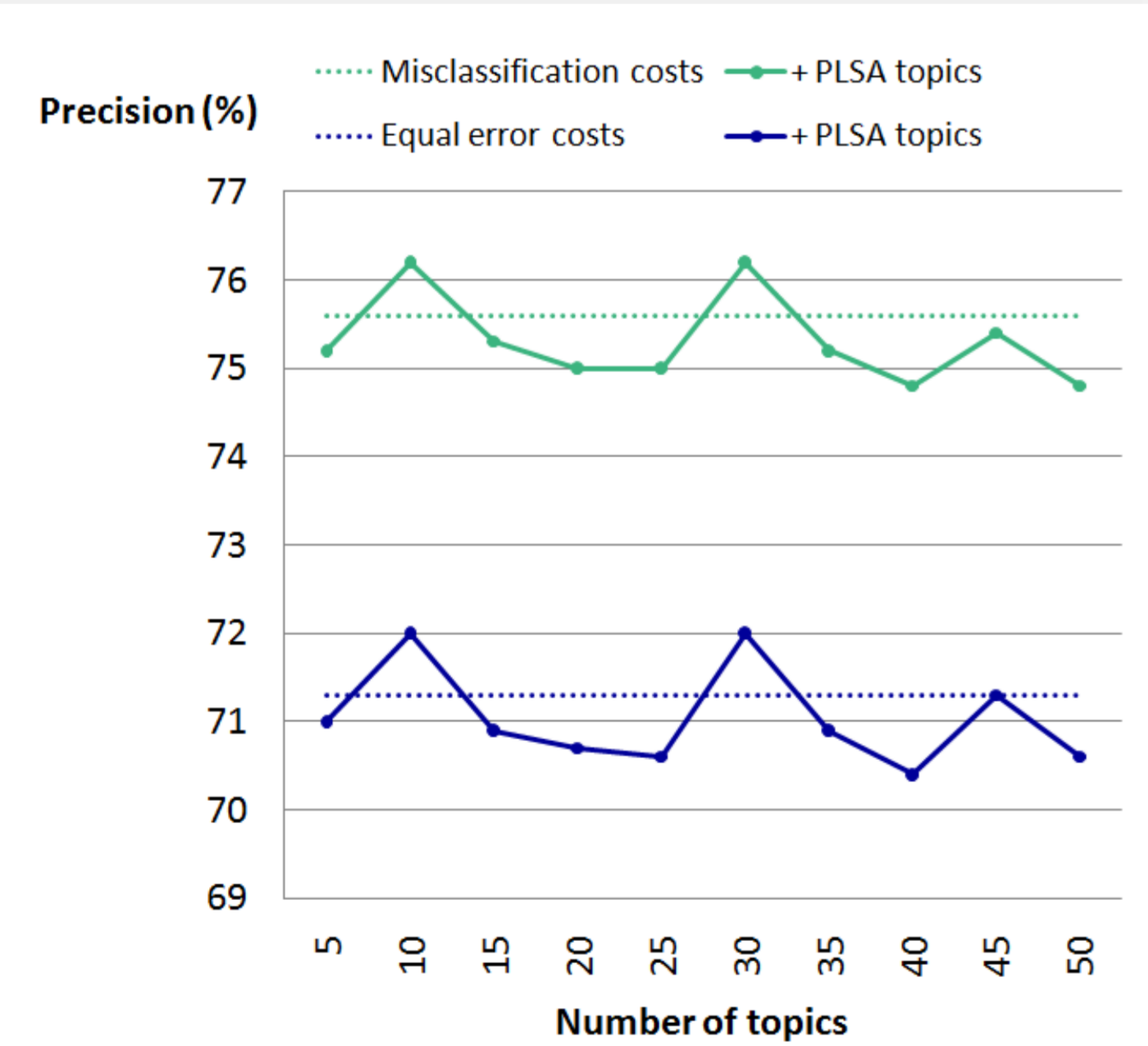
Classification : performance evaluation

- Average precision on occupations
- Deducting precision on categories
- Implementation of a misclassification cost matrix

	Sales	Marketing	IT	Accounting
Sales	=1	<1	<1	<1
Marketing	<1	=1	<1	<1
IT	<1	<1	=1	<1
Accounting	<1	<1	<1	=1

Results

Classification precision using PLSA latent topics as additional features (compared with multi-term word method)



- It is necessary to choose carefully the number of topics

Two PLSA topic factors (from a 30 factor decomposition) with high probability to generate the word "development", represented by their most probable words

« IT »	« Sales »
development	commercial
study	sale
project	sector
java	develop
implementation	customer
computing	development
technique	prospect

- The word "development" occurs in two different contexts

Comparison of method average precisions (without and with implementation of a misclassification error cost)

Method	Job occupations (equal error costs)	Job occupations (misclassification costs)	Job categories
Baseline	64,4	69,4	91,6
χ^2 statistic tresholding	68,3	72,8	92,2
Title term weighting	69,2	73,6	92,5
Multi-term word identification	71,3	75,6	91,4
PLSA	72	76,2	92,8

Conclusions & Future Work

- Our methodology allows to :
 - Standardize the job category on all our posting database
 - Automate job posting labeling according to each job board referencing system
- Future work :
 - Use the job category to recommend the use of job search web sites in order to optimize recruitment performance

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