

Automatic Classification and PLS-PM Modeling for Profiling Reputation of Corporate Entities on Twitter

J.V. Cossu
University of Avignon, France

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Authors

J.-V. Cossu, *M. El-Bèze, E. SanJuan and J.-M. Torres-Moreno*

Outline

- Background e-Reputation: CLEF RepLab
 - Reputation Monitoring: main topics
 - Focused sub-issues
- Document Scoring Approach
- Reputation Modeling Approach
- Perspectives

Profiling Corporate entities on Twitter defined by RepLab

- Filter unrelated contents
- Group tweets depending on trends
- Detect aspects oriented opinions
- Find tweets needing immediate attention and react appropriately

Data

- Large tweets collection (142,000 tweets, 80% English, 20% Spanish)
- 61 entities from Automotive, Banking, Music, Universities
- Crawling with entity name between June and Decembre 2012
- More than 500,000 manual experts assessments
- Annotators had hard times finding agreements
- Finally a few training data for each entity (600 training examples)

Priority Ranking

Predict the priority level of conversations:

- Negative messages may impact the priority rank
- Message from "opinions makers" may receive an higher priority
- Classification or Relationship: ALERT > MILDLY > NOT IMPORTANT
- Rank the few Alerts (3%) using the probability of being ALERT
- Official evaluation as clustering problem

Dimensions Classification

- Dimensions = Conceptual Reputation Aspects suggested by specialists
- *Citizenship, Governance, Innovation, Leadership, Performance, Products, Workplace*
- Most tweets are about Products/Services (60%)
- Official evaluation using typical *Precision/Recall/Accuracy*

Joint Approach

- Generalize assessments using tweet content
- Multilingual/domain scoring approach
- Propose annotation and model for unannotated domains (No Dimensions annotation for Music and Universities)

Objective

- Find relationships: Dimensions -> Priority
- Provide a hierarchy for Dimensions
- Model entities' reputation in the time

Evaluation

- Comparing obtained hierarchies with references and predictions
- Look for ranking improvements with predicted alert

Is tweet content sufficient ?

- Basic classifiers using TFxIDF over bag-of-words
- Without parameters tuning and features selection

Dimensions classification performances

System	F-Score	Accuracy
Cosine	.505	.741
SVM	.467	.733
<i>Best_System</i>	.473	.731
Jaccard	.378	.476

Priority detection performances

System	F-Score	Accuracy	F(R&S)
<i>Best_System</i>	.571	.636	.335
SVM	.553	.643	.304
Cosine	.566	.637	.260
Jaccard	.492	.561	.233

Why Partial Least Squares Path Modeling ?

- Allow to use various type of data
- Uncommon way to combine classifiers outputs

Latent Variable PLS-P for Dimensions

- Each dimension is a latent variable
- Consists in a vector of normalized classifiers' scores
- Assumption that a tweet belongs to more than 1 Dimension

Latent Variable PLS-P for Priority

- Alert can be a vector of classifiers' scores or manual reference
- Important is the complement of alert

Objective of the PLS Model

- Minimize the square distance between classifiers and concept

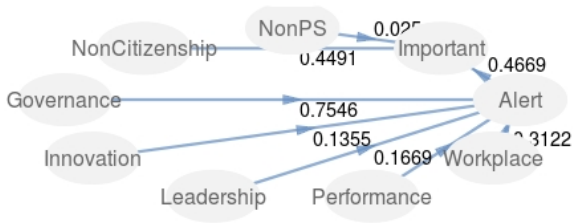
Model

- Global or entity/domain specific model
- If no link between Dimensions and Alert we choose the Non-Dimension (Dimension vector complement)

Expectations

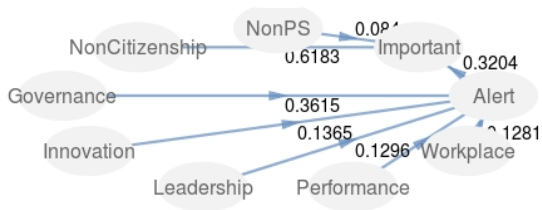
- Does a dimension imply alert or entail importance ?
- Does the modeling improve alert detection ?
- Which classifier provides robustness

Banks Reputation Modeling with reference Alert



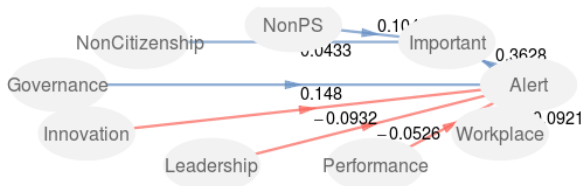
- Governance has a high impact

Banks Reputation Modeling with predicted Alert



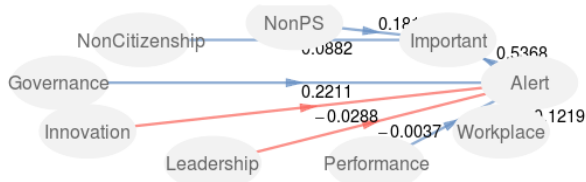
- Same dimensions hierarchy but with lower correlations
- No Improvement of Alert ranking

Music Reputation Modeling with reference Alert



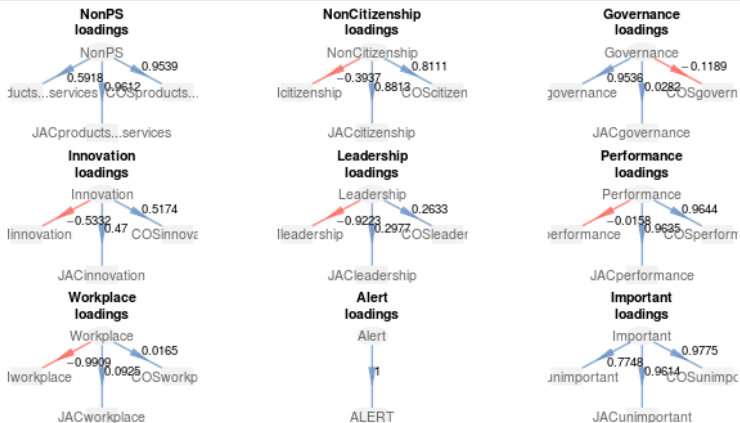
- Dimensions inferred from Automotive and Banking
- Almost no correlation !

Music Reputation Modeling with predicted Alert



- Global hierarchy is not the same
- Improvement of Alert ranking by 10%

Systems scores correlations with the Dimensions



- SVM seems uncorrelated for most Dimensions

Regarding classification issues

- Tweet content appears sufficient for tackling these classification tasks
- Concepts appear to fit Automotive and Banking
- Not well defined for Music or Universities
- PLS-PM can help to compensate the lack of annotation

Perspectives

- Additional feature/resource that can explain alerts
- Bayes and Dirichlet Modeling instead of PLS (in progress)
- Work with longer documents (blogs)
- Consider politicians and more reputation concepts

References

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Thank you !

Contact:

- jean-valere.cossu@univ-avignon.fr
- www.jeanvalerecossu.fr