

An ICT Framework for Food Monitoring using Social Data

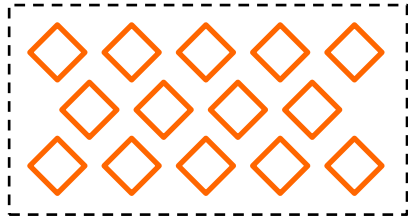
Marco Morana - University of Palermo, Italy

Antonio Giallanza - AgroBioPesca District

Motivations and Goals

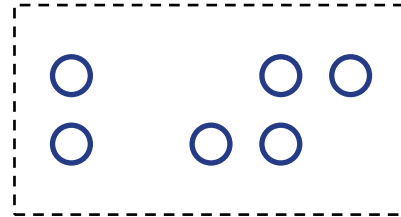
- ❖ A **a system for real-time Twitter data analysis** in order to follow a generic event from the user's point of view
 - ❖ Tweets are usually related to **events which involve many people** in different parts of the world
 - ❖ The framework we propose **adapts its behaviour to the nature of incoming data**

Set of tweets



TERM SELECTION

Top terms (T)



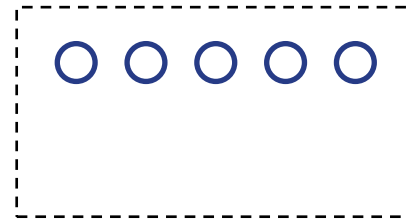
Find Best-Matching Terms

while (cosine similarity (S, t^) > Θ)*
expand S;

Topic (S)

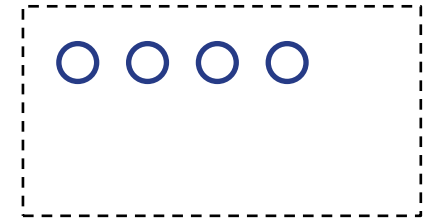


Topic (S)



. . .

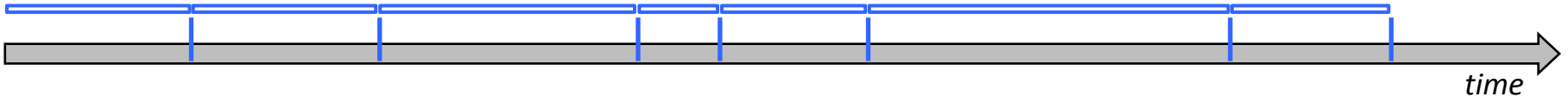
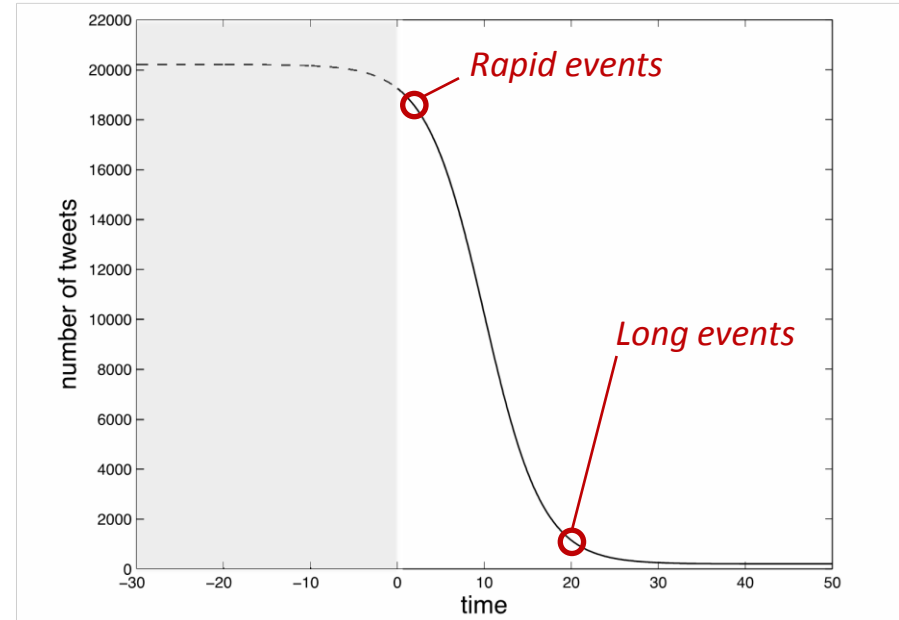
Topic (S)



Dynamic Soft Frequent Pattern Mining

Dynamic Detection Windows

The size of the windows depends on the duration of the event and the number of related tweets



Dynamic Soft Frequent Pattern Mining

Dynamic Term Selection (DTS)

Select the terms which are relevant both in W_{n-1} (existing topics) and in W_n (emerging topics)

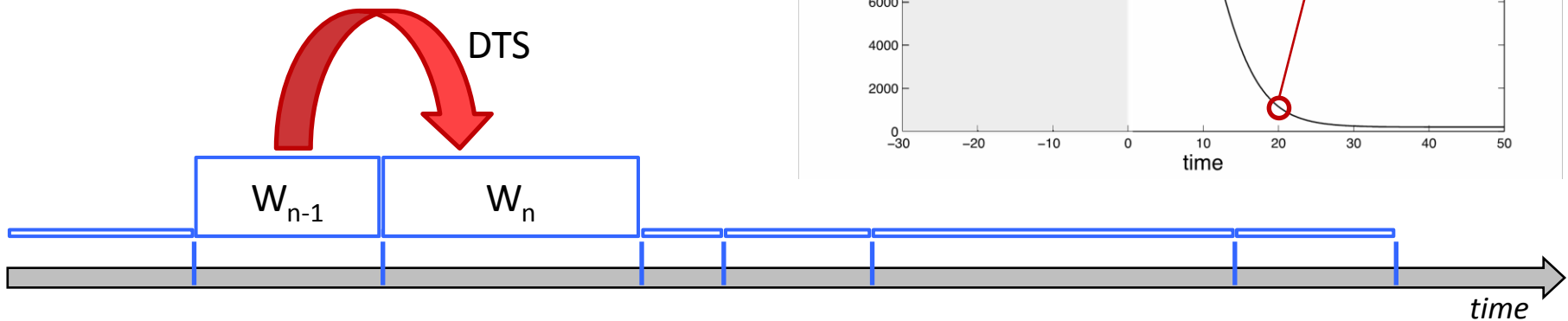
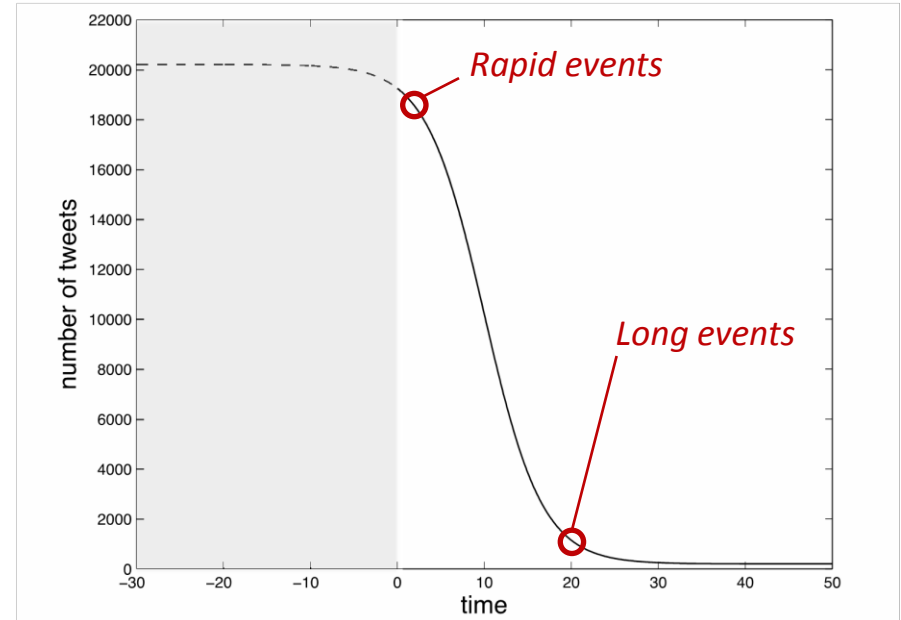
⇒ TF-IDF weighting

Give priority to terms denoting persons, organizations, and locations

⇒ Named-Entity Recognition (NER)

Dynamic Detection Windows

The size of the windows depends on the duration of the event and the number of related tweets



Dynamic Soft Frequent Pattern Mining

Dynamic Term Selection (DTS)

Select the terms which are relevant both in W_{n-1} (existing topics) and in W_n (emerging topics)

⇒ TF-IDF weighting

Give priority to terms denoting persons, organizations, and locations

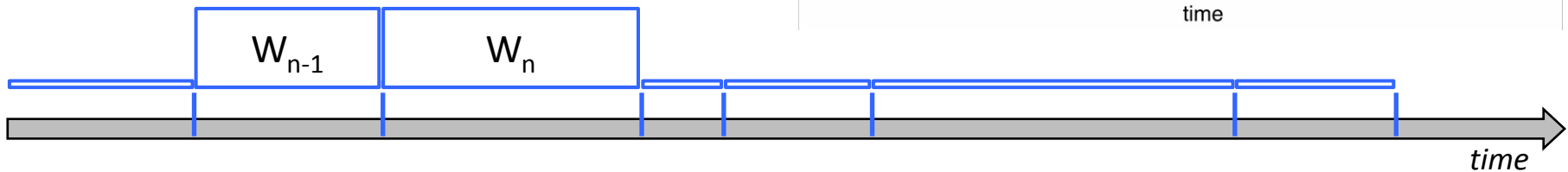
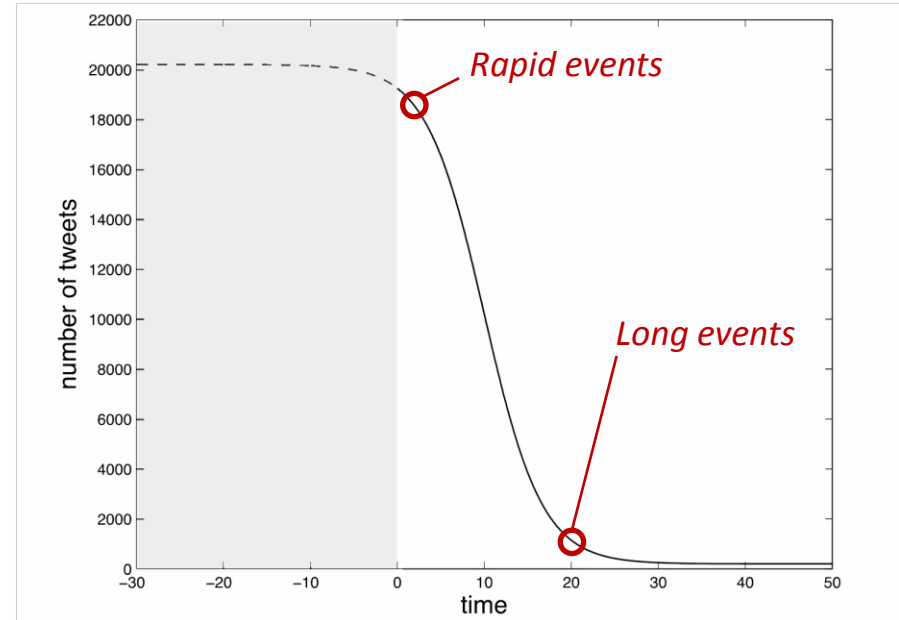
⇒ Named-Entity Recognition (NER)

Dynamic Keywords

For each W_n the set of keywords is updated by including new terms which reflect the users' perspective on a specific event or deleting those unused.

Dynamic Detection Windows

The size of the windows depends on the duration of the event and the number of related tweets



Case Study



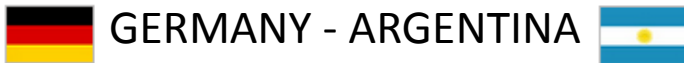
Case Study



A framework for real-time Twitter data analysis. *S. Gaglio, G. Lo Re, M. Morana. In Journal of Computer Communications, Elsevier*

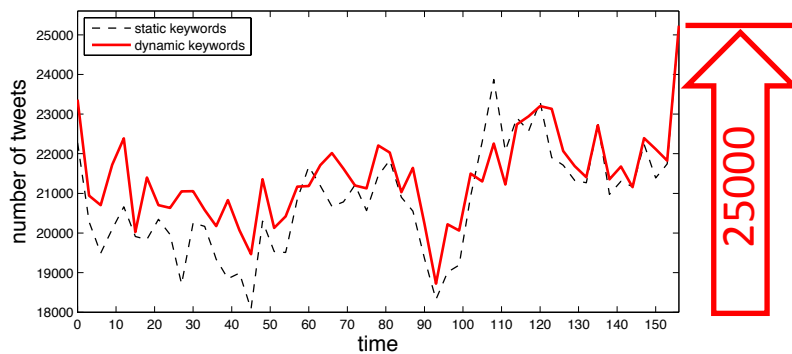
Real-Time Detection of Twitter Social Events from the User's Perspective. *S. Gaglio, G. Lo Re, M. Morana. In Proceedings of the 2015 IEEE International Conference on Communications (ICC2015)*

Results



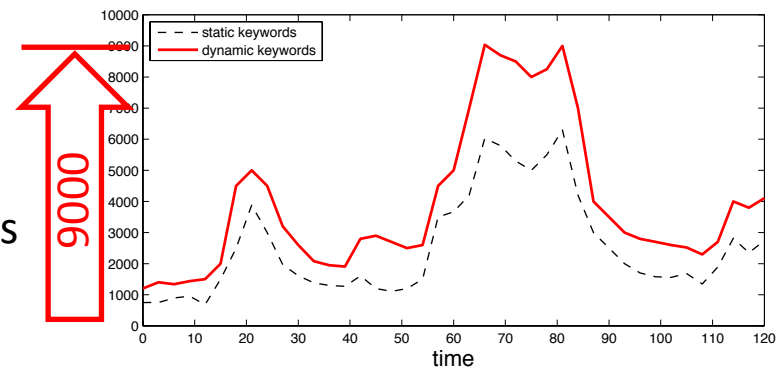
*#brasil2014, #brazil, #brasil,
#worldcup2014, #worldcup,
#FIFAWC2014, #ARGVsGER,
#GERVsARG*

*#brasil2014, #brazil, #brasil,
#worldcup2014, #worldcup,
#FIFAWC2014, #NETvsAUS,
#AUSvsNET*



Average window duration: 2.3 min

VS



Average window duration: 12.3 min

The 15 most popular topics detected during the FIFA World Cup 2014 final match

Time (CEST)	Topic
20:45	Puyol shows the World Cup trophy.
21:00	Khedira is out due to injury.
21:30	Higuain goal disallowed for offside.
21:47	Howedes's shot hits the near post.
22:30	Will the game be decided in 90 minutes?
22:53	Full-time! Match moves to extra-time.
23:00	Great chance for Schurrle.
23:14	First period of extra-time ends. Still 0-0.
23:17	<i>Messi was seen vomiting.</i>
23:24	GOAL! Mario Goetze.
23:36	Germany are the champions of the world.
23:36	Germany win the World Cup.
23:37	Gotze goal crowns Germany champions.
23:38	Germany has won its 4th title.
23:58	Germany lift the World Cup.

Social Sensing for Food Monitoring

We can process social networks data to detect and follow specific topics of interest

- ❖ The social networks can be considered as a part of a heterogeneous sensing infrastructure which also includes technologies such as RFID and NFC.
- ❖ An ICT platform can be designed to merge implicit information contained in social posts with explicit feedback provided by the users (mobile apps) in order to ensure that food is safe from '*farm to fork*'.
- ❖ Topic detection and summarization techniques can be used for automatic reporting of relevant events



UNIVERSITÀ
DEGLI STUDI
DI PALERMO



<http://www.dicgim.unipa.it/networks>

References

1. **A framework for real-time Twitter data analysis.** Gaglio, G. Lo Re, M. Morana. In Journal of Computer Communications, ISSN 0140-3664. doi: /10.1016/j.comcom.2015.09.021.
2. **Real-Time Detection of Twitter Social Events from the User's Perspective.** Gaglio, G. Lo Re, M. Morana. In Communications (ICC), 2015 IEEE International Conference on, pp.1207-1212, 8-12 June 2015. doi: 10.1109/ICC.2015.7248487