Using Topic Models for Twitter Hashtag Recommendation

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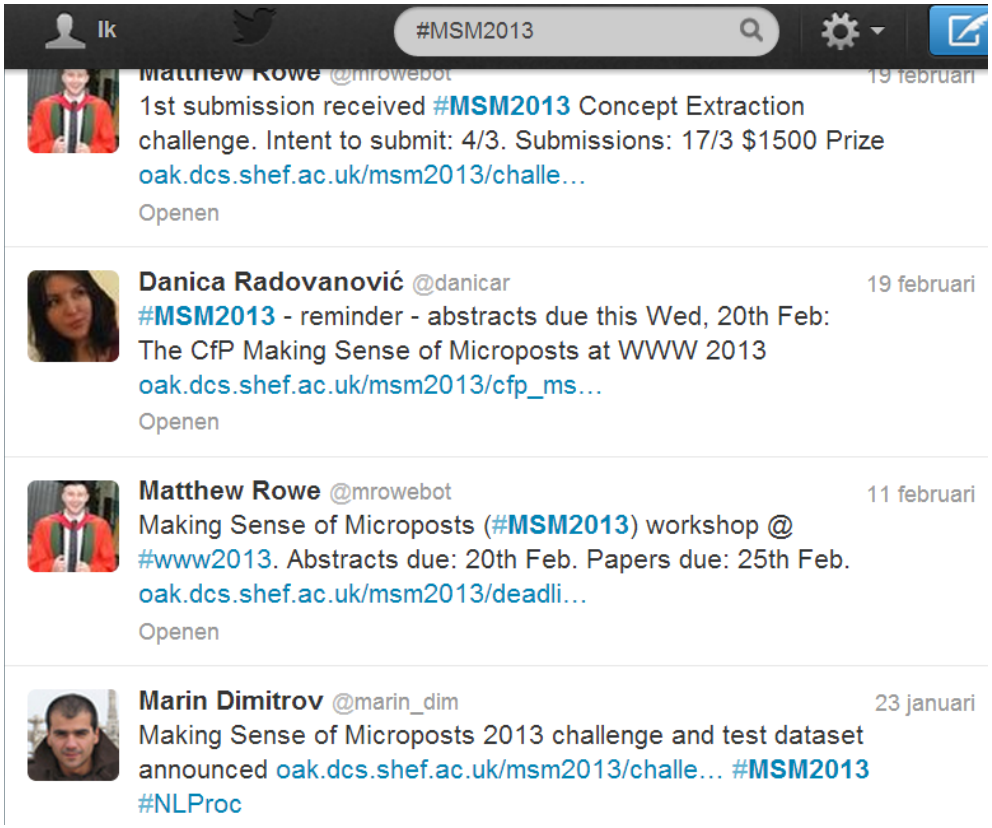
Introduction (1)

Search

Linking

Memes



General Topic

Indexing

Grouping

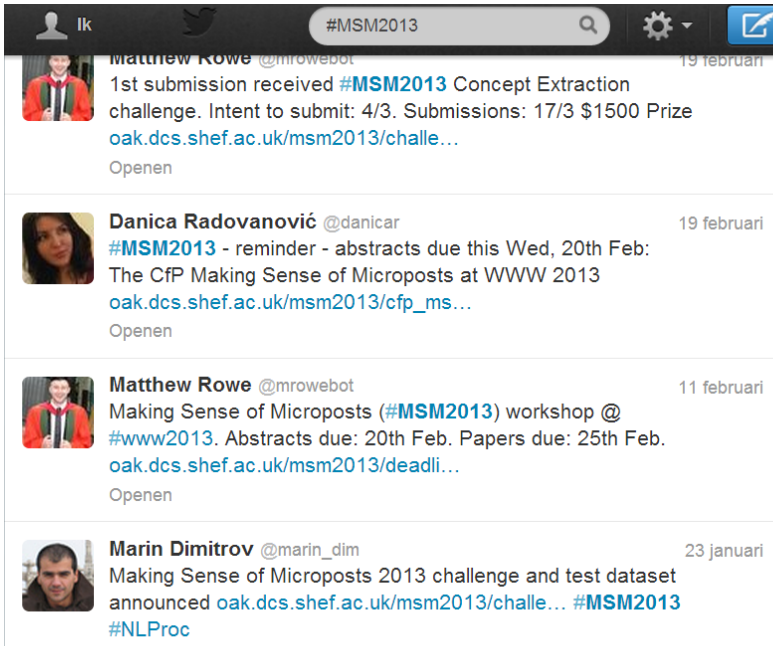
Information retrieval

Introduction (2)

Search

Linking

Memes



General Topic

Indexing

Grouping

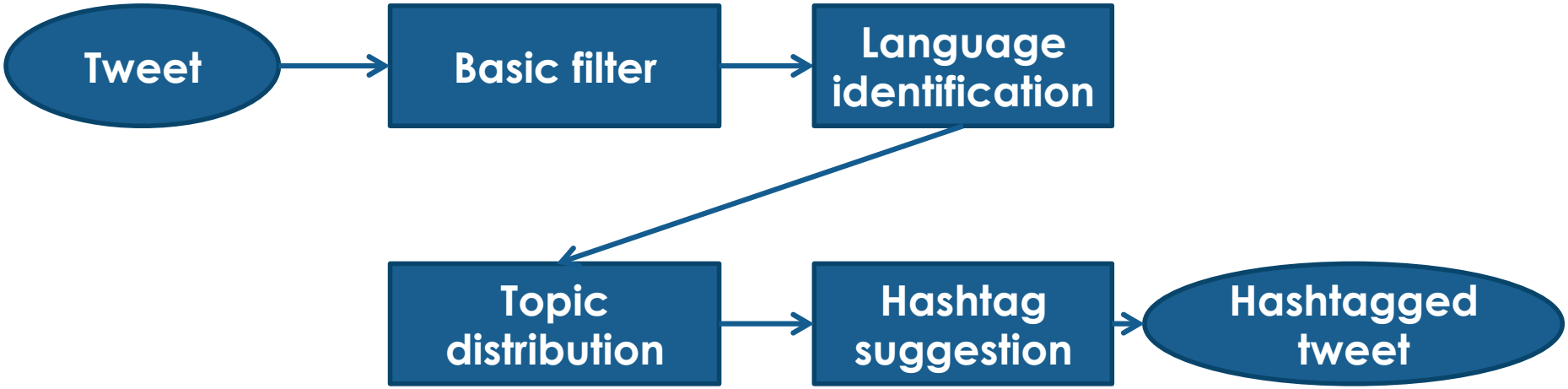
- ±10% of tweets contain a hashtag
- 3% of the hashtags are used more than 5 times

Goal

Suggest keywords that resemble the general topic of a tweet and that could be used as a hashtag

- Promote hashtags for effective indexing
- Allow for effective search of tweets through hashtags
- Reduce the use of sparse hashtags

Architectural overview



Basic filter

Clean up the tweet: URLs, special HTML entities, digits, punctuations, the hash character, …

During training:

- Remove tweets with just one word
- Remove retweets

Language identification

Why — We need to build a language-dependent topic model.

Goal — Build unsupervised classifier that discriminates between English and non-English tweets.

How — Using Naive Bayes and the Expectation-Maximization algorithm + character n-gram features

Result — Evaluation on a test set of 1000 randomly selected tweets

	Lui & Baldwin (LangID.py)	Our algorithm
Precision	97.9%	97.0%
Recall	91.8%	97.8%
F1	94.8%	**97.4%**

Calculating the topic distribution

Idea	Find the general topic(s) of a tweet
How	Using Latent Dirichlet Allocation to find the topic distribution in an unsupervised manner
Training	1.8 million tweets pre-filtered on 4000 keywords 200 topics, α=0.1, β=0.1
Example	"Please RT!! sign Bernie Sanders petition for the fiscal cliff! http://.."

0	1	2	3		57		199
[0.1;	0.0 ;	0.0 ;	0.0 ;	… ;	0.8 ;	… ;	0.05]

Topic 57:

1. Fiscal
2. Political
3. President

…

Hashtag suggestion (1)

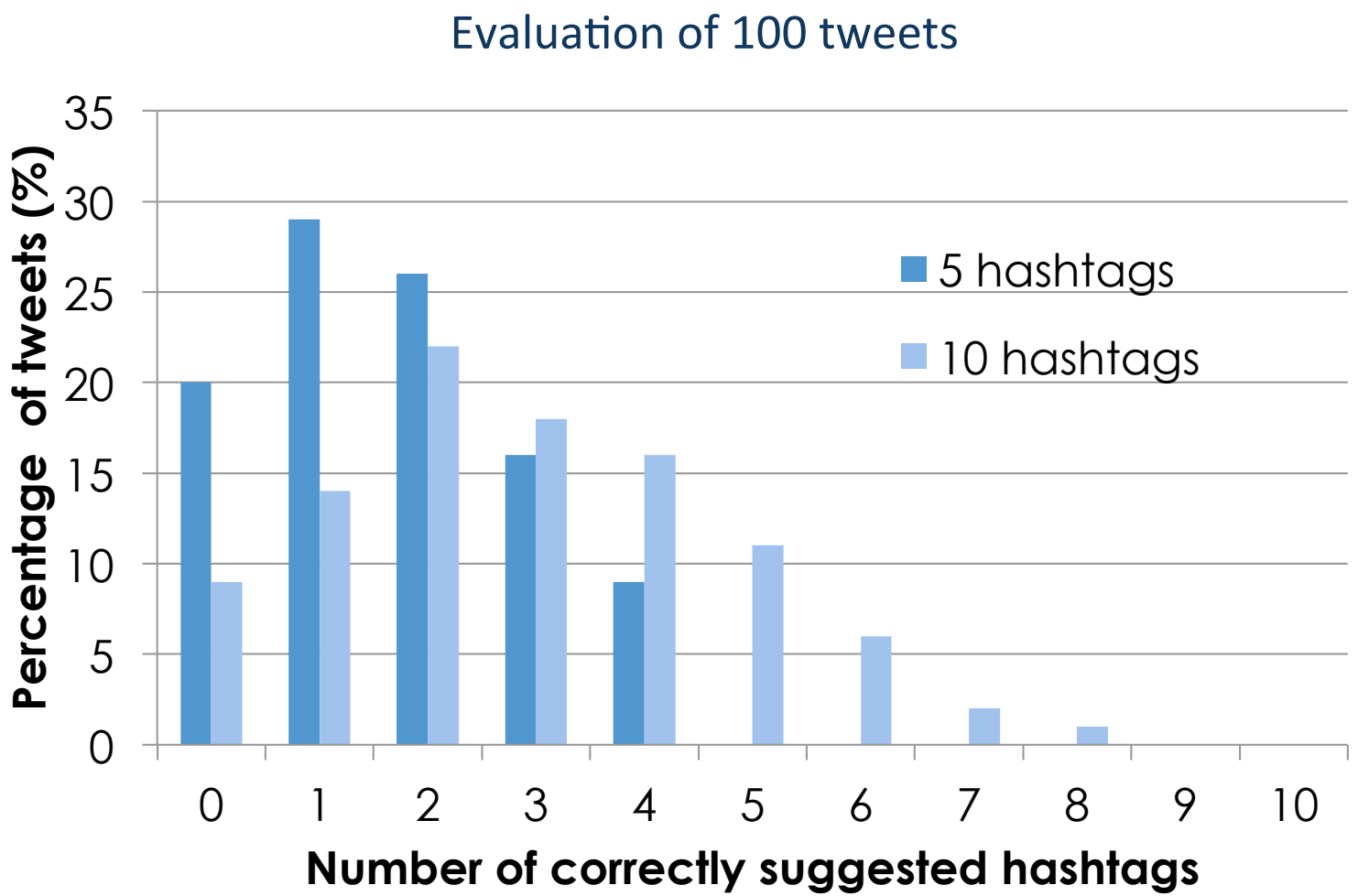
Idea — Suggest a number of hashtags based on the topic distribution of the tweet

How — Sample the topic distribution and suggest the top ranked keywords

Example

Yay, we got sixth period today	**school**	business	light	**time**	**period**
Please RT!! Sign Bernie Sanders petition for the fiscall! Http://..	**fiscal**	**political**	traffic	**president**	**policy**
comfort, elegance, prettiness	little	good	love	relationship	god

Hashtag suggestion (2)



Conclusions and Future Work

We built a hashtag recommendation system:

- Suggests general keywords
- Unsupervised

In the future:

- Use more context information: semantic web, social graph,…
- Adopt a hybrid approach between general and specific hashtags

#Questions @frederic_godin