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Twitter Motivation

What we can do with Twitter data

Paolo Nesi, Gianni Pantaleo, Imad Zaza

Distributed [Systems and internet | Data Intelligence and] Technologies Lab
Dipartimento di Ingegneria dell'Informazione (DINFO),
Universita' degl;I Studi di Firenze
Fax: 0039-055-2758570, tel: 0039-3355668674
http://www.disit.dinfo.unifi.it , http://www.km4city.org

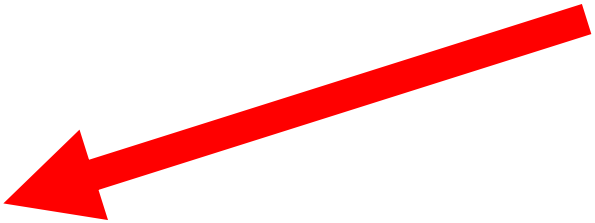
http://www.disit.org/tv
http://www.disit.org/rttv

Twitter Vigilance

Agenda

1. Introduction: What is Twitter
2. Overview on Twitter Data Capabilities
3. Twitter Vigilance how it is working
4. Exercitation Work Plan

Agenda



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Twitter Applications

- Social media analysis is becoming a very important instrument to monitor communities, users' preferences, and to make predictions
- Twitter is one of the most widespread microblogs allowing users to have a personal news feed and followers attached to it

Introduction: What is Twitter ?

The evolution and growth of Social Networks and Media has recently brought new horizons and challenges for designing smart tools for event monitoring, providing also predictive capabilities

Microblogging services like ***Twitter*** have been proven to be an inestimable source of *continuously, instantly updated information*, useful for different purposes

Many different contexts and application areas:

- ***Collect users' information*** *about* ***quality of services***
- ***Event Monitoring*** *- crowd size estimation, voting results, predicting TV audience etc.*
- ***Early Warning*** *- monitoring critical situations for alerts providing (weather alerts, spread of contagious diseases, natural disasters etc.)*

Twitter in Numbers

- 350,000 Tweets are sent every minute
- In 2016, Twitter has 310 million monthly active users *(almost the same as the U.S. population)*
- A total of 1.3 billion accounts have been created
- Of those, 44% made an account and left before ever sending a Tweet

Followers receive some notification connected to the actions performed by the users they follow.

Hashtags **#** represent codified keywords

Twitter Users, Mentions and Citations **@**

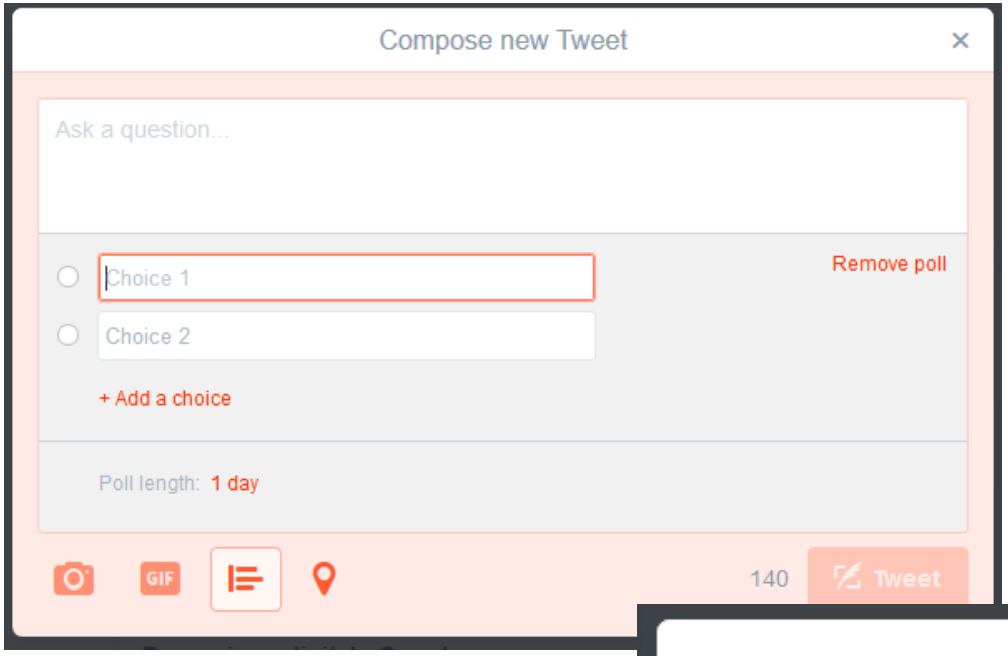
Typical actions:

- *Compose a new tweet*
- *Comment*
- *Like / Favourite*
- *Retweet*

Can provoke reactions, echoes and interest in viral processes that may lead to massive propagation in the user community, create influencers, pushers etc.

SOCIAL ENGAGEMENT

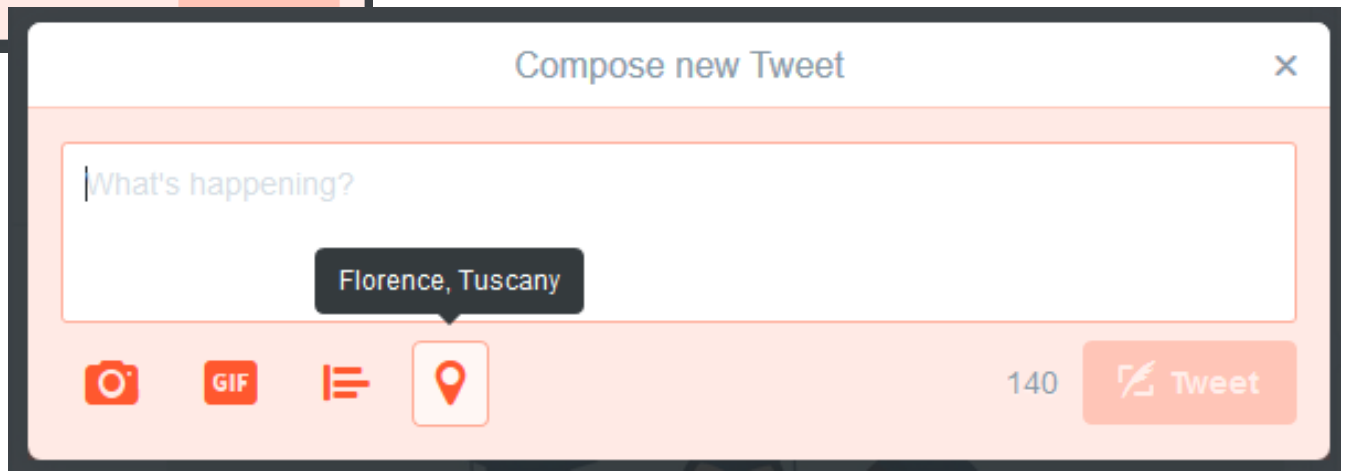
Compose a New Tweet



- Compose a new text message (up to 140 characters)

- Add several kinds of metadata (pictures, Location…)

- Add polls for specific questions



Twitter Users

- They are characterised by a number of features:
  - Following
  - Followers
  - Metadata information (age, location, sex, etc..)

Different Kinds of Twitter Users

- Not only single users…
  - but also News Agencies

  - Public Institutions & Governments

  - VIPs

  - Teams, Schools, Municipalities,, etc.,

Share, Promote and Communicate

Follower and Following of an user

- Followers: are those that decided to be connected with the user receiving all updates from his activity and post.
  - A typical user has more following than followers
- Following: are the users followed by the identified user

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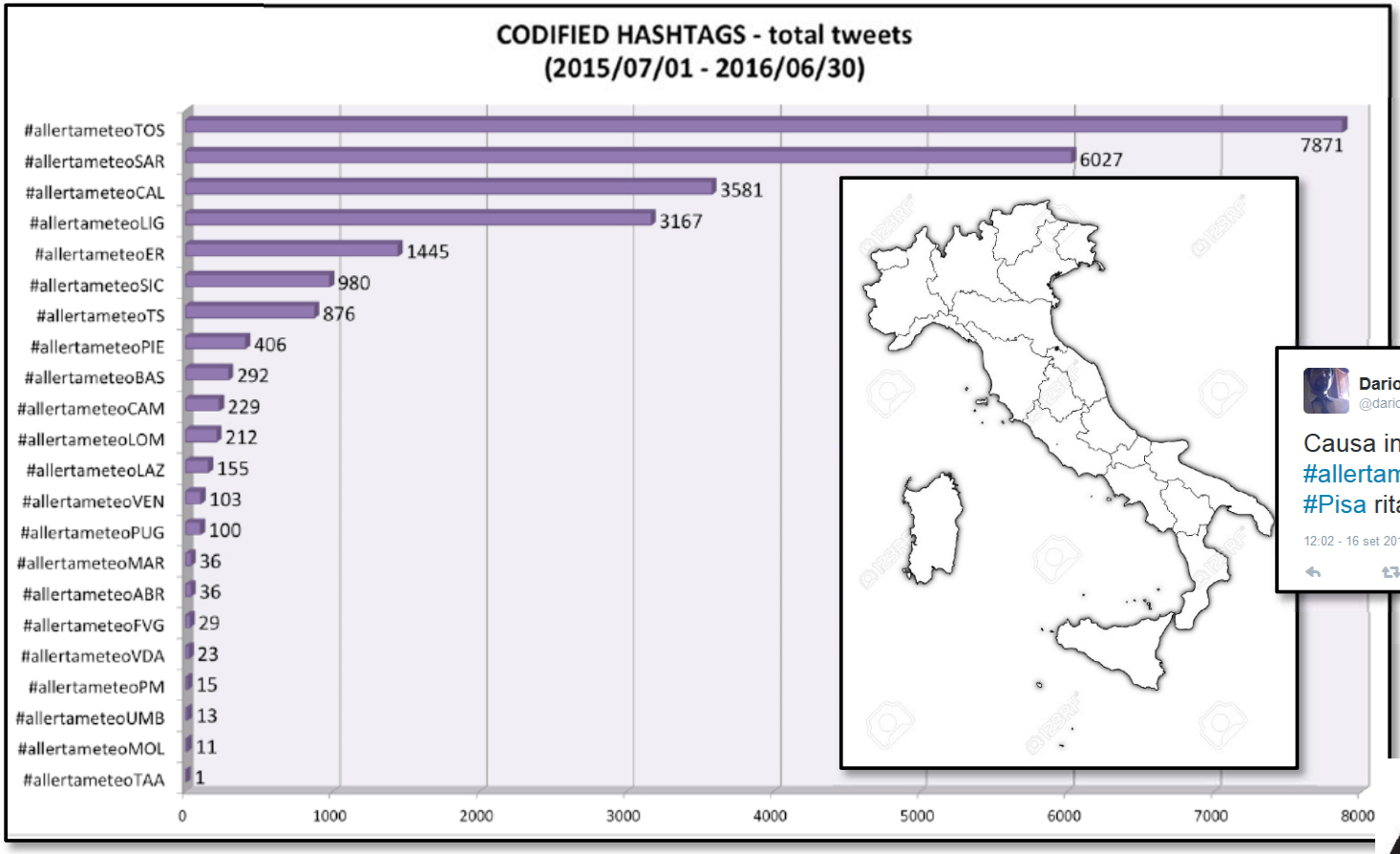
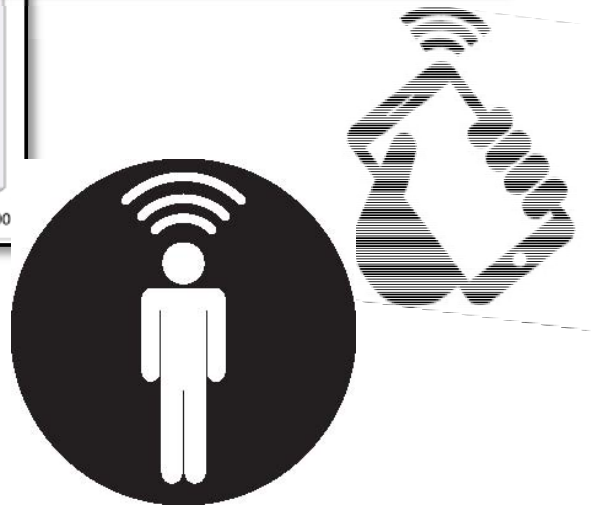
Twitter User as a Sensor





Codified Hashtags for Italian Regional Weather Report Services

Twitter Vigilance

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Qualified VS Free Information ?

- ***Hashtags*** "#<keyword>" can be invented and/or suggested to the community by the communication stakeholders (Public Administrations, companies and services, TV/web productions etc.), or created spontaneously by some users as well

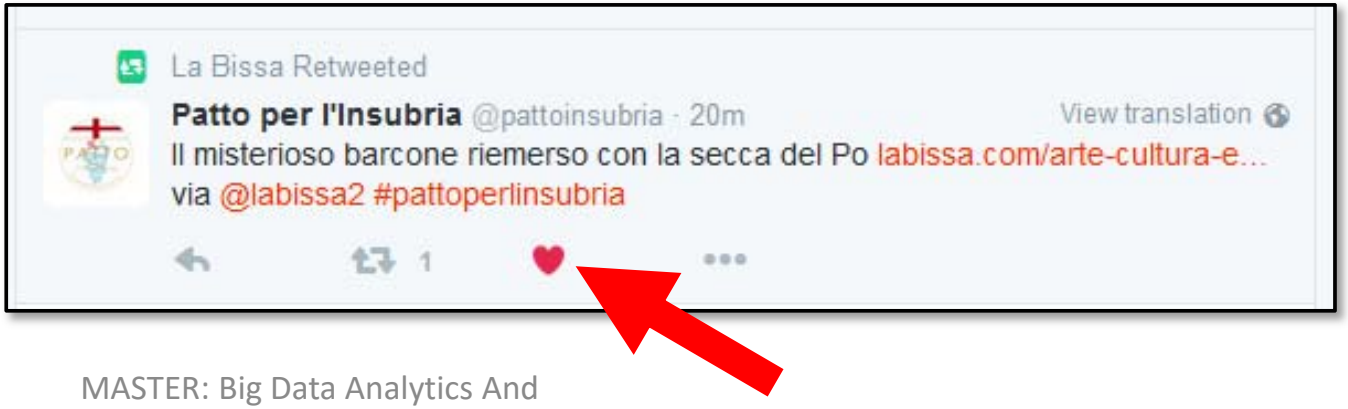
- Qualified Hashtags VS Free Hashtags for Social Engagement ?
  - ❖ Codified hashtag are helpful as ***focused information channels***

Citation (e.g., @paolonesi)

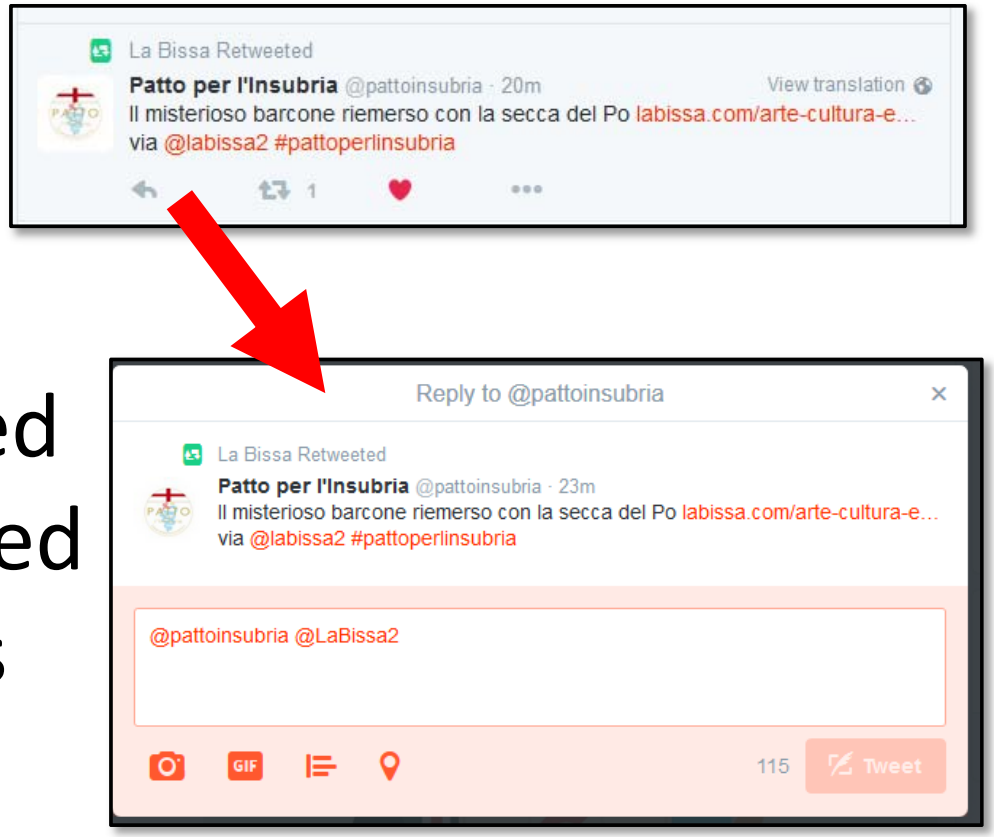
- When you can find a citation (e.g., @paolonesi) in the body of the tweet
  - Twitter sends to the CITED user (e.g., @paolonesi) a message pushing him/her to read and intervene
  - It is one of the main drivers of virality, connected with the number of Followers of the cited persons, since if the cited person reply, ALL his followers are going to received a notification of a new message

Favorites

- Each Tweet can be *Favourite* by some user
- The number of *Favourite of a Tweet is an index of appreciation and create virality since the actions of Favourite are promoted on the network of Followers of*
  - *who has favorited and*
  - *who has produced the tweet favourite*



Reply / Comment



- Each Tweet can be replyed and the Reply is Connected with the former Tweet as in the figure.
- Twitter.com suggests you to put direct citations to former user and cited users

ReTweet

- Given a Tweet, an user can do a ReTweet
- This implies that Twitter.com is promoting you action to:
  - your followers: @fgsfgklgh has retweeted……
  - User of former tweet
  - the followers of the User of former Tweet

Advertising ……. Also in Twitter

- **In general**
  - **Costs per Impressions, CPI (Costs per Thousands of Impressions, CPM, M is derived from M as 1000 in Roman numbers):**
    - a fee for each impression of the Ad
  - **Cost per Click, CPC:**
    - a fee for each click on the Ad
  - **Cost per Sale, CPS:**
    - a fee for each Sale of a given product/service

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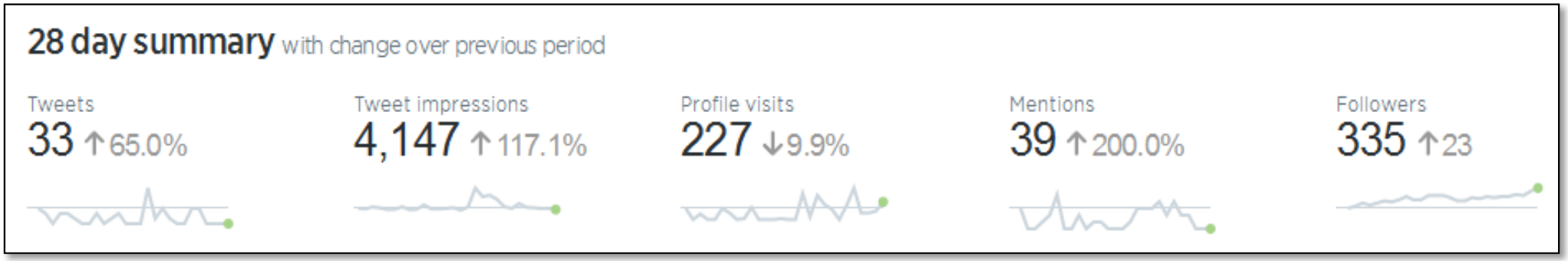
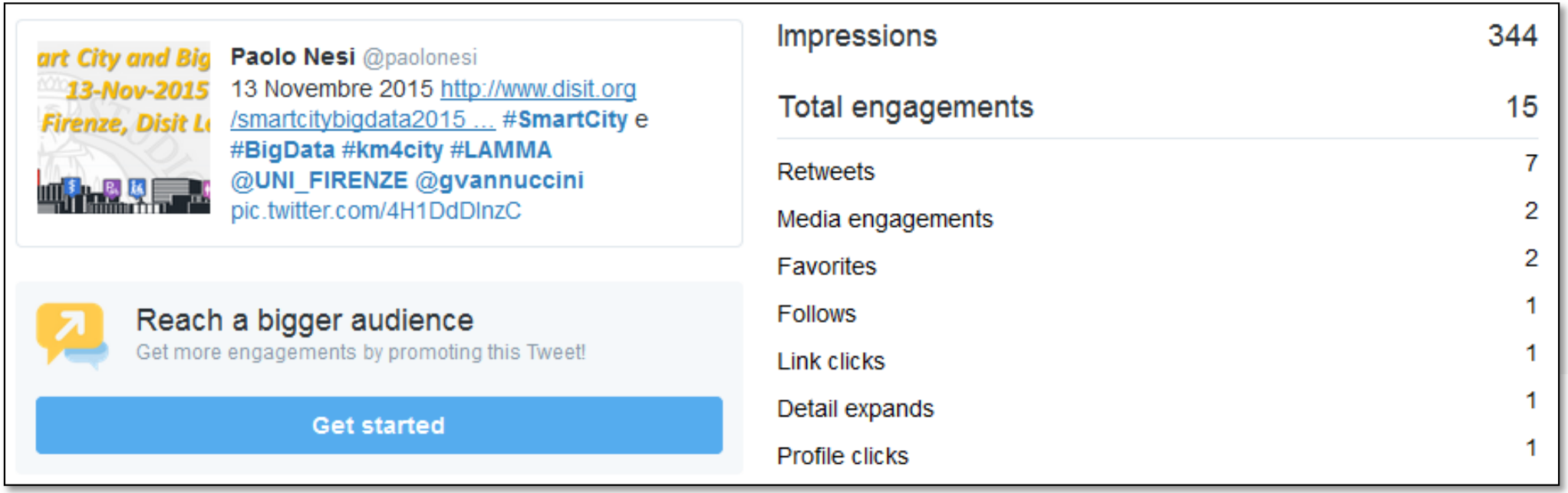
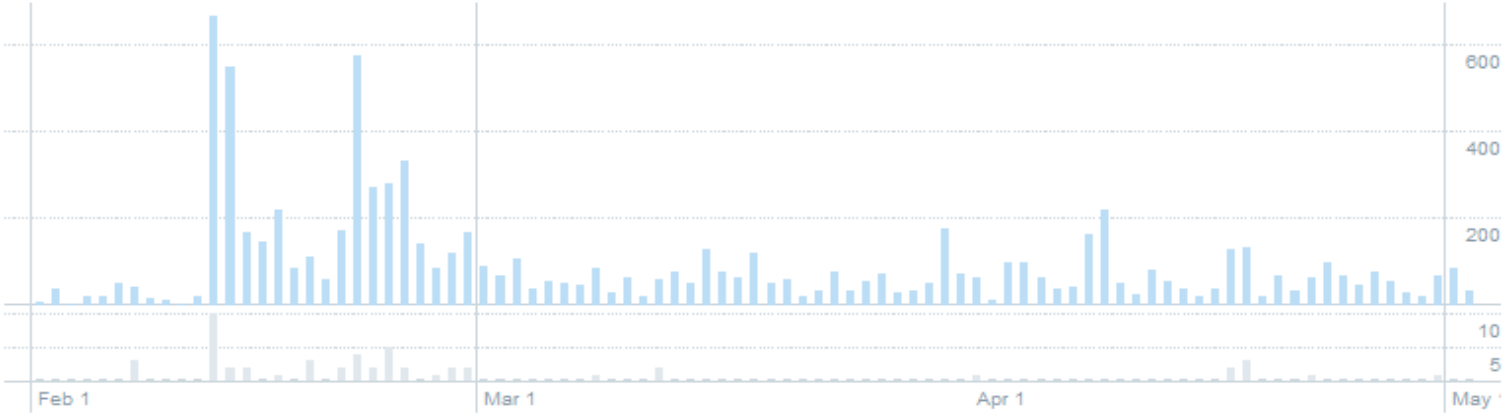
Twitter Analytics





Twitter Vigilance

Your Tweets earned **8.6K impressions** over this **91 day** period



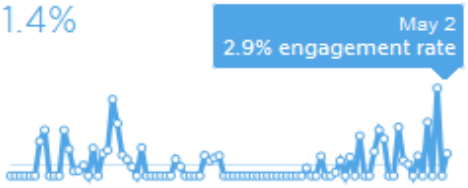
YOUR TWEETS
During this 91 day period, you earned **95 impressions** per day.

Tweets | Top Tweets | Tweets and replies | Promoted

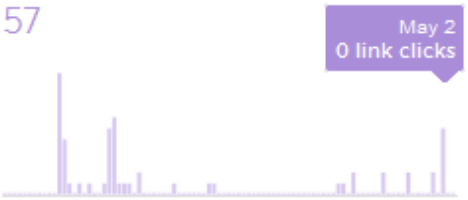
	Impressions	Engagements	Engagement rate
Paolo Nesi @paolonesi · Feb 12 FODD2015 - Firenze Open Data Day disit.org/fodd @CGiachi @PoloNavacchio @sclopit View Tweet activity	1,068	17	1.6% Promote
Paolo Nesi @paolonesi · Feb 22 #fodd slide e video disit.org/6593 #Firenze #OpenData #oddit15 @vbugli @opentoscana @gvannuccini @comunefi @anteos @paolonesi View Tweet activity	757	23	3.0% Promote
Paolo Nesi @paolonesi · Feb 21 #fodd firenze open data day 2015 pic.twitter.com/QuwB3kpwrj View Tweet activity	663	13	2.0% Promote

Engagements
Showing 91 days with daily frequency

ENGAGEMENT RATE
1.4%



LINK CLICKS
57



On average, you earned **1 link clicks** per day

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Twitter Vigilance: le analisi

- **Analisi e caratterizzazione della comunicazione**
- **Percezione sociale, eventi pubblici, naturali..**
- **Scoprire, identificare e calcolare**
  - **Nascita / crescita di nuove occorrenze** in tempo reale: eventi, fatti, meteo, condizioni critiche, etc.
    - ***Supporto alla decisioni, ridurre i tempi di reazione, valutare la percezione, ridurre i costi, incrementare la resilienza come capacità di reagire, diagnosi precoce***
  - **Chi influenza** la comunicazione, le comunità e come: i pusher, gli attori, i *follower*, le sorgenti, etc.
  - **Predizione su eventi** periodici, per esempio presenze ad eventi, presenze sui canali televisivi, vendite aziende, etc.
  - **Misure indirette** basate sulla popolazione: rischio sicurezza, degrado, neve, grandine, vento, fallimenti, etc.

Prediction/Assessment

- Football game results as related to the volume of Tweets
- Number of votes on political elections, via sentiment analysis, SA
- Size and inception of contagious diseases
- marketability of consumer goods
- public health seasonal flu
- box-office revenues for movies
- places to be visited, most visited
- number of people in locations like airports
- audience of TV programmes, political TV shows
- weather forecast information
- Appreciation of services

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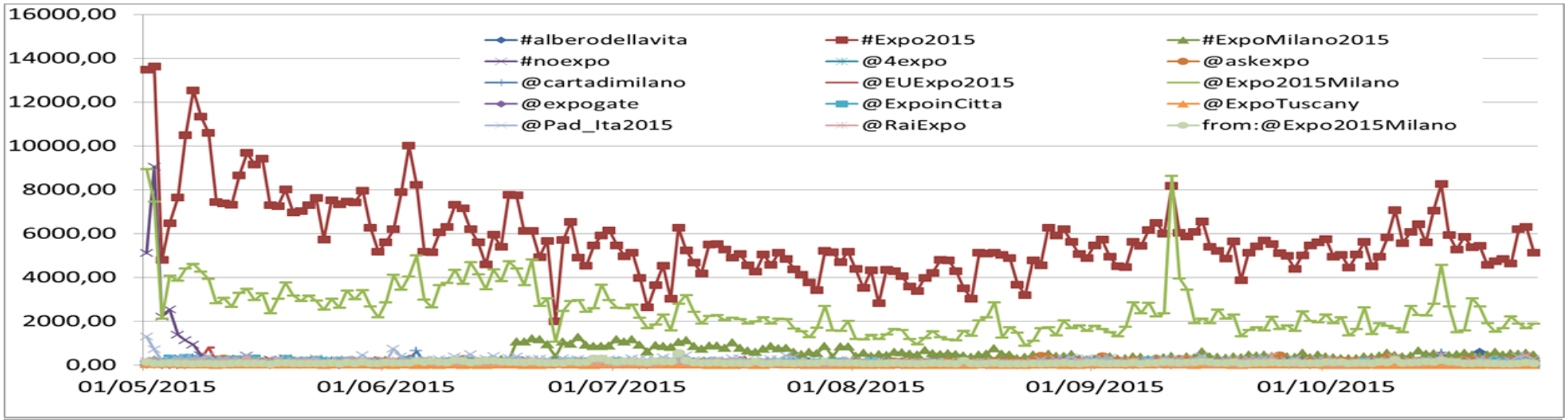
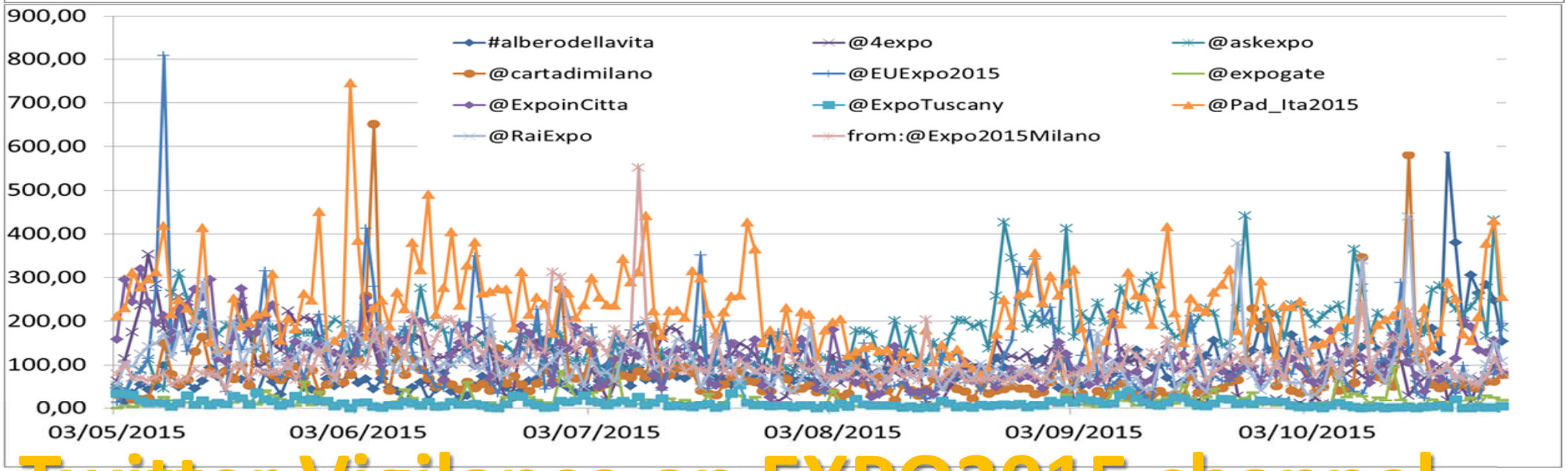
Twitter Vigilance





Twitter Vigilance on EXPO2015 channel

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Twitter Metrics

- TW: Number of Tweets per **Search/Channel** (as called Volume) , per day, per hour
- RTW: Number of ReTweets per **Search/Channel**, per day, per hour
- NRT/TW: ratio from ReTweets and Tweets per **Search/Channel**, per day, per hour
- NumSearch: number of Tweets including the Search per **Channel,** per day, per hour
- Sentiment Analysis Score per **Search/Channel**, per day, per hour
- Num of xxxxx

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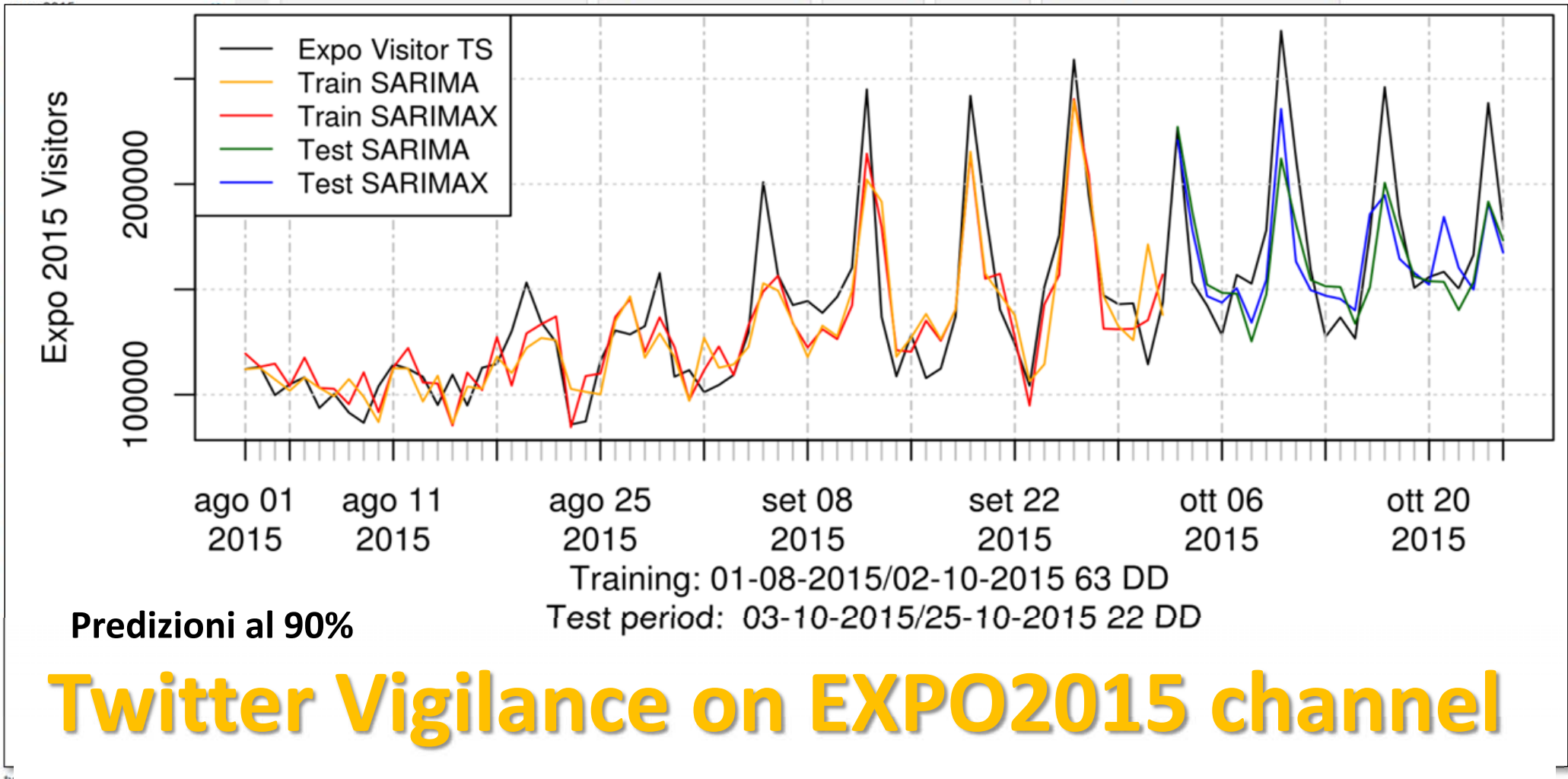
Twitter Vigilance monitoring and predictions



Predizioni al 90%

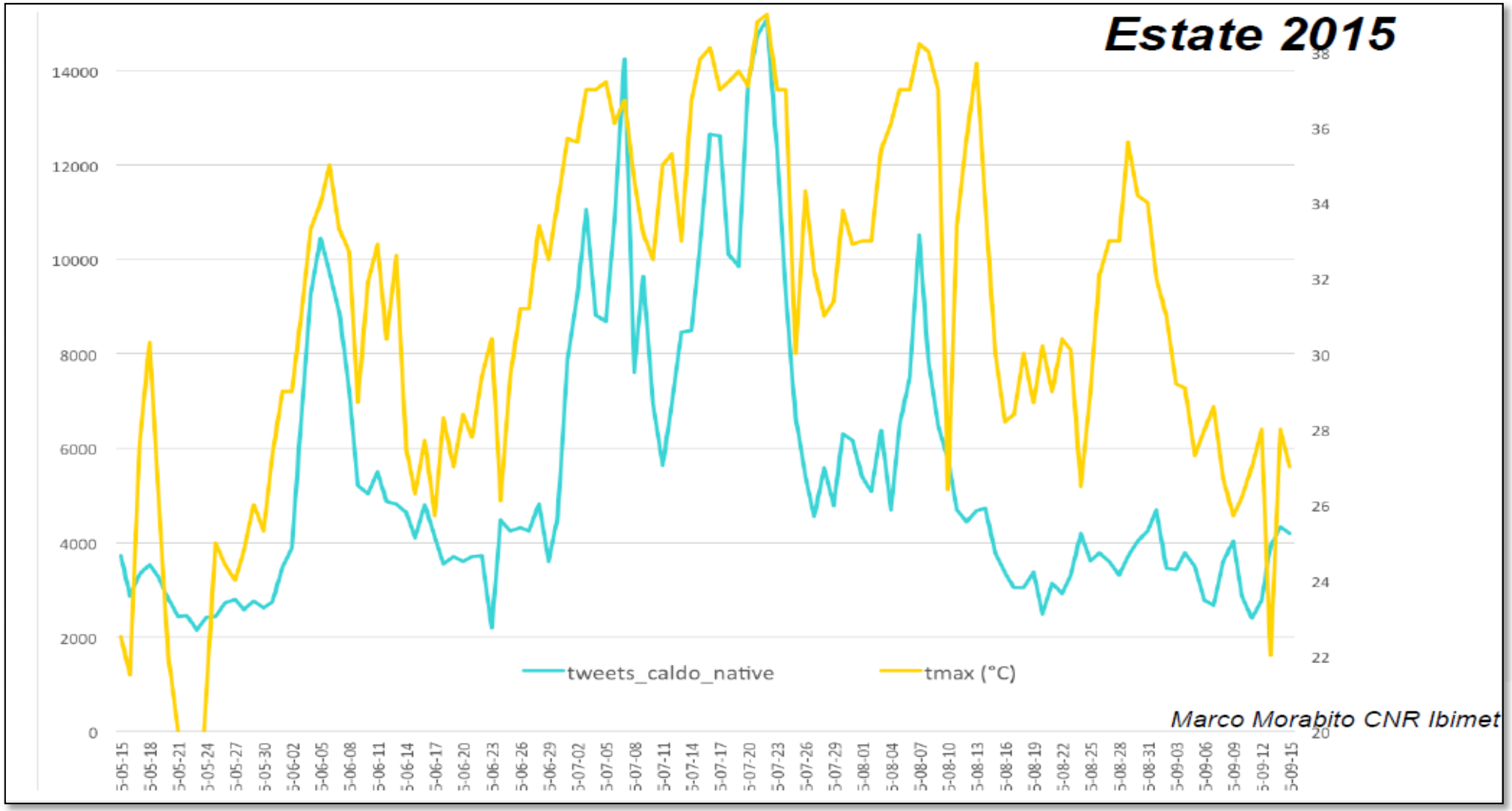
Twitter Vigilance on EXPO2015 channel

Predicting volume of visitors for tuning the services

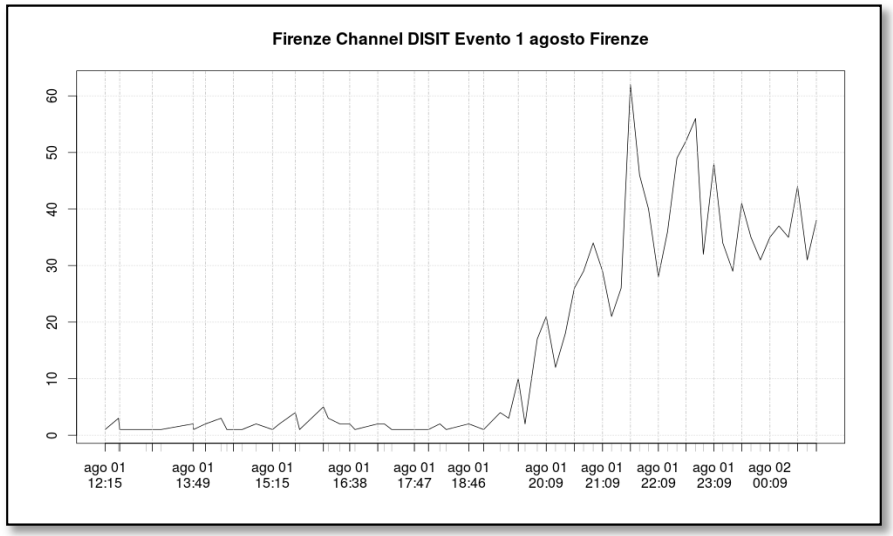
Early Warning (diagnosi precoce)

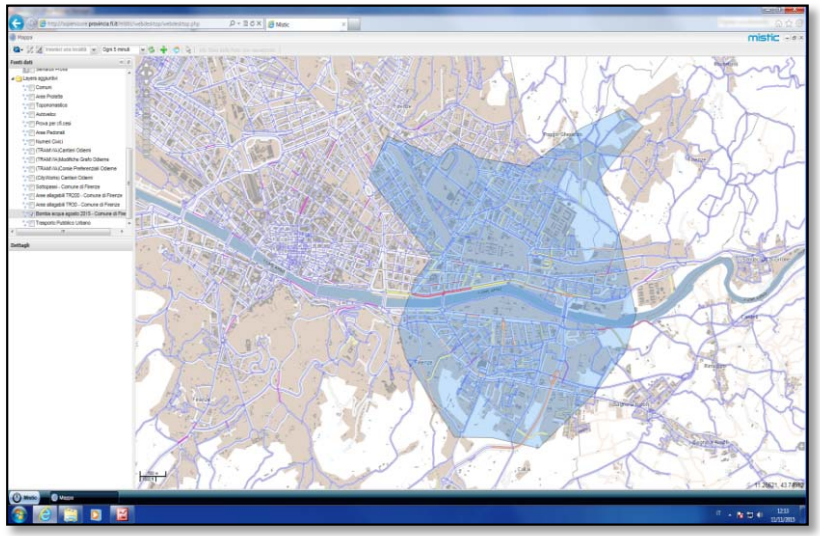
- **Computing time**
  - Twitter Vigilance: 1 Day computing, 1 hour update, http://www.disit.org/tv
  - Real Time Twitter Vigilance: 5 minutes computing, http://www.disit.org/rttv
- **Alert of events inception**
  - Relatively Short Term prediction
  - E.g.: emerging drugs, disasters, emerging locations for social activities, new fashionable restaurants, etc.
- **Reaction time:**
  - Firing action on some metric: ReTweet, Alert, ….

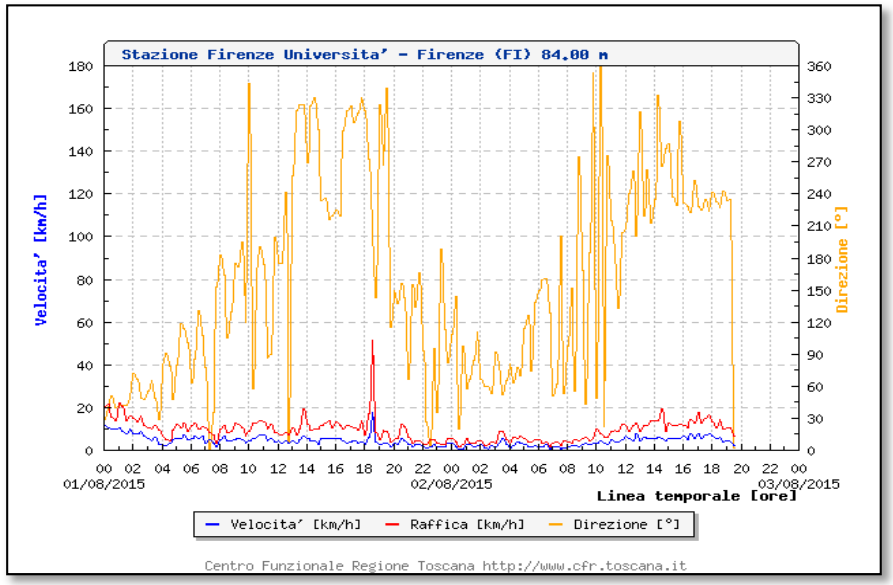
Twitter Vigilance and Hot Trends

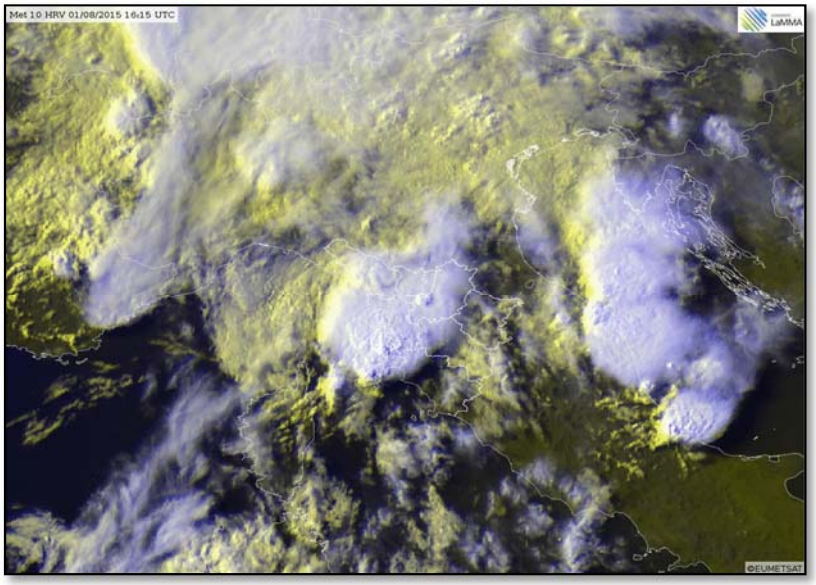


Twitter Vigilance and Water Bomb









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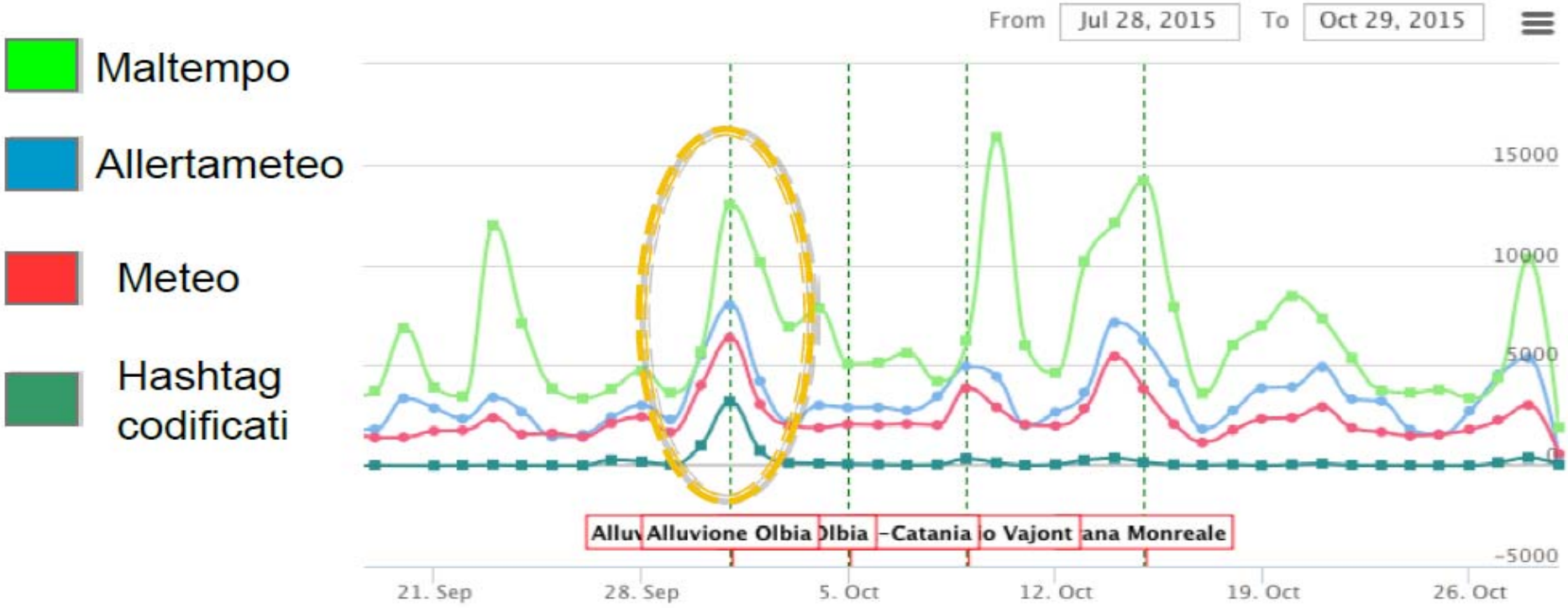
From IBIMET

Strong correction with events different metrics remarking events



In collaboration with LAMMA

NLP and SA analysis

- Analysis of Twitter text taking into account the specific grammatical constructs and lexicon of twitter
- Extraction of: verbs, adjectives, keywords, citations, hashtags, etc….
- Construction of metrics counting those elements
- Understanding the meaning of the text and taking into account the discourse, the context; disambiguating statements

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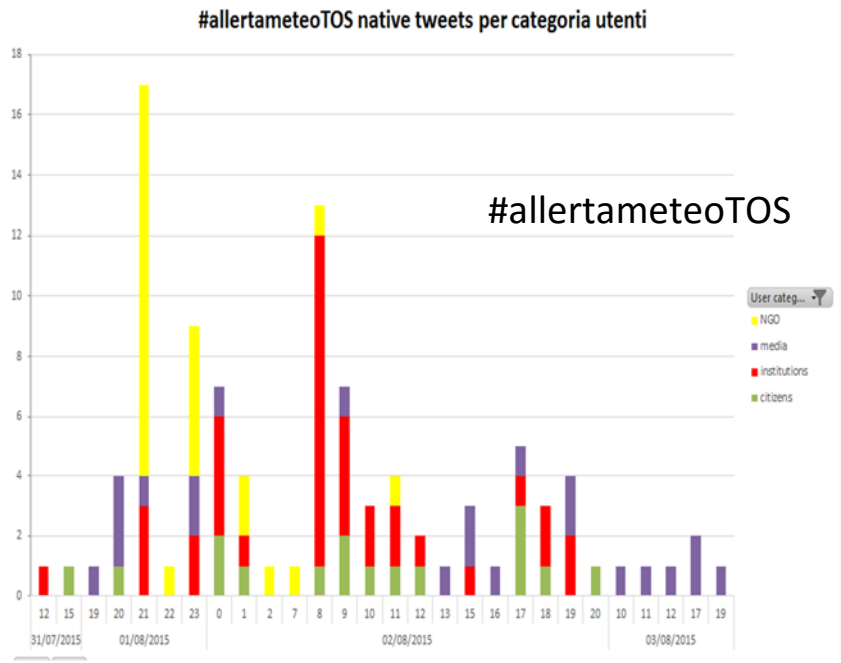
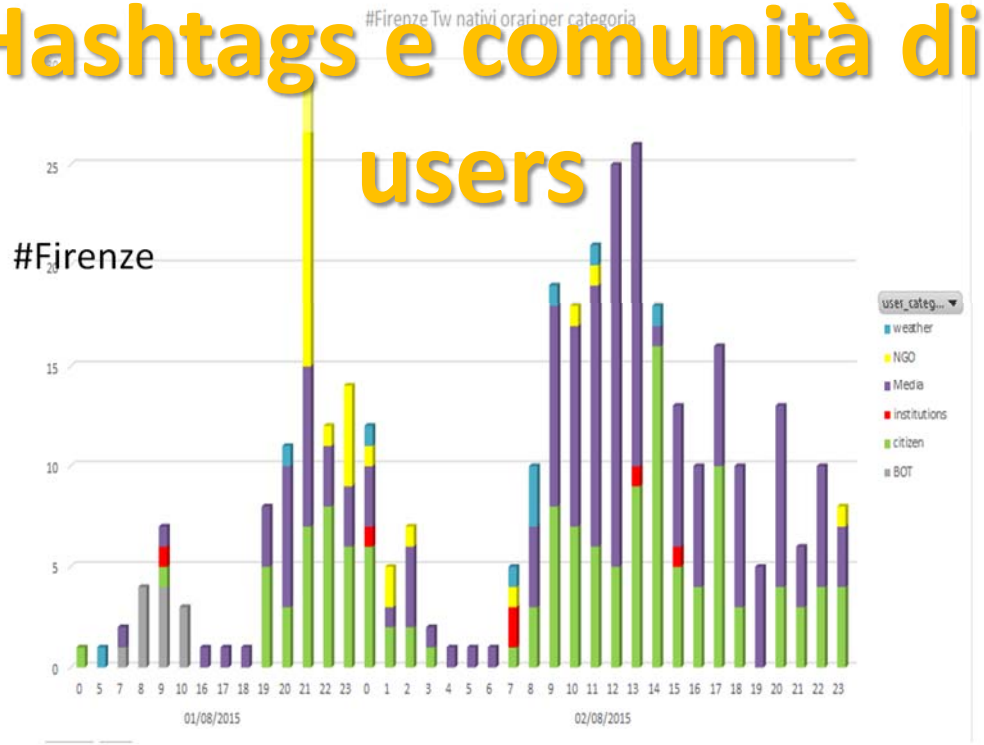
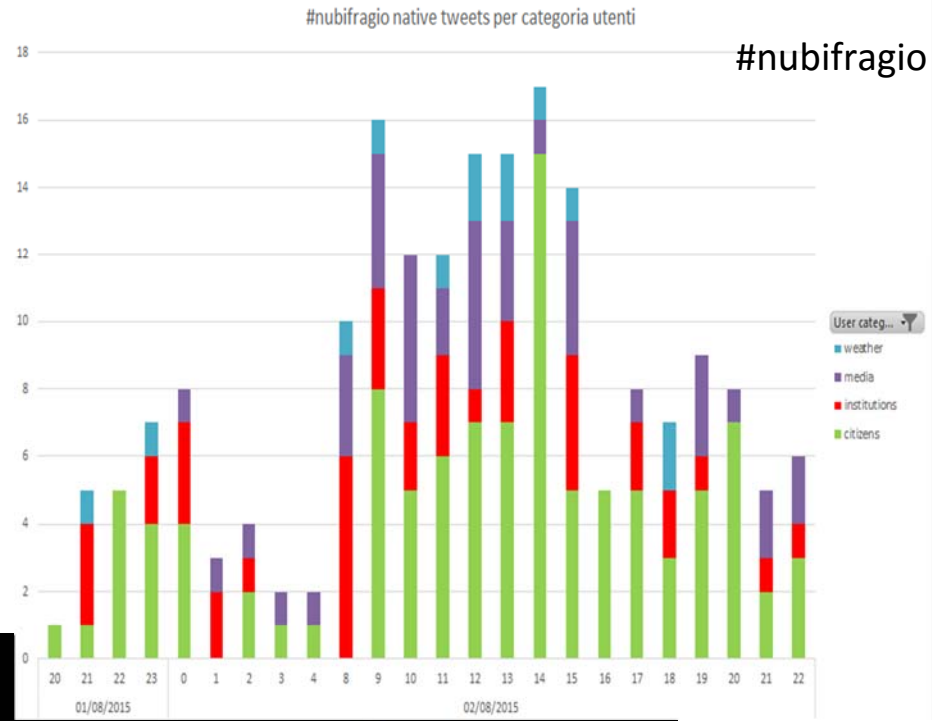
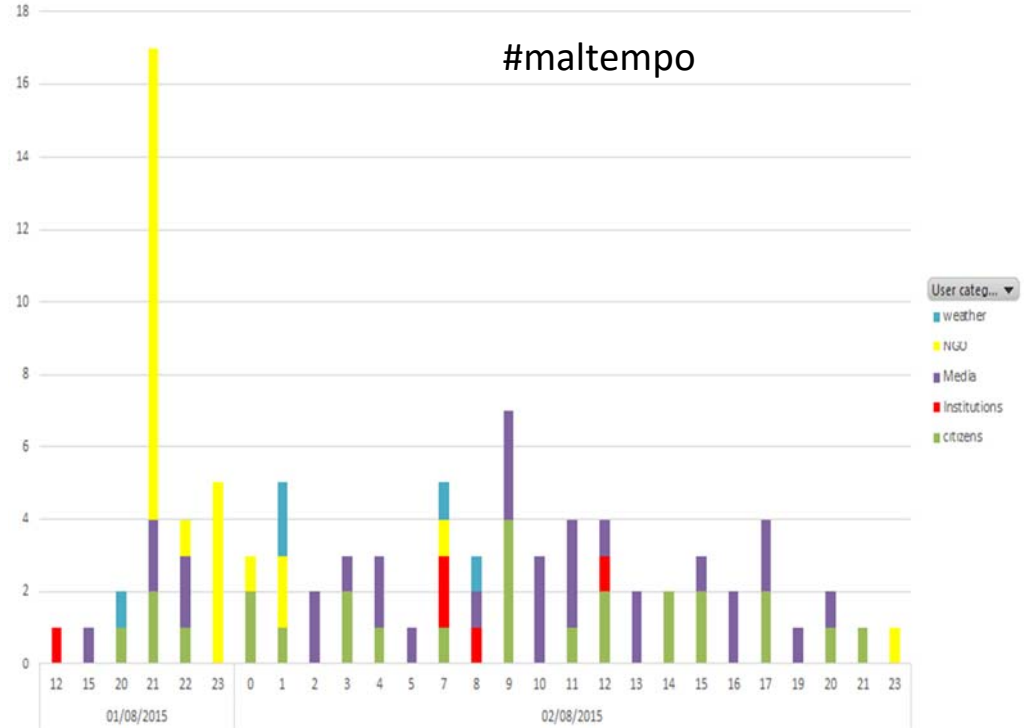
From LAMMA

Hashtags e comunità di users









Twitter Vigilance: sentiment analysis

- **Controlla e analizza in automatico** il *livello di apprezzamento e/o dissenso* per:
  - prodotti, servizi, promozioni, cambiamenti in città,
  - persone, azioni politiche, eventi,
  - programmi TV, attori, cantanti (surrogato di "auditel")
- Permette di effettuare
  - Valutazioni di **andamento** a breve e lungo termine
  - Valutazioni **comparative** a breve e lungo termine
  - **Predizioni** in certe situazioni
  - **Identificazioni in quasi real time** della nascita di eventi esplosivi, situazioni critiche, etc., uso di utenti come sensori diffusi

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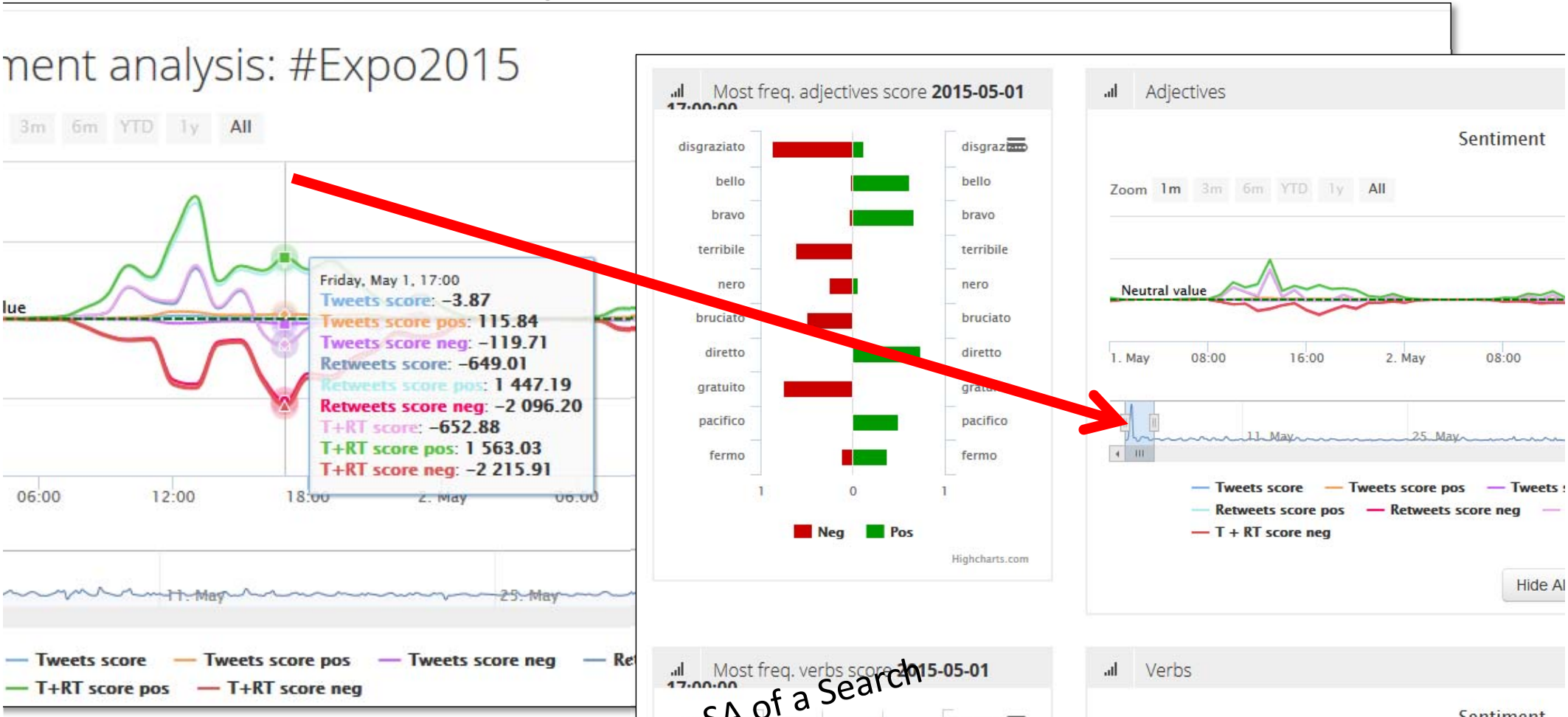

Some views on details of the SA of a Search

Sentiment Analysis on #EXPO2015 search

Twitter Vigilance

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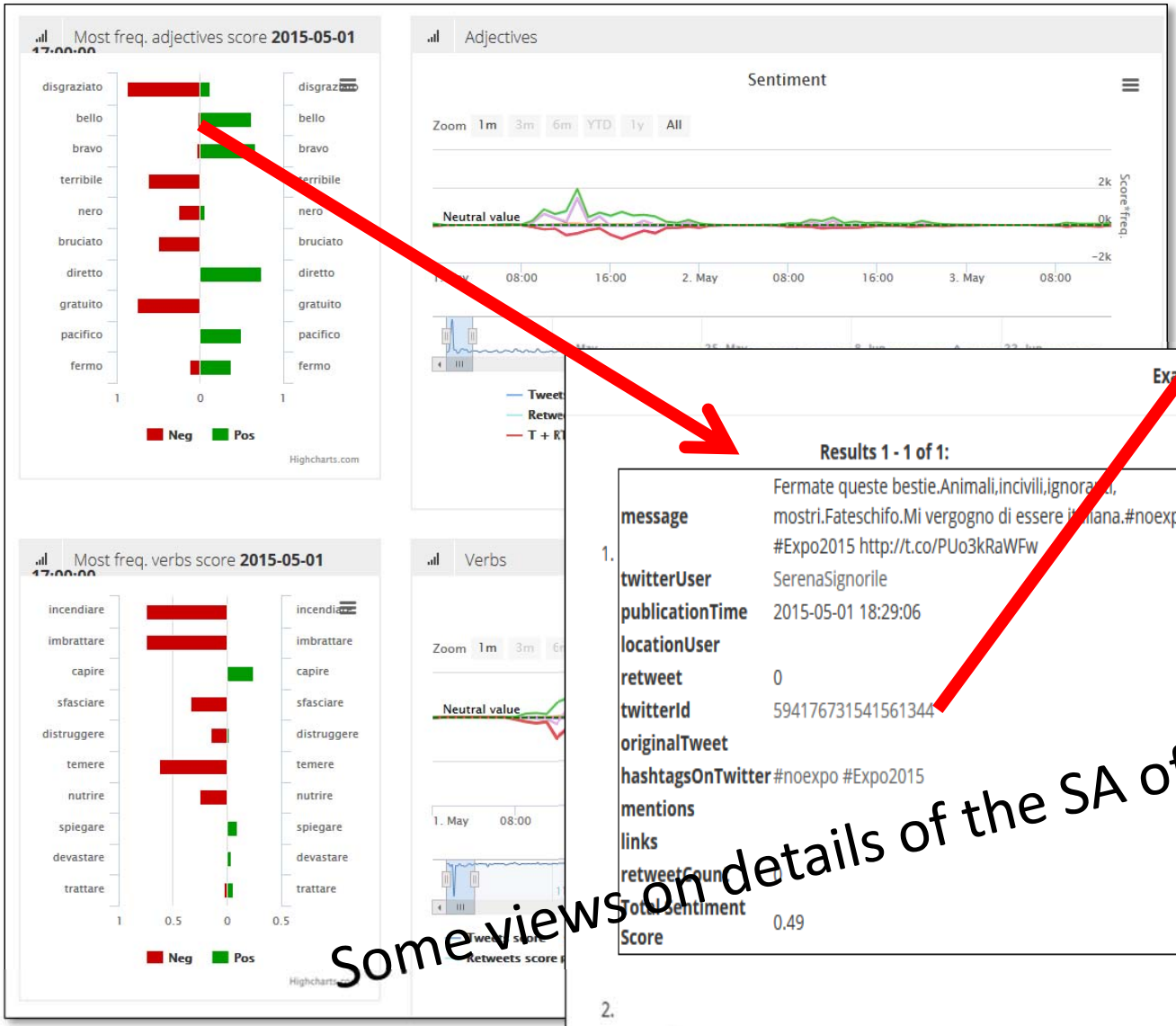

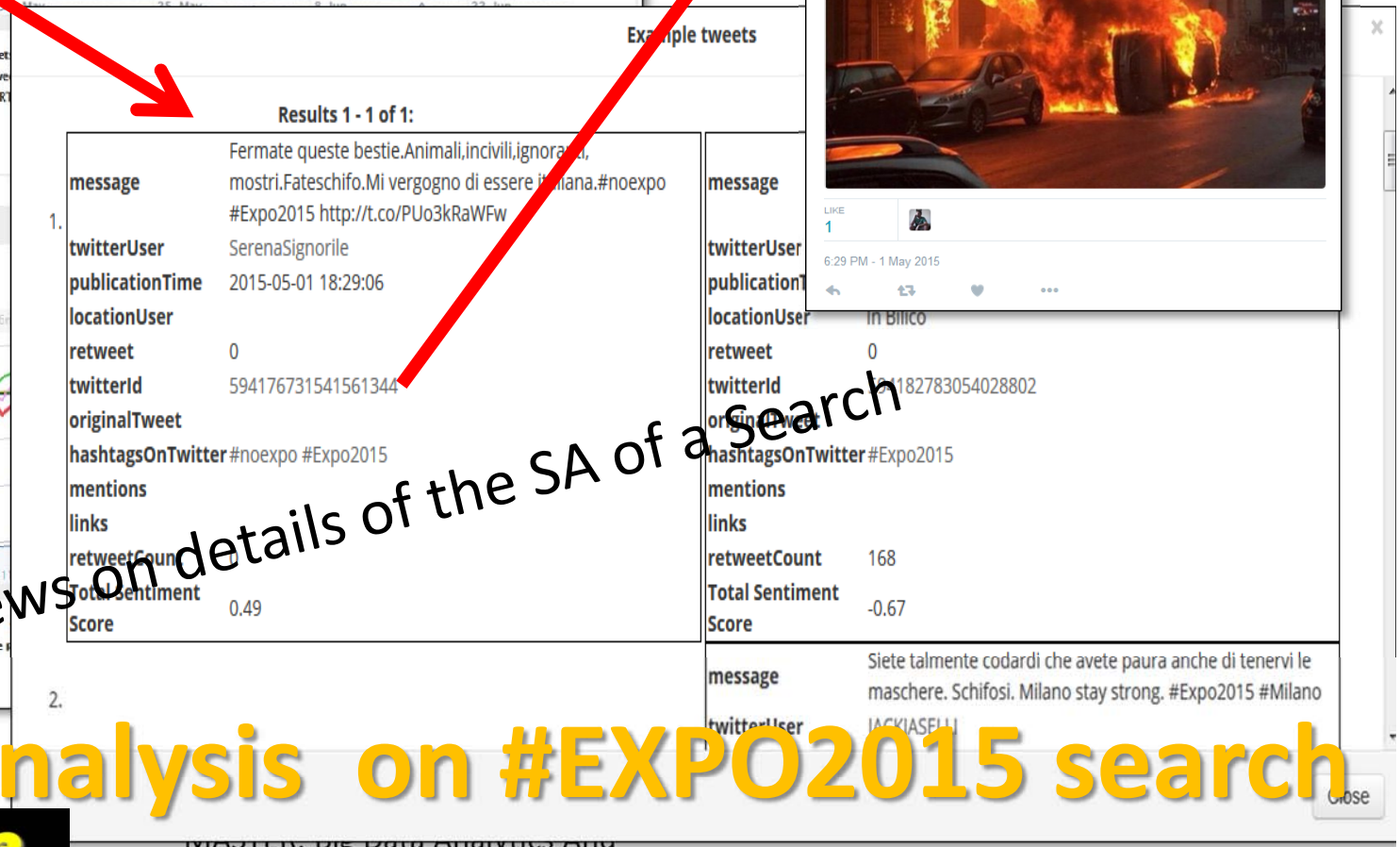

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Twitter Vigilance

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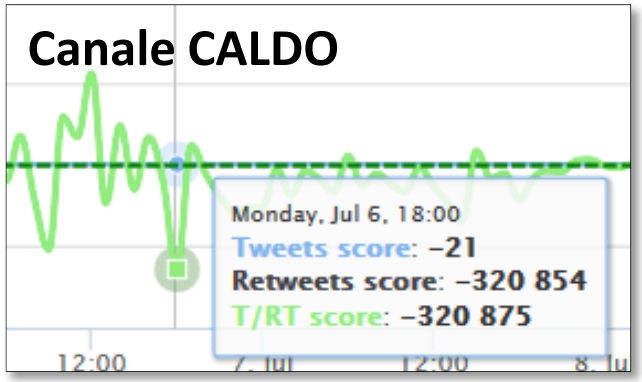
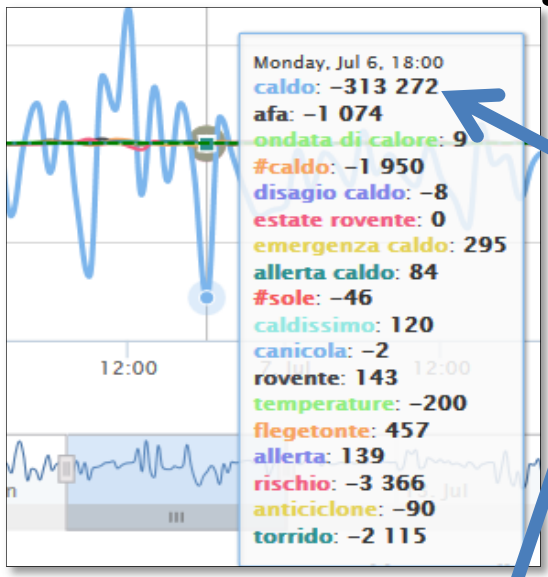
Sentiment Analysis

Canale CALDO

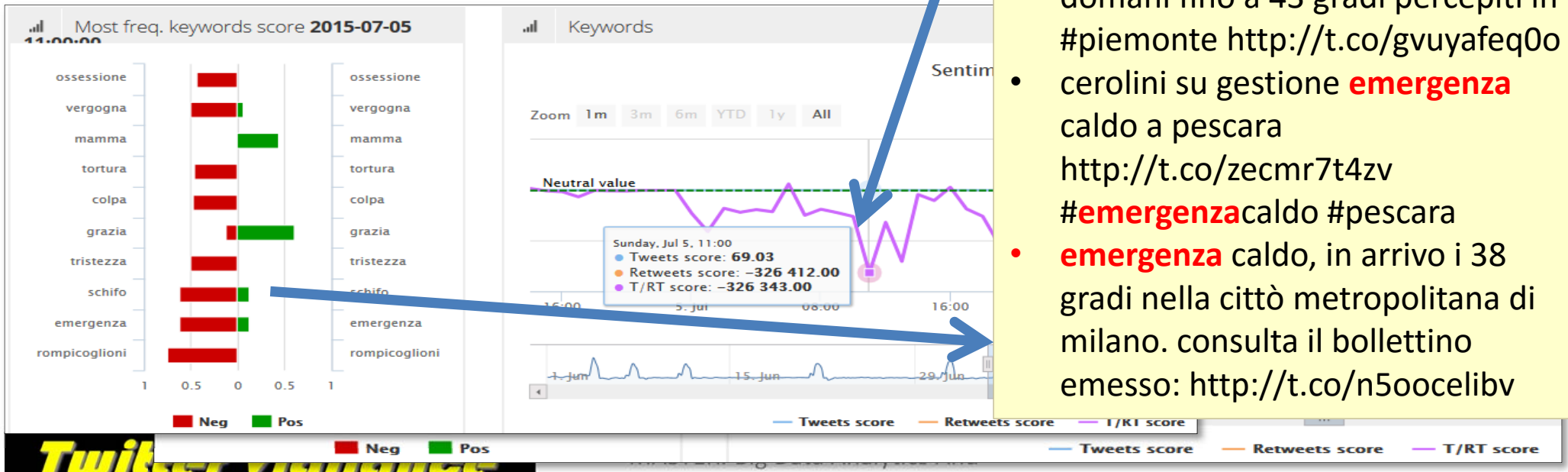


SA sul canale CALDO: la ricerca "caldo" ha dato un sentiment negativo



Un sentiment marcatamente negativo: -313272
Anche su key multiple

Pochi Tweet negativi hanno provocato un enorme numero di retweet



- **emergenza** caldo, una rete per i più deboli http://t.co/x6e4dkwqk8
- continua l'**emergenza** #caldo. domani fino a 43 gradi percepiti in #piemonte http://t.co/gvuyafeq0o
- cerolini su gestione **emergenza** caldo a pescara http://t.co/zecmr7t4zv #**emergenza**caldo #pescara
- **emergenza** caldo, in arrivo i 38 gradi nella cittò metropolitana di milano. consulta il bollettino emesso: http://t.co/n5oocelibv

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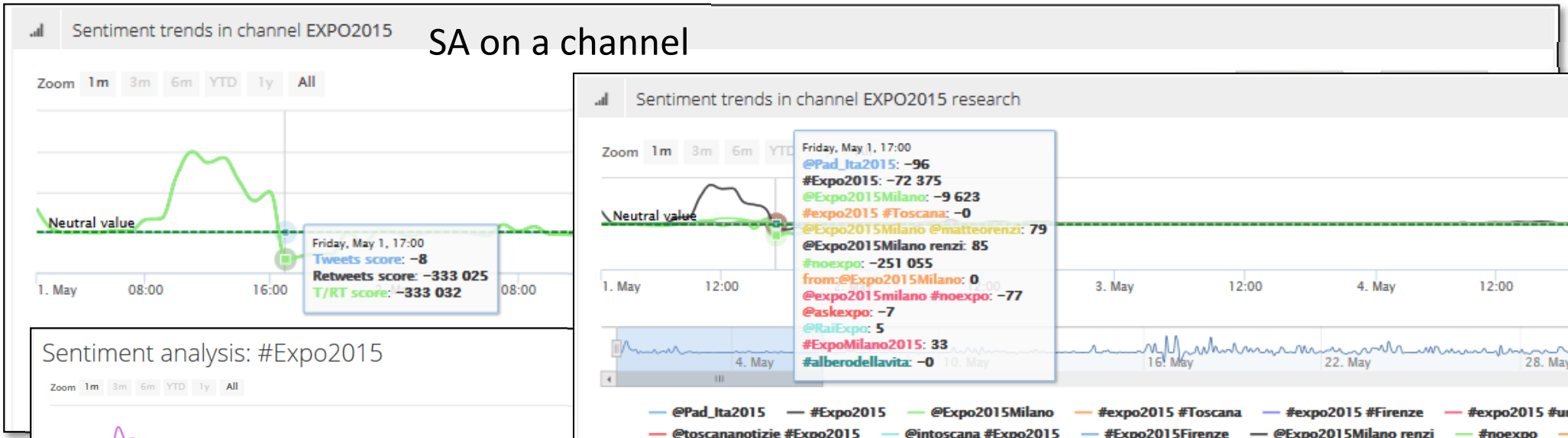
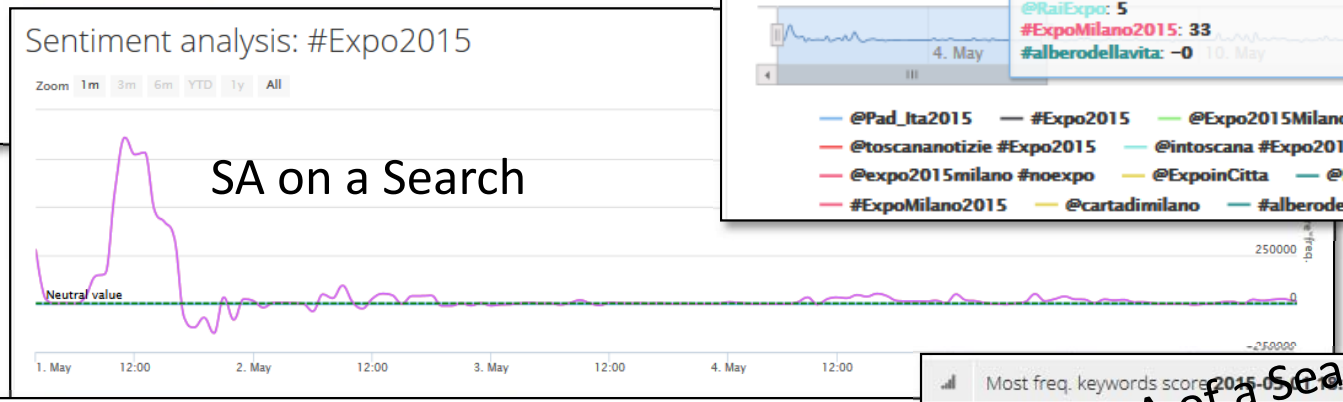
Sentiment Analysis

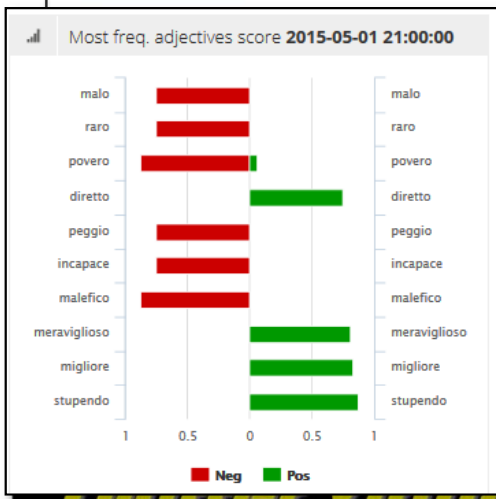
SA on a channel

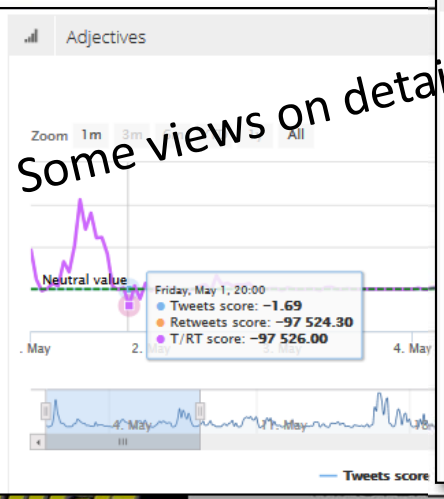


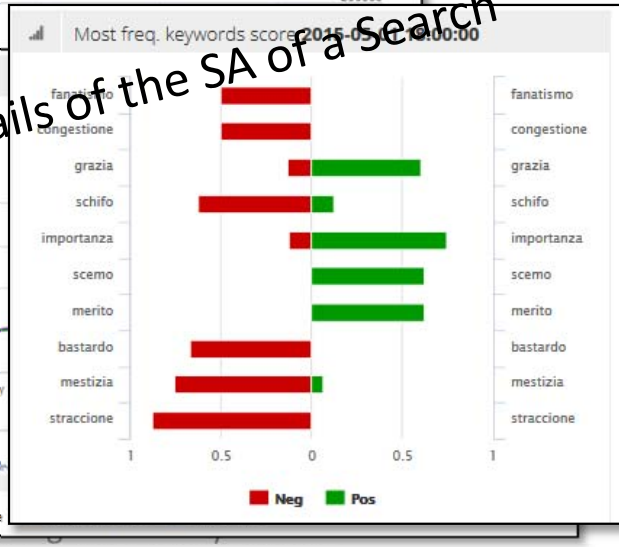


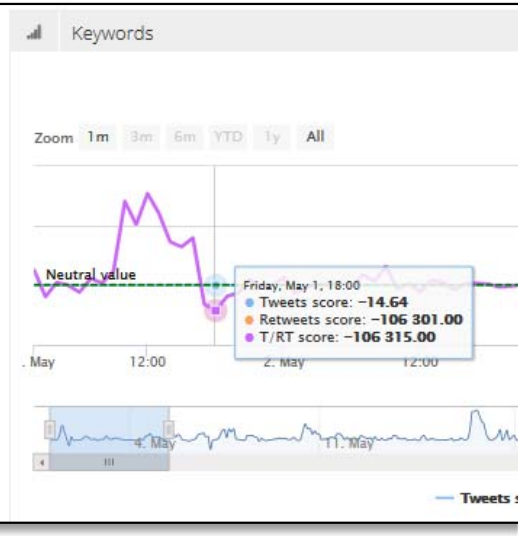
SA on a Search

Some views on details of the SA of a Search









Twitter user profile aspects

- **Twitter user:**
  - No much different from other social media users
  - User profile is not a confident and trusting info
  - Most of them does not provide info about their location, their language, etc.

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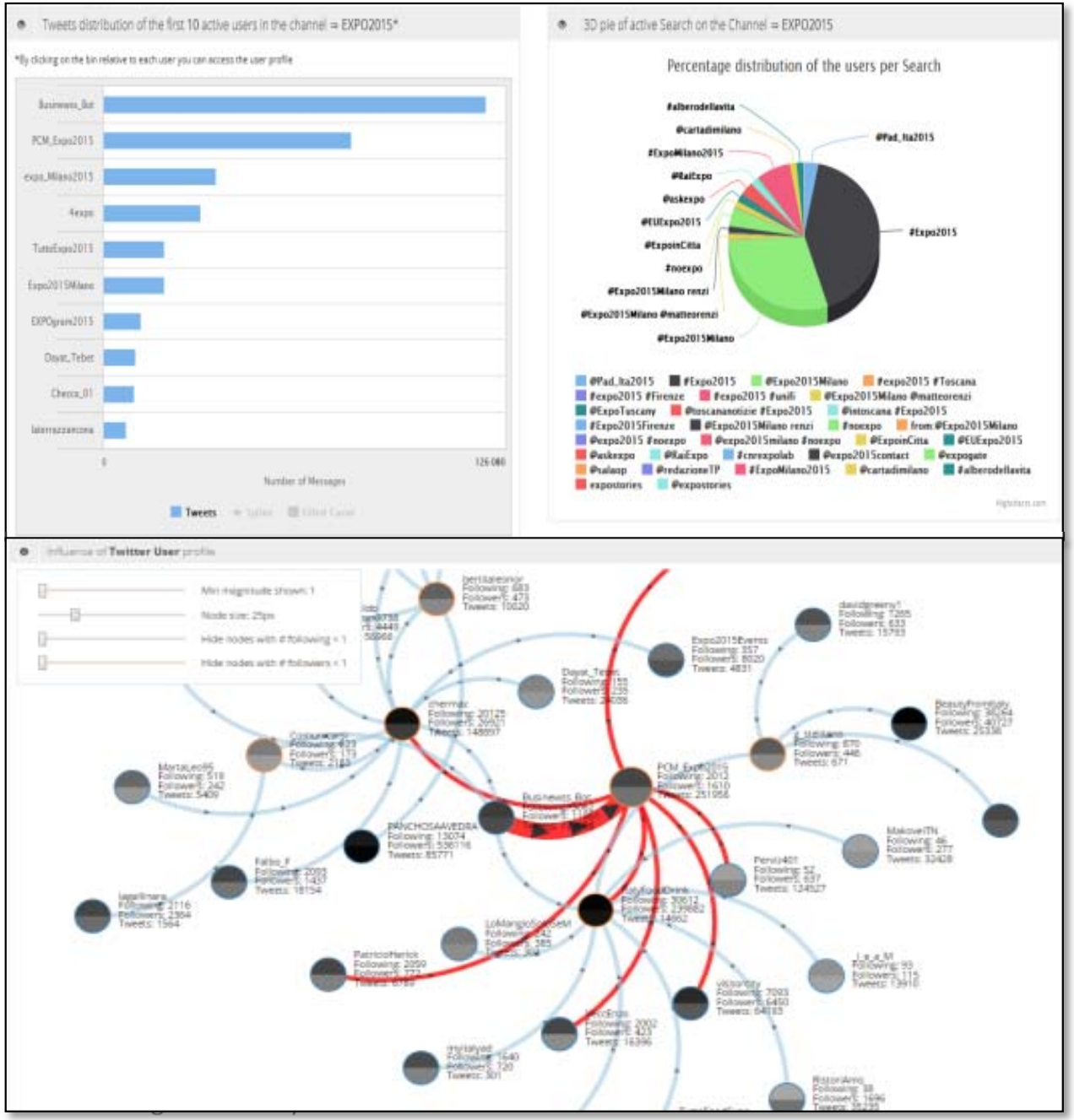
Twitter User Analysis

- Identification of
  - Influencer
  - Chains of users
  - communities
  - pusher
  - BOT
  - Relationships
- Assessing and predicting Virality



Twitter Vigilance

Metadata OF each Tweet

- Tweet itself, date and time, UserID
- Number of retweets
- Number of Favorites
- GPS coordinates
- Language
- Details about the UserID:
  - how many followers, following, lists, favorites, etc..
  - List of connected users…
- ……

Alcuni Canali di TwitterVigilance

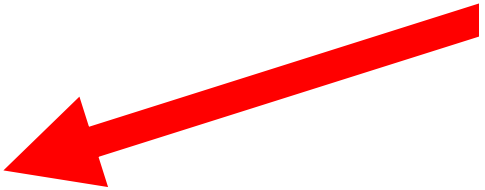
- **http://www.disit.org/tv canali pubblicati**
- **Esempi di Canali:**
  - EXPO 2015, CNR EXPO2015, Firenze, ApreToscana, maturità, ConsumoSuolo, meteo, allerta meteo toscana,
  - protezione civile, farmaco vigilanza, smart drug, ECLAP e Europeana, advertising TV, laudatesi, terrorismo, etc.
- **Aree tematiche:** meteo, ambiente, advertising, eventi pubblici, farmacovigilanza, smart city, politica, TPL, emergenza, Servizi, etc.

Twitter Vigilance Tools

- Twitter Vigilance:
  - 1 Day computing, 1 hour update
  - http://www.disit.org/tv
- Real Time Twitter Vigilance:
  - 5 minutes computing
  - http://www.disit.org/rttv

Agenda

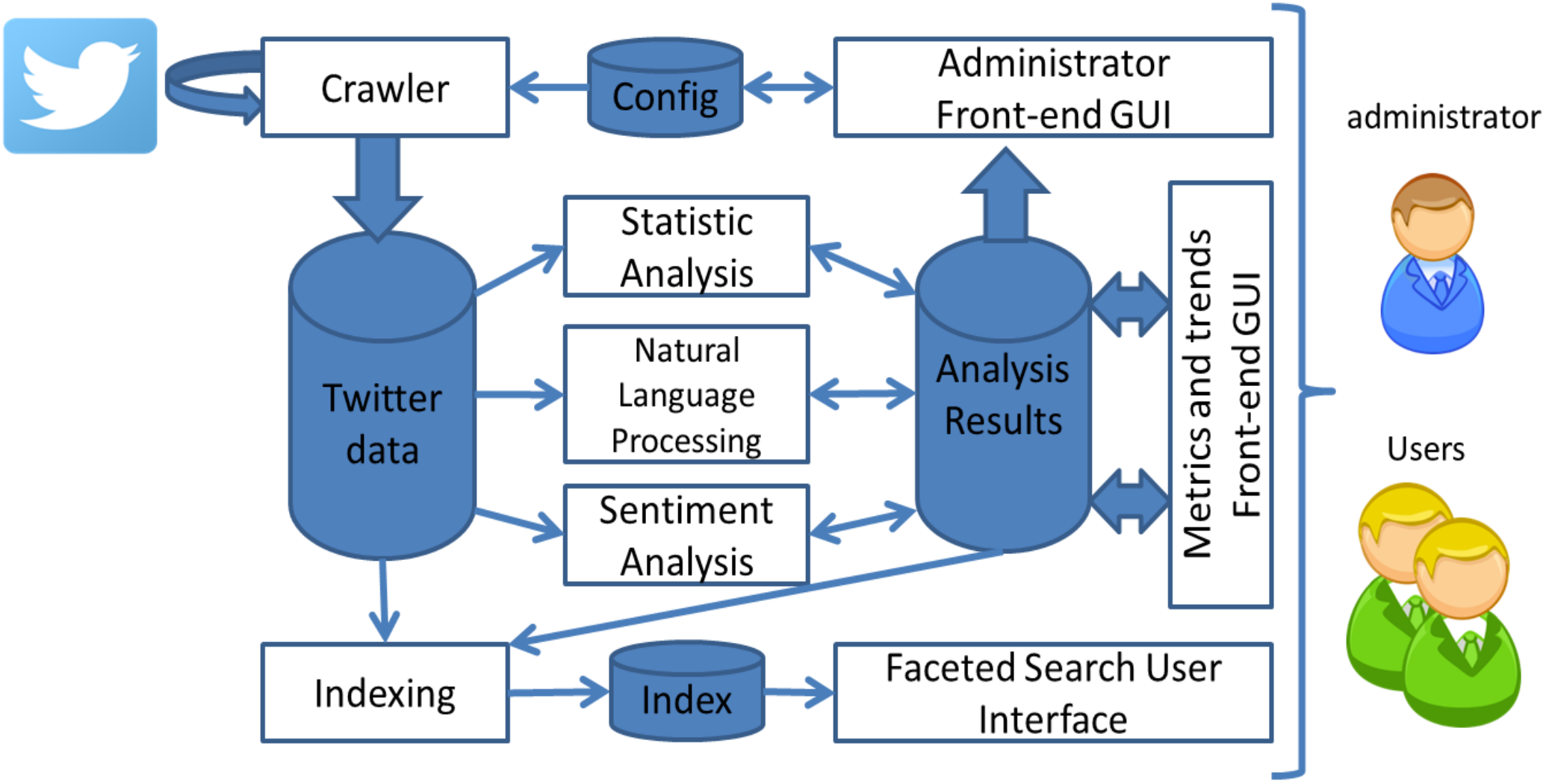
1. Introduction: What is Twitter
2. Overview on Twitter Data Capabilities
3. Twitter Vigilance how it is working
4. Exercitation Work Plan



Obiettivi: Twitter Vigilance

- **Monitorare** Canali Twitter con
  - **Elevata affidabilità** e precisione, seguendo eventi lenti, veloci ed esplosivi
  - **Gestione multiutente** per canali multipli: pubblici e privati
  - **Data analytics e sentiment analysis** in modo assistito e diretto
- ***Canale di Twitter Vigilance:*** un insieme di ricerche attive e adattive su social media Twitter.
  - Ogni ricerca può essere semplice o complessa
  - Ogni utente qualificato può gestire più canali e ricerche
- **Attivo**
  - da Aprile 2015 per il collezionamento dati,
  - da settembre per il calcolo automatico big data analytics,
  - da ottobre per la Sentiment Analysis automatizzata.
- **Gestisce** con disinvoltura
  - Oltre 1.3-2.5 Milioni di Tweet per giorno per server
  - Oltre 190 Milioni di Tweet
  - Lavora anche Real Time con RealTimeTwitterVigilance

Twitter Vigilance



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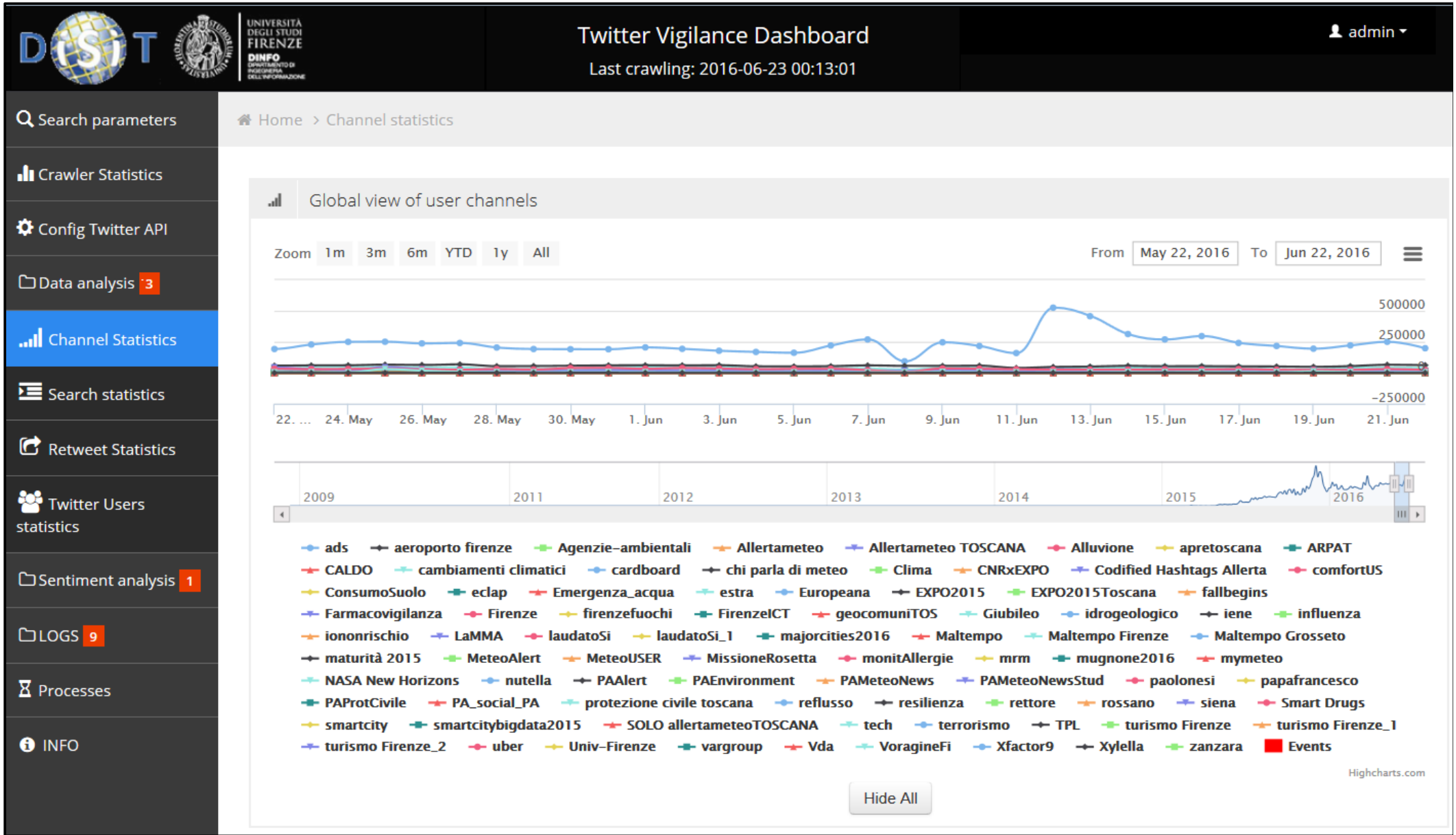
Http://www.disit.org/tv



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Real time Twitter Vigilance

Http://www.disit.org/rttv

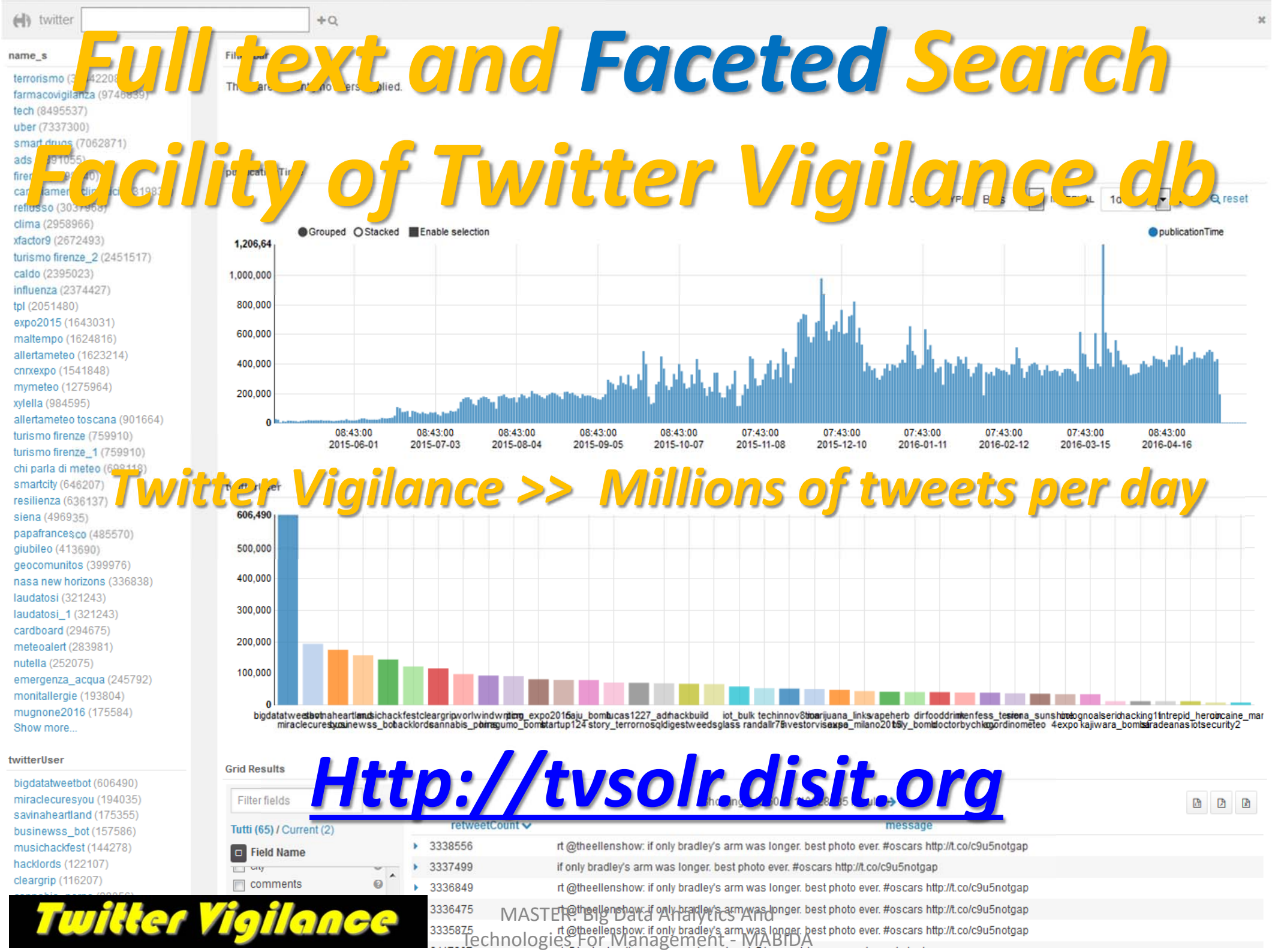
Twitter Vigilance

MASTER: Big Data Analytics And Technologies For Management - MABIDA

Full text and Faceted Search Facility of Twitter Vigilance db

Twitter Vigilance >> Millions of tweets per day

Http://tvsolr.disit.org



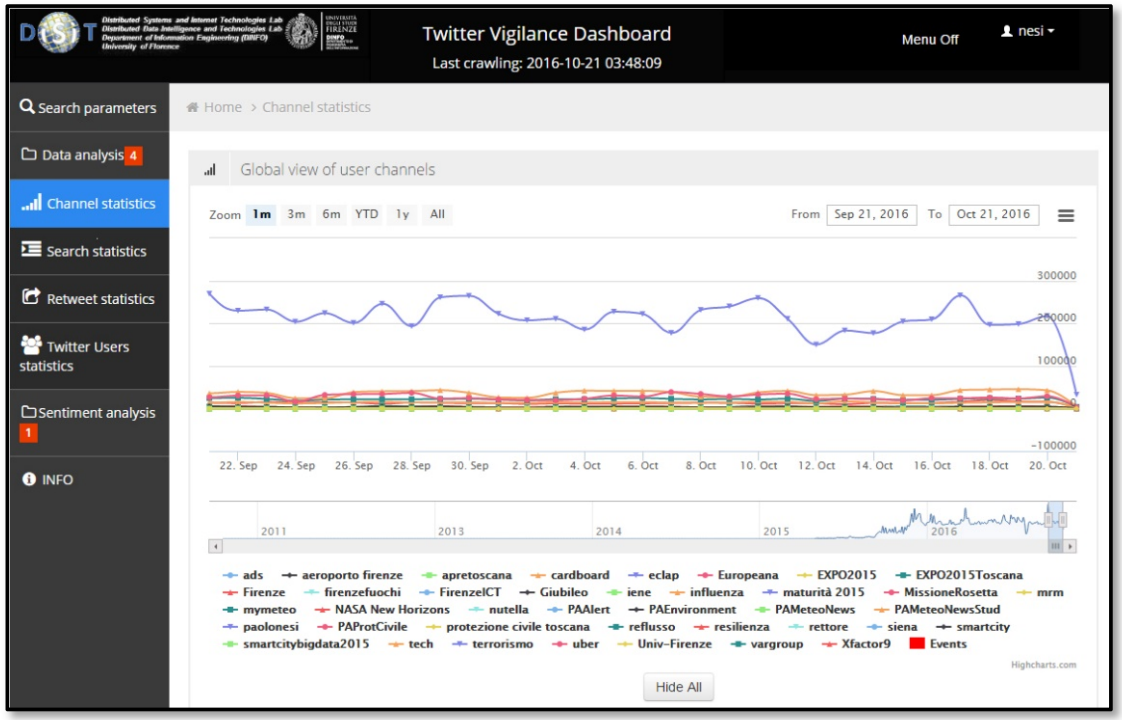
Twitter Vigilance

Definitions

- Channel := { Search }
- Search := <request> AND <request>
- Request := keyword | from:<username> | #<hashtag> | @<username> | ……

Twitter Vigilance (TV) – Channel

http://disit.org/tv/

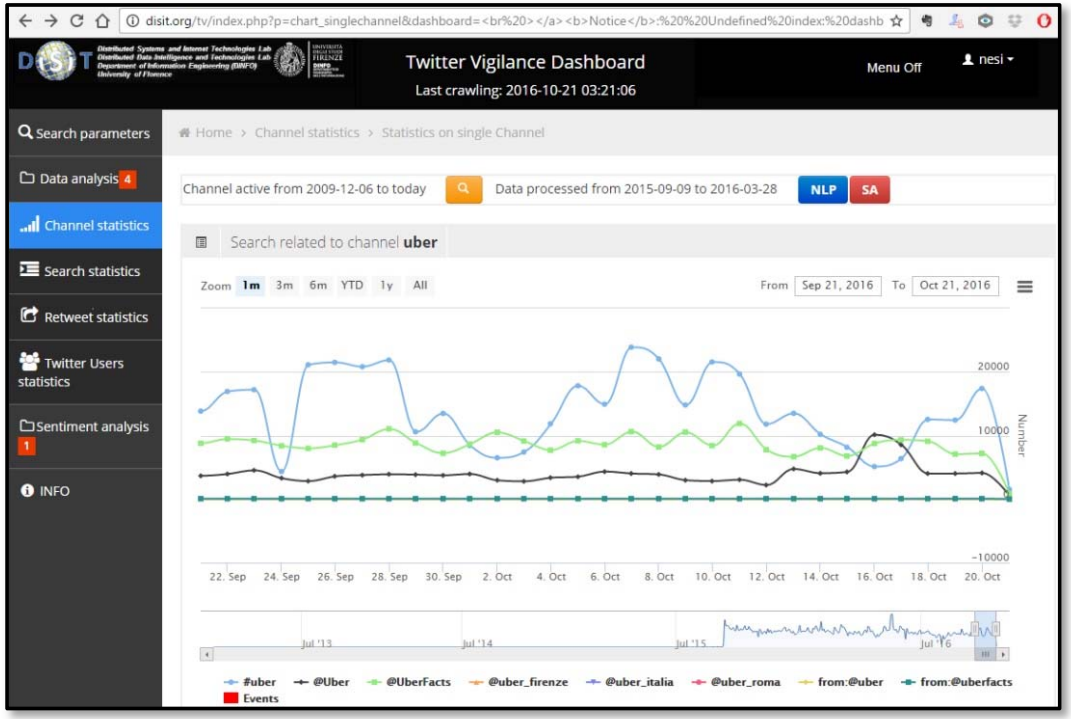


- Data Acquisition is based on the concept of ***Channel***

- A ***Channel*** is a thematic set of simple and complex ***Searches***

Twitter Vigilance (TV) – Search

http://disit.org/tv/



- ***Searches*** can be single or groups of keywords used to monitor and extract Tweets information through Twitter APIs

- A complex ***Search*** can combine several keywords such as hashtags, user IDs, mentions, citations with logical operators (AND, OR…)

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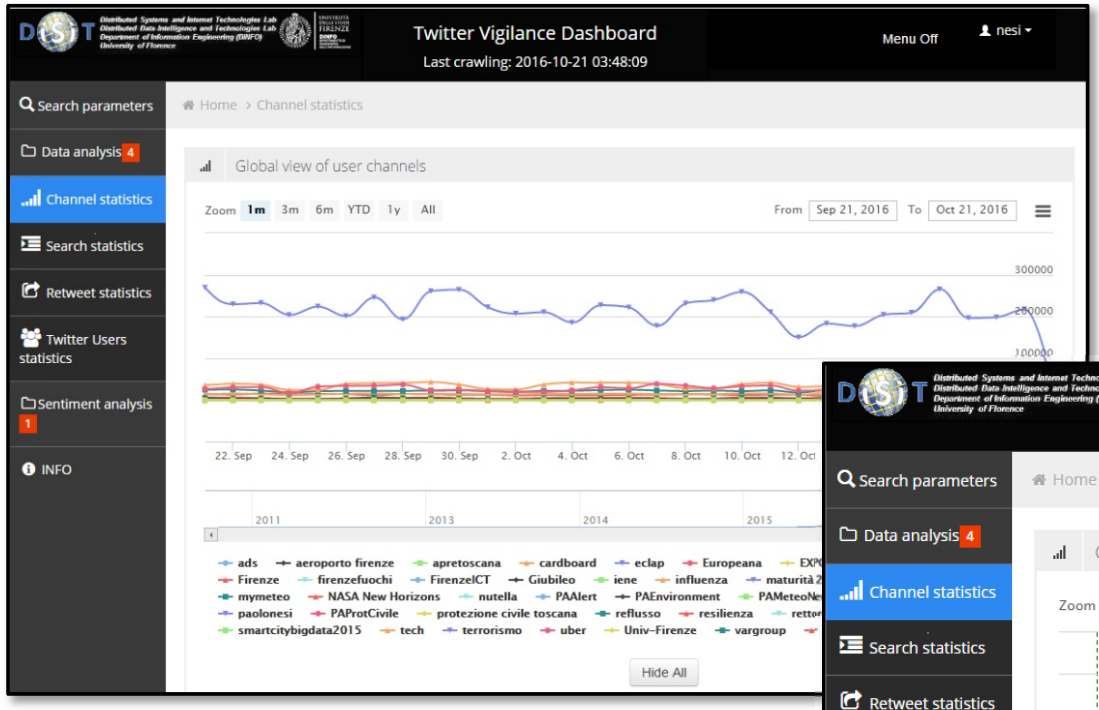
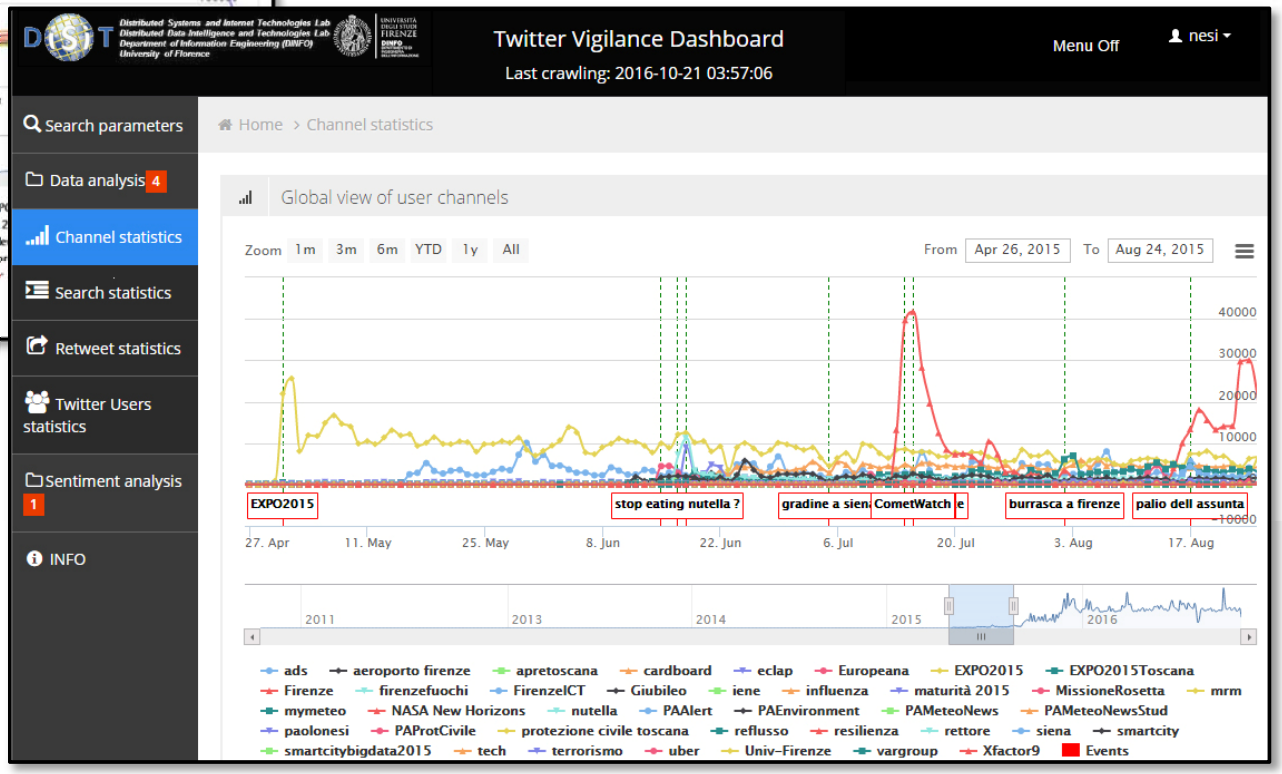
TV Graphs: Channel View



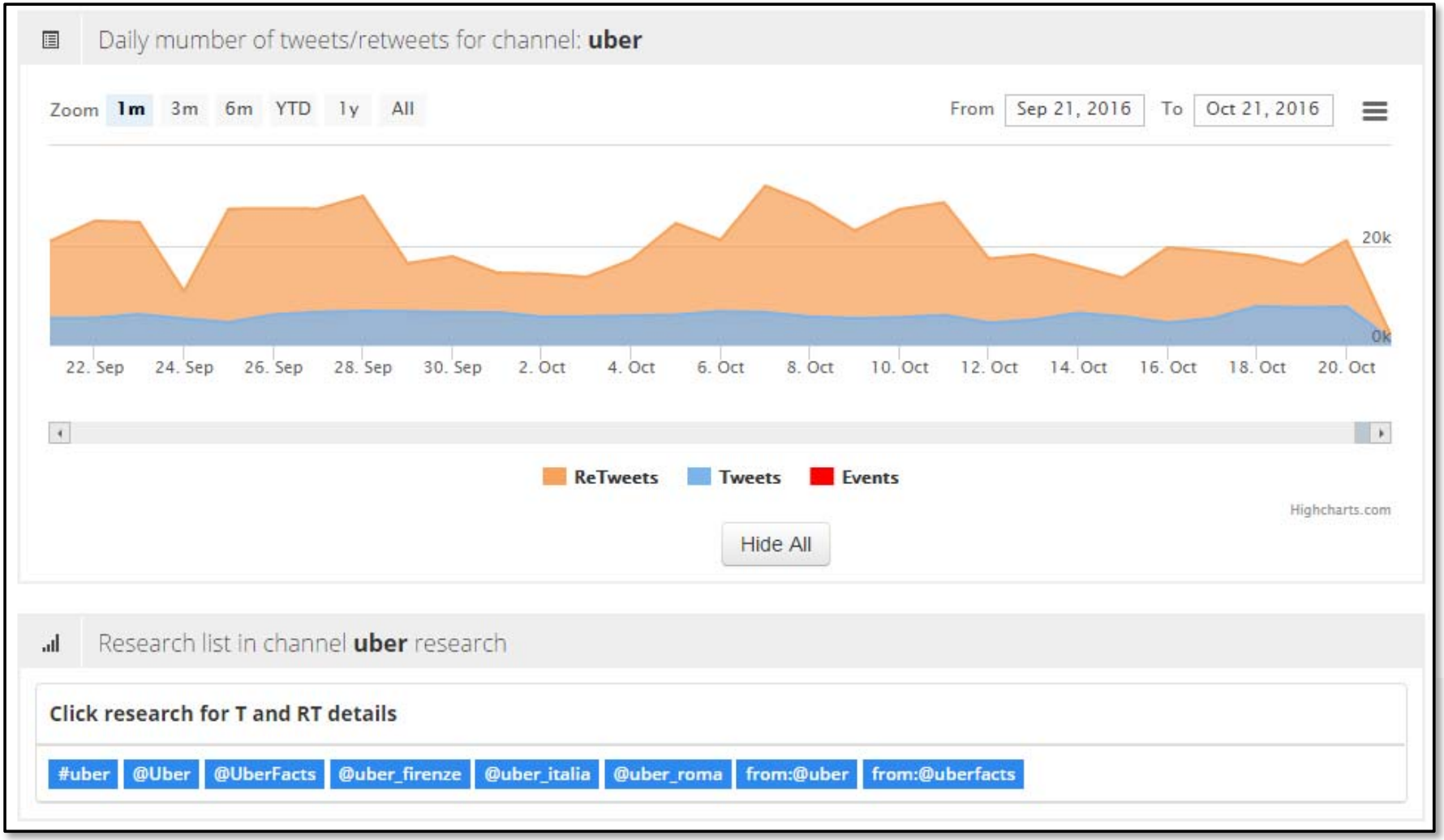
➢ Display / Hide single Channels or all Channels



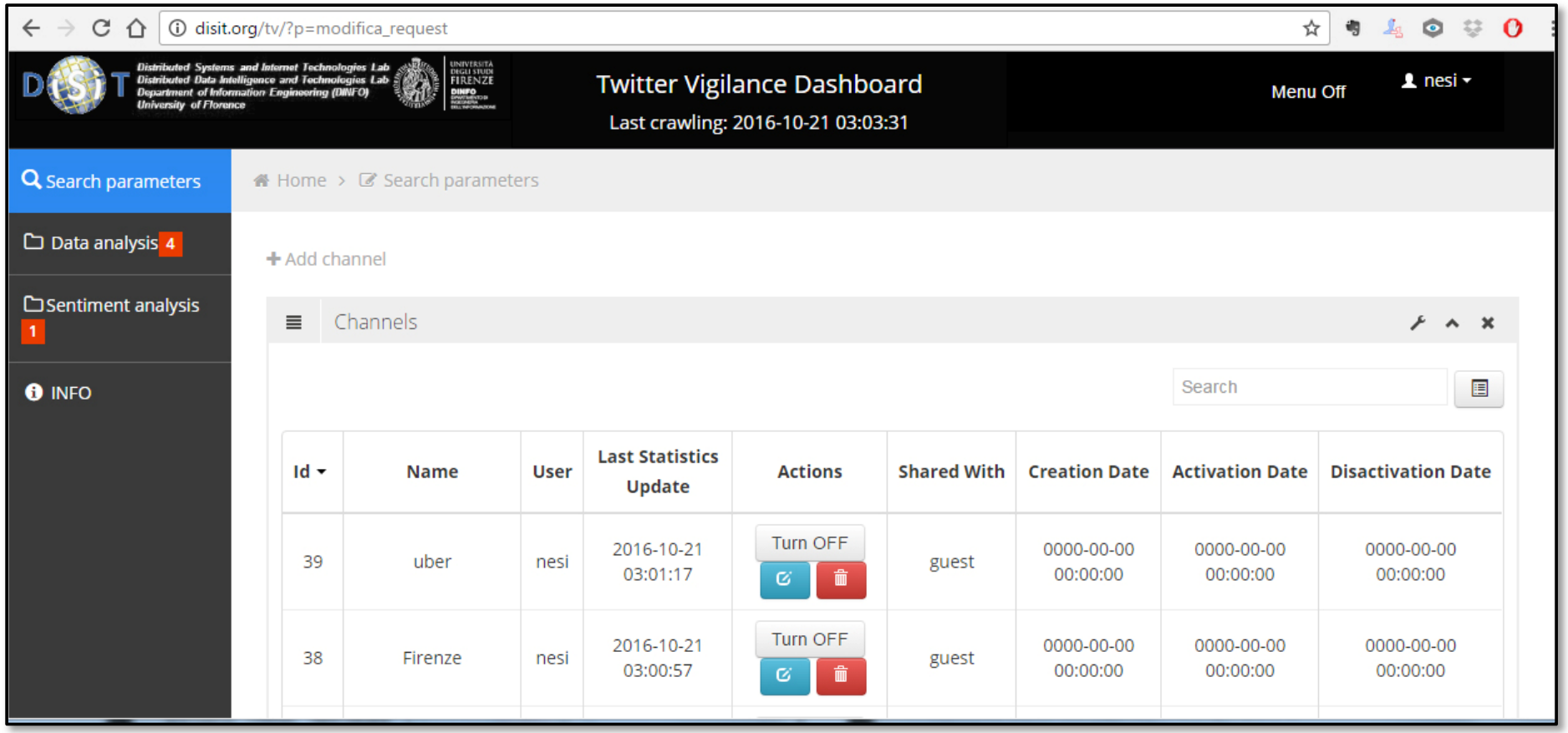
➢ Define and Mark events to improve readability

Twitter Vigilance

TV Graphs – Channel View

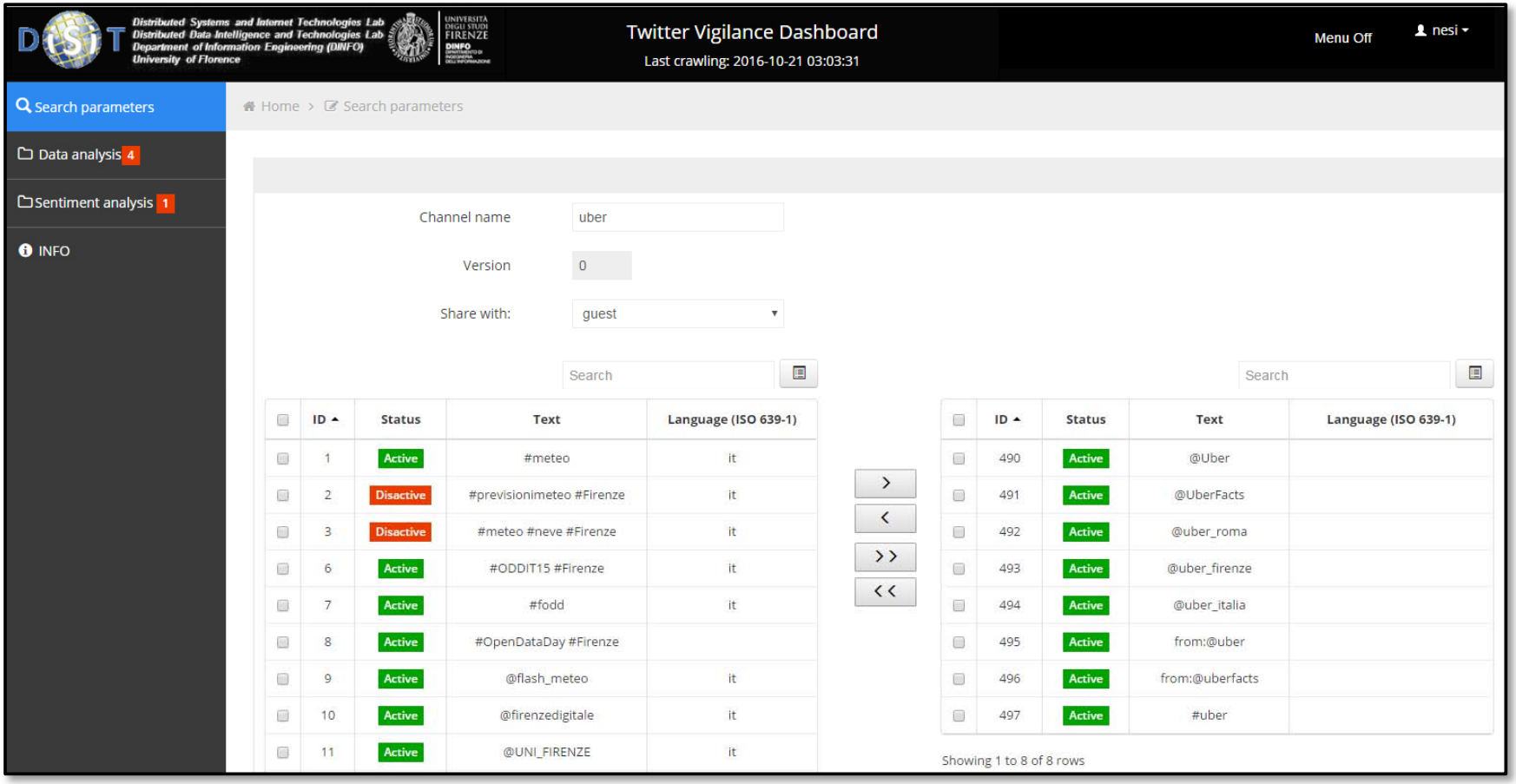


TV Graphs – Channel View



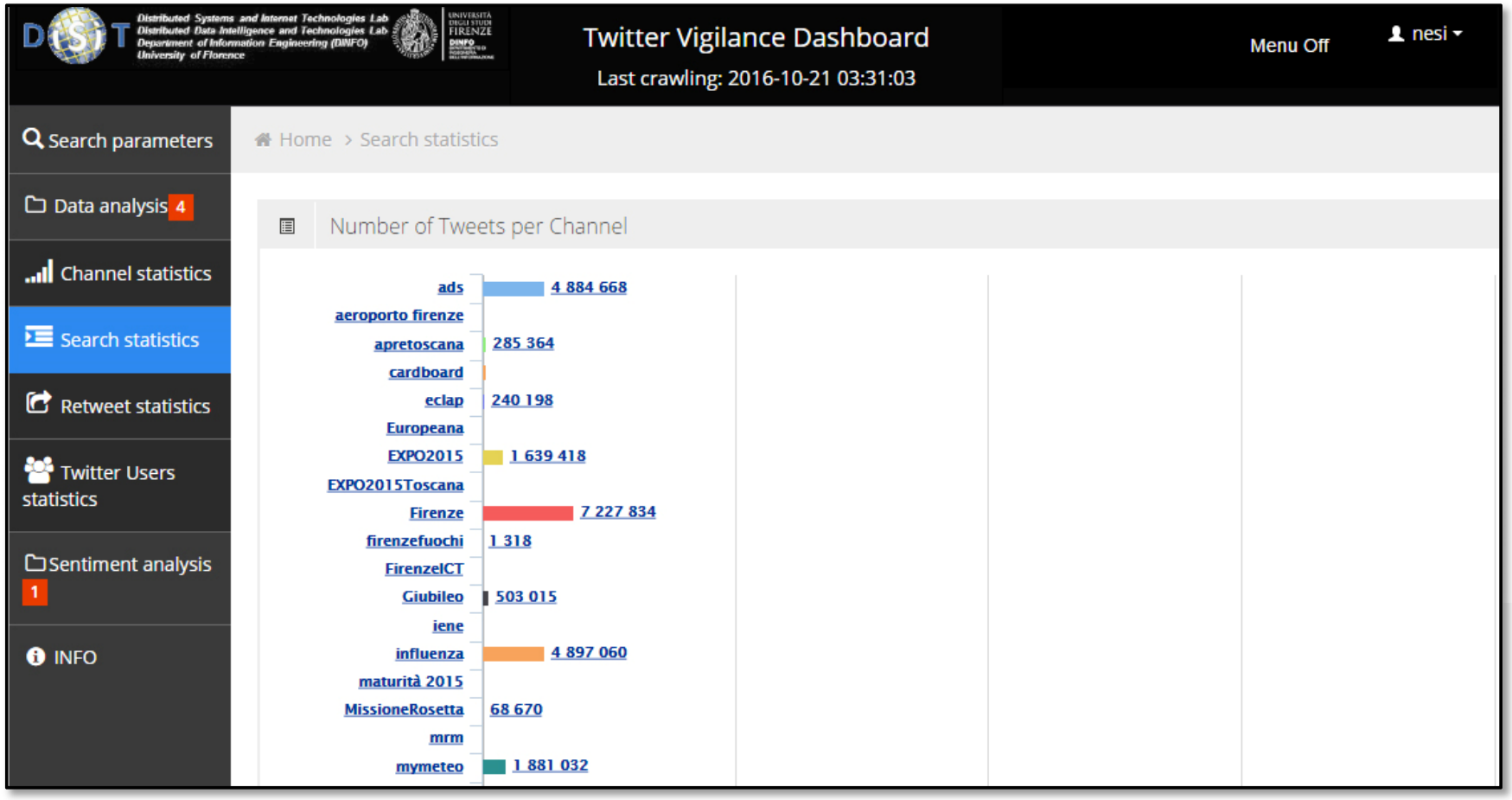
- Add, Edit and Delete Channels
- Activate / Deactivate Channels
- Share Channels with Other Users
- See Channel Statistics

TV Graphs – Channel Edit



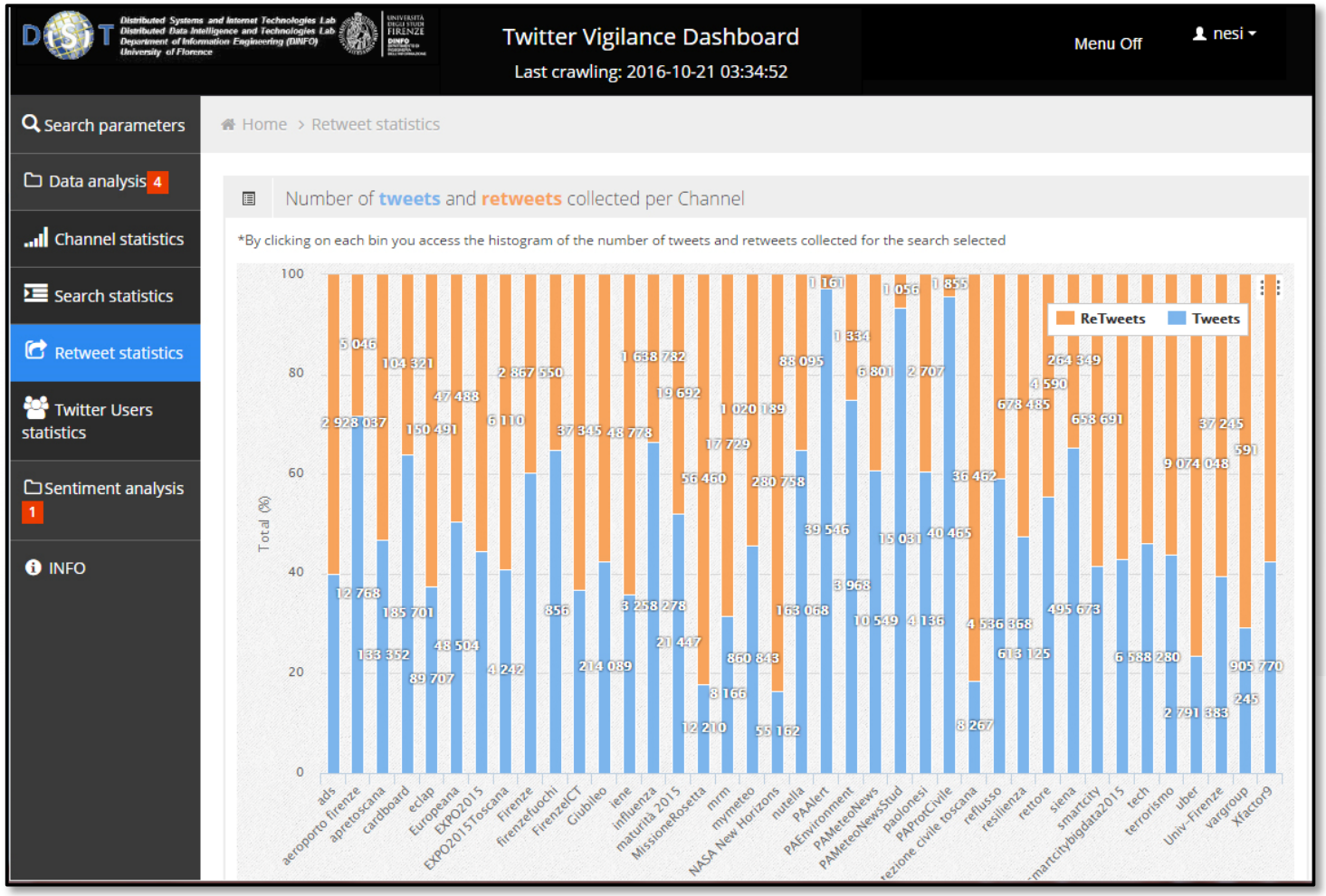
- Add and /or Remove Searches for a Channel

TV Graphs – Channel Statistics



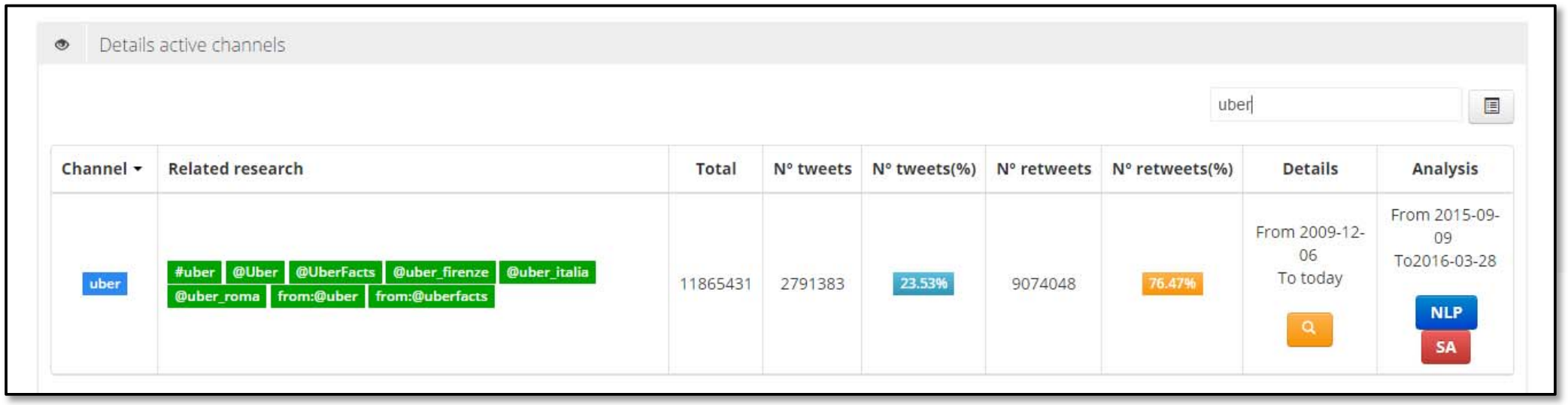
- Statistics Resume Charts for all Channels

TV Graphs – Channel Statistics



- Number of tweets and retweets collected per Channel

TV Graphs – Channel Statistics



- Channel Statistics: Total Number of Posts (Tweets + Retweets)

- Graphical details: charts, temporal trends of Tweets and Retweets for each Search of selected Channel…

- Natural Language Processing (NLP) and Sentiment Analysis (SA) of collected Tweets

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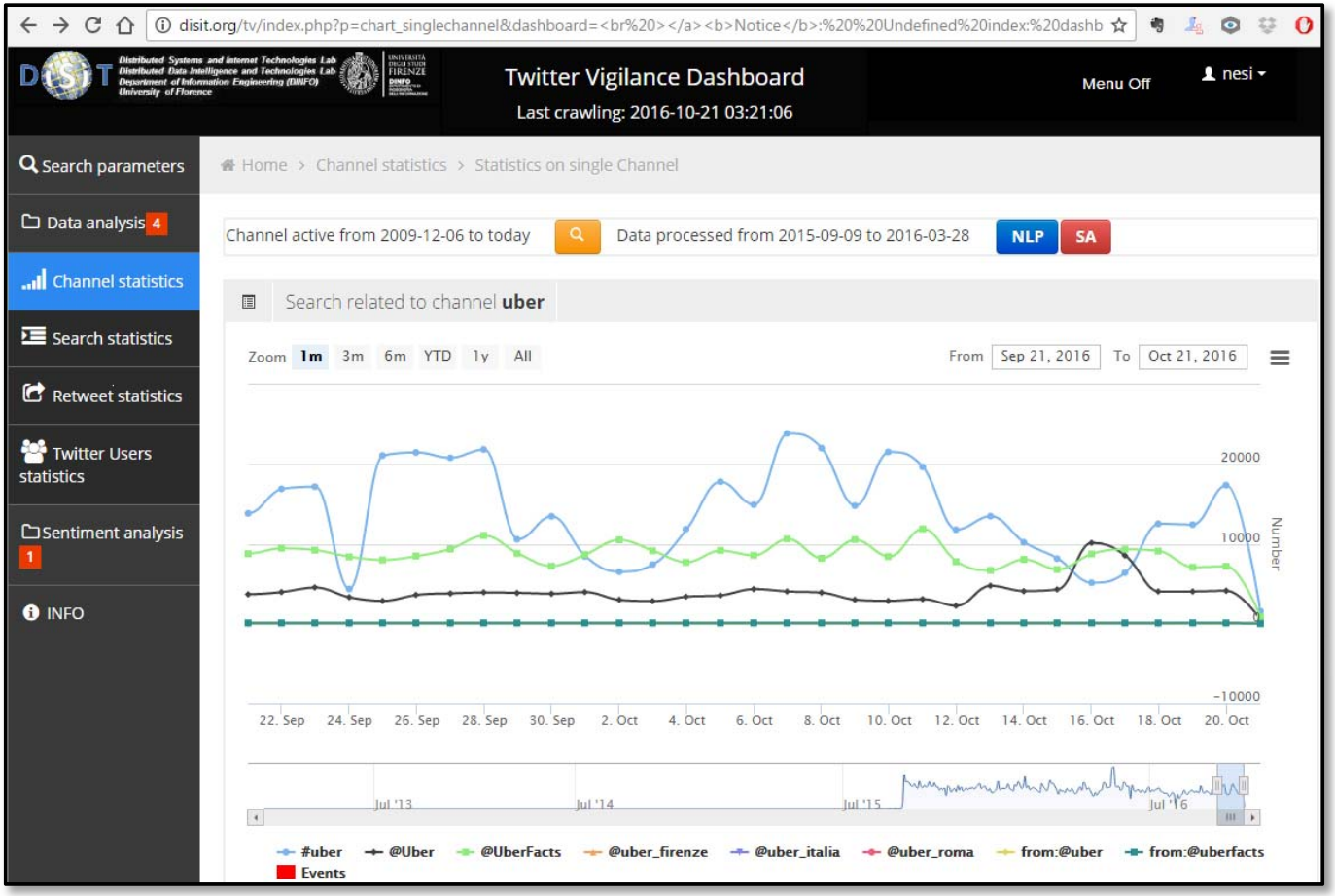
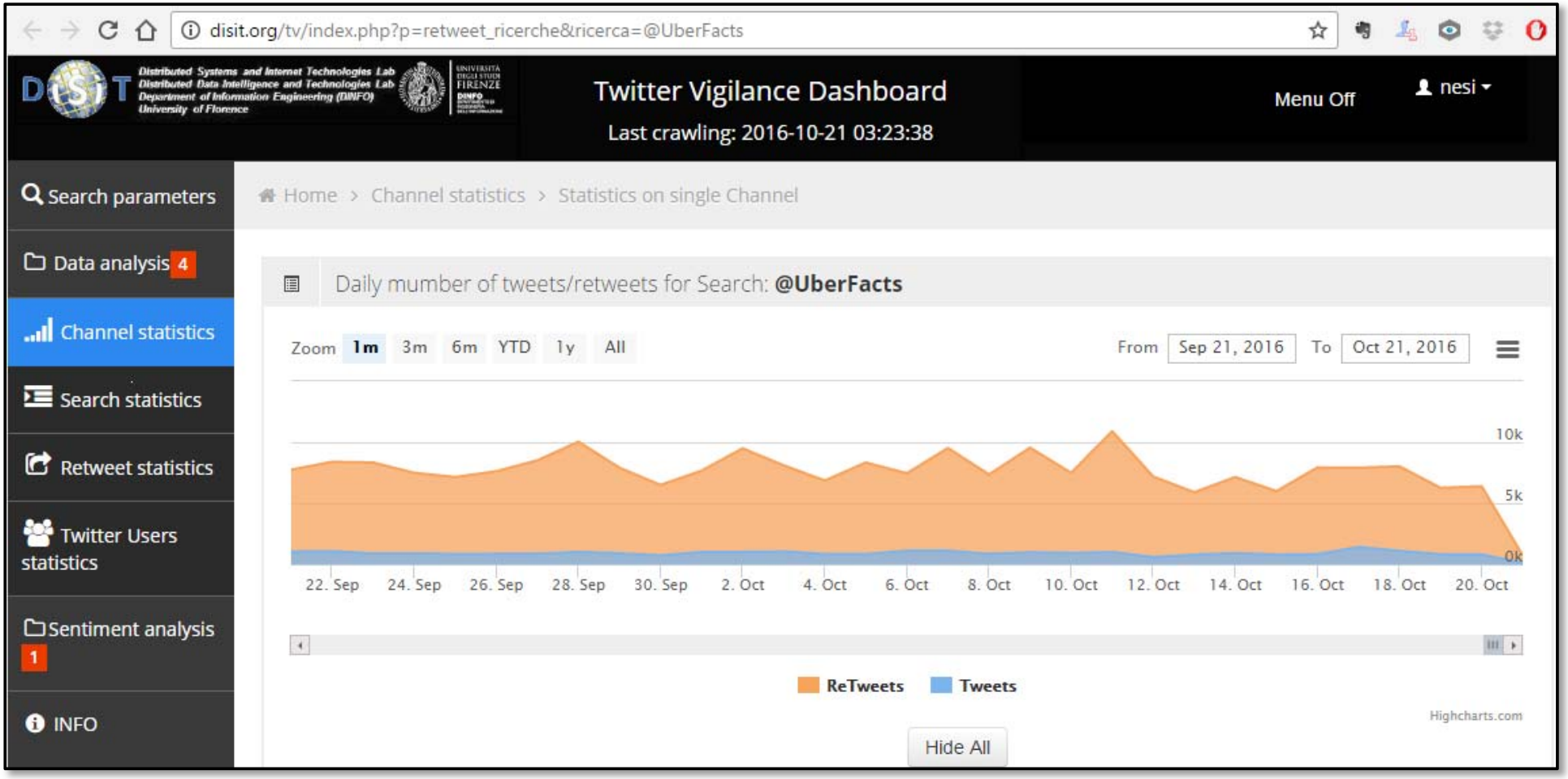
TV Graphs: Search View

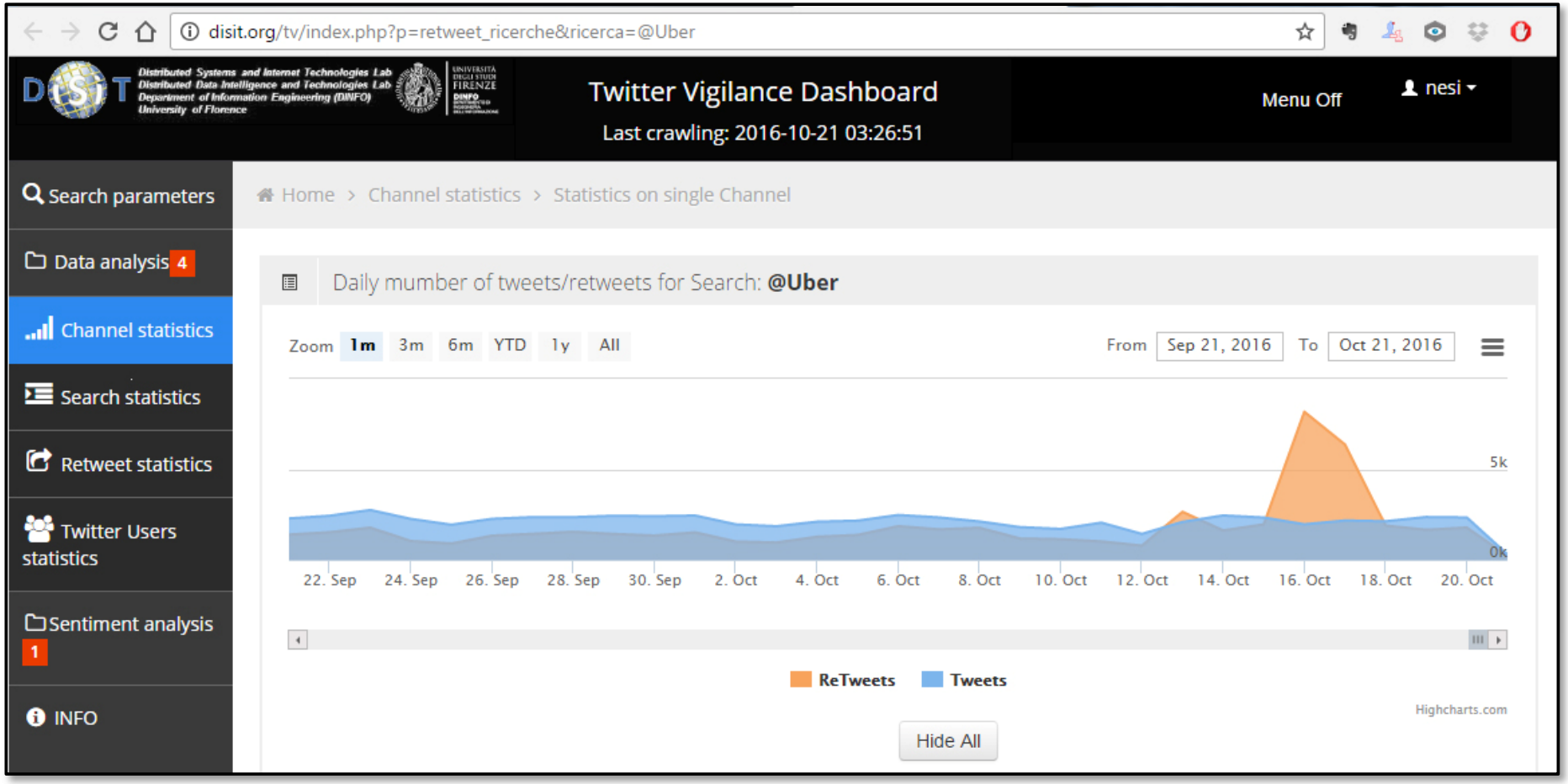


- Display / Hide single Searches in a specific Channel
- Temporal Trends
- Zoom on Timeline

TV Graphs – Single Search Details

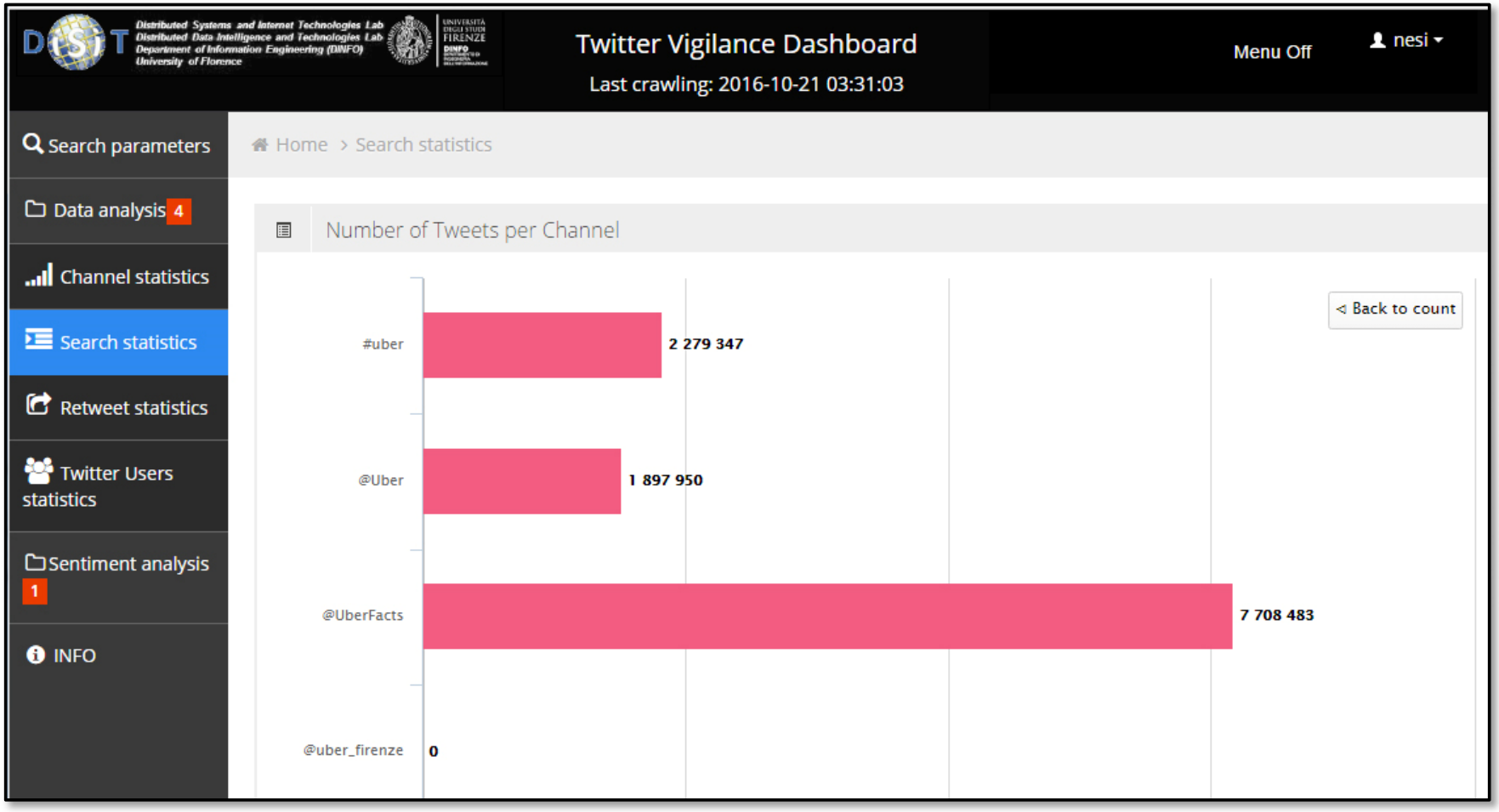


Twitter Vigilance – Single Search Details



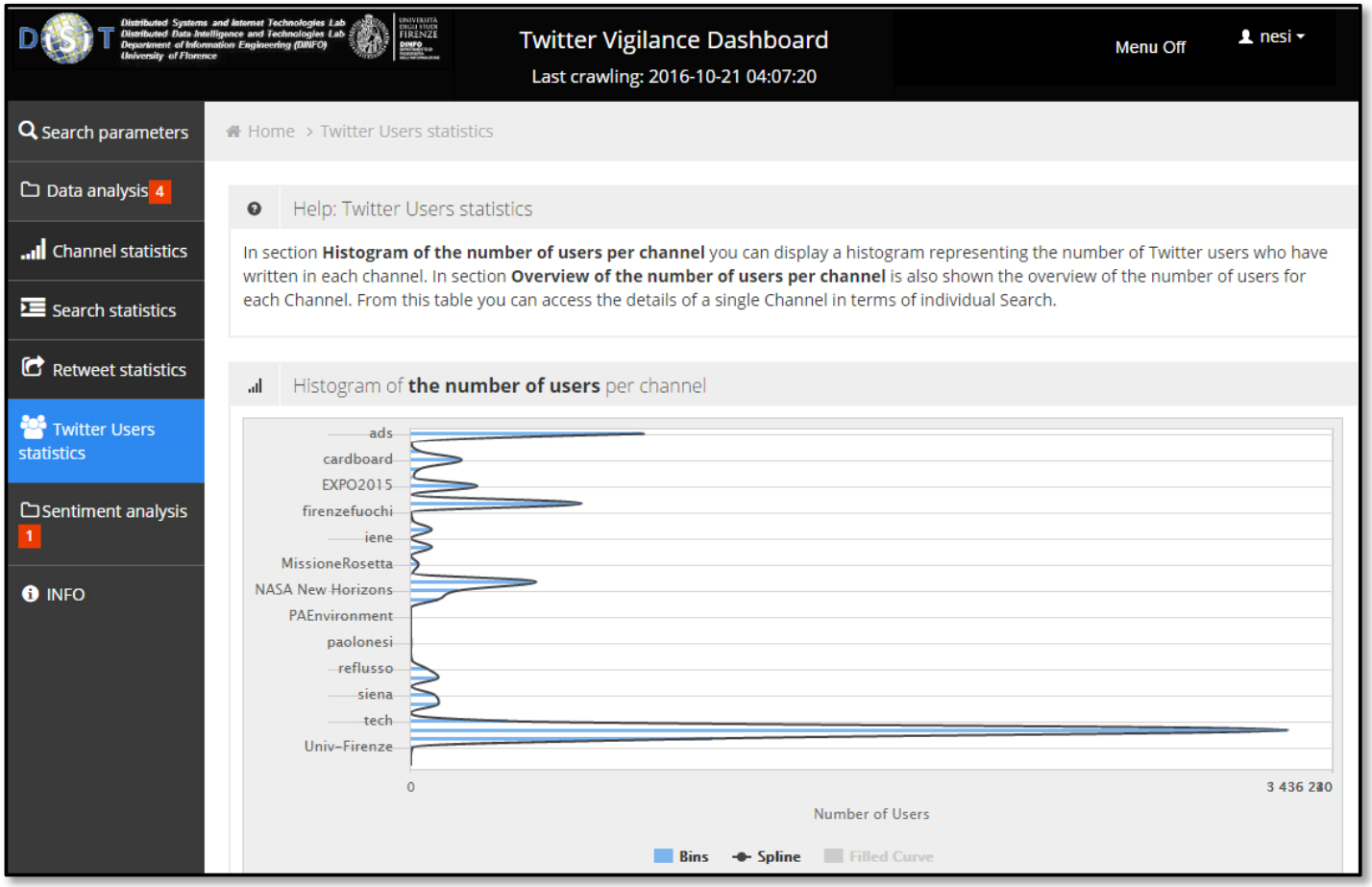
- Find and Retrieve Communication Peaks

Twitter Vigilance – Search Statistics



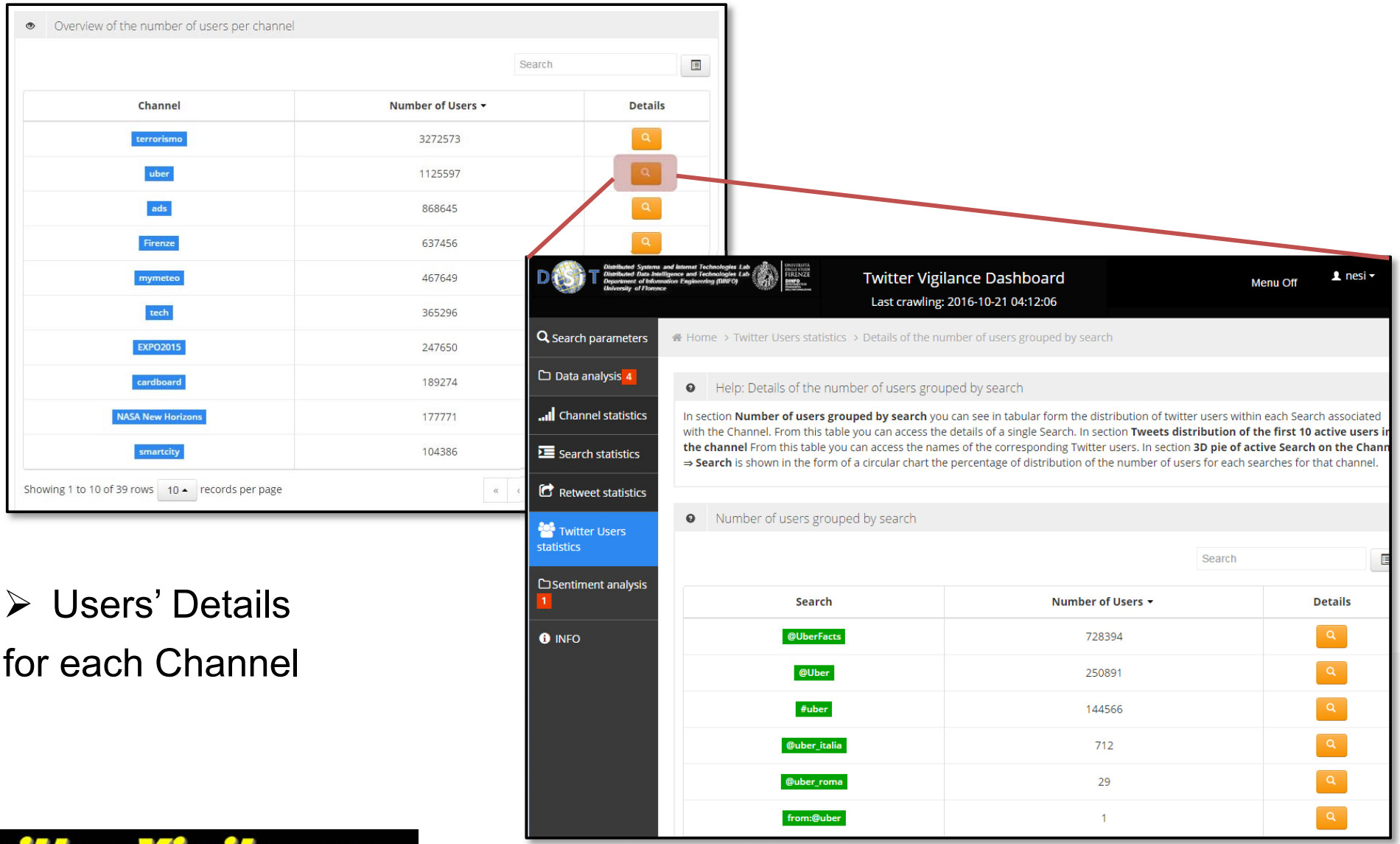
- Statistics Resume charts for all the Searches of a single Channel

Twitter Vigilance – User Statistics



- Statistics Resume charts for all the Users posting tweets / retweets for each Channel

Twitter Vigilance – User Statistics



- Users' Details

for each Channel

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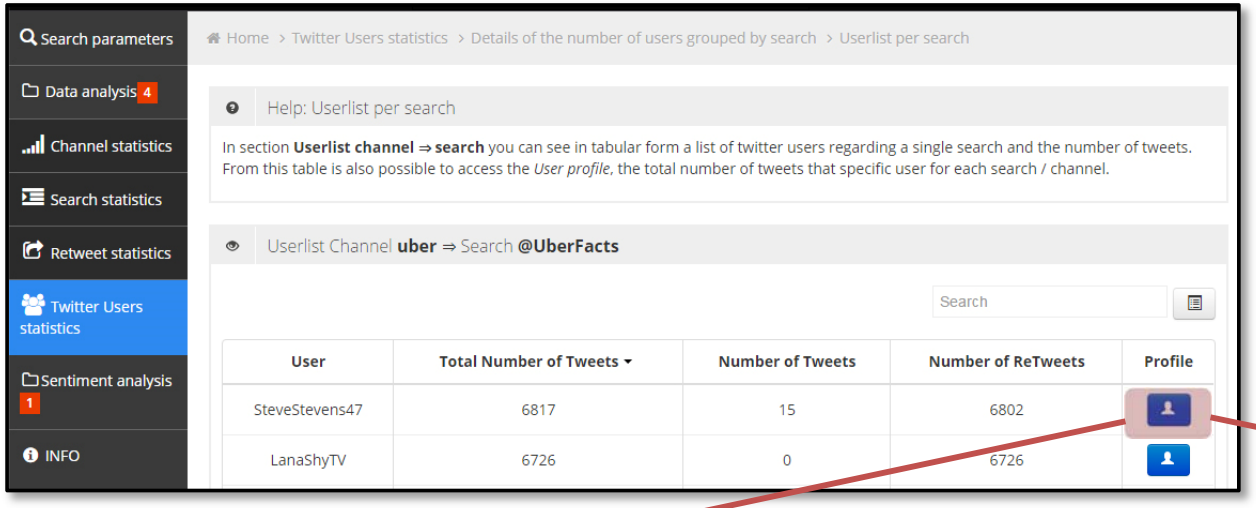
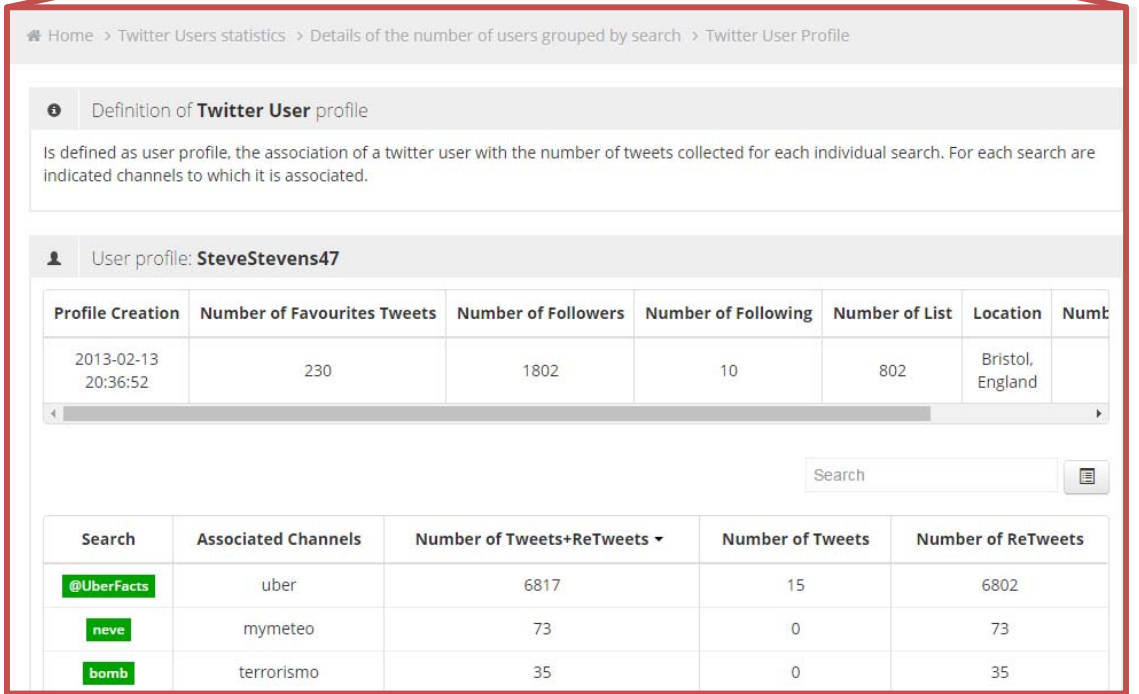
Twitter Vigilance – User Statistics

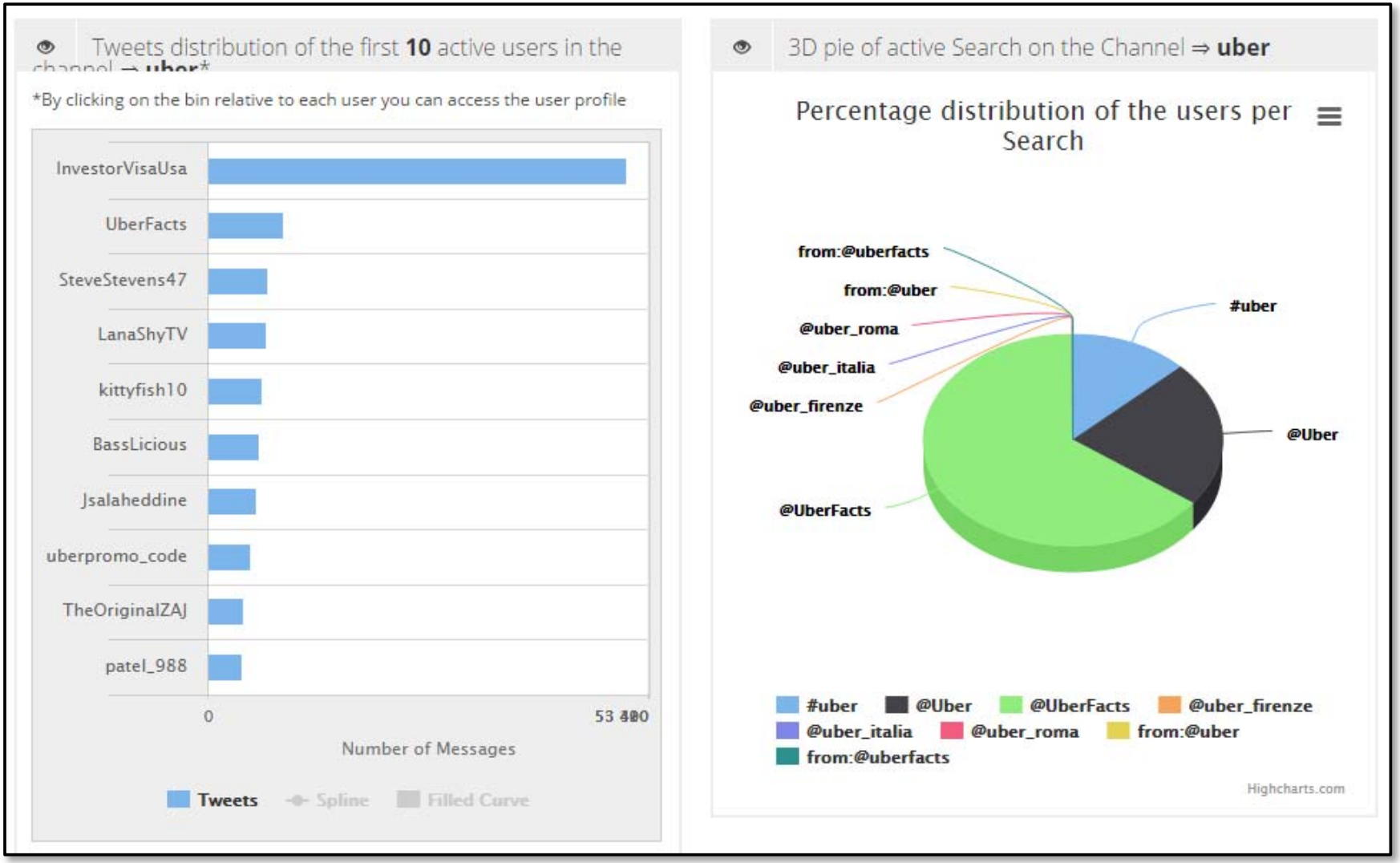


- Details for single users



Twitter Vigilance

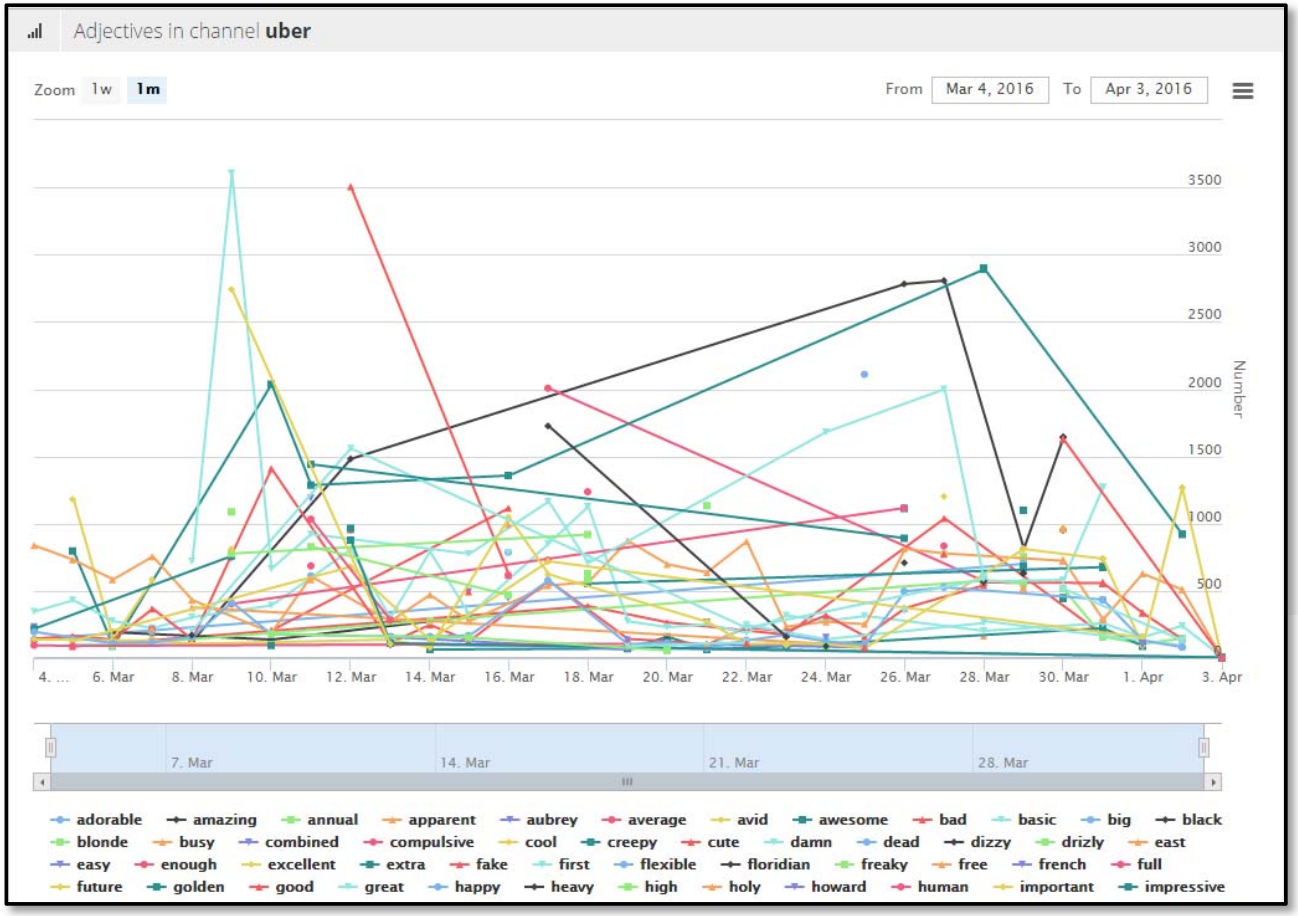
Twitter Vigilance – User Statistics



Twitter Vigilance – NLP & SA

- Natural Language Processing (NLP) of Tweets content.

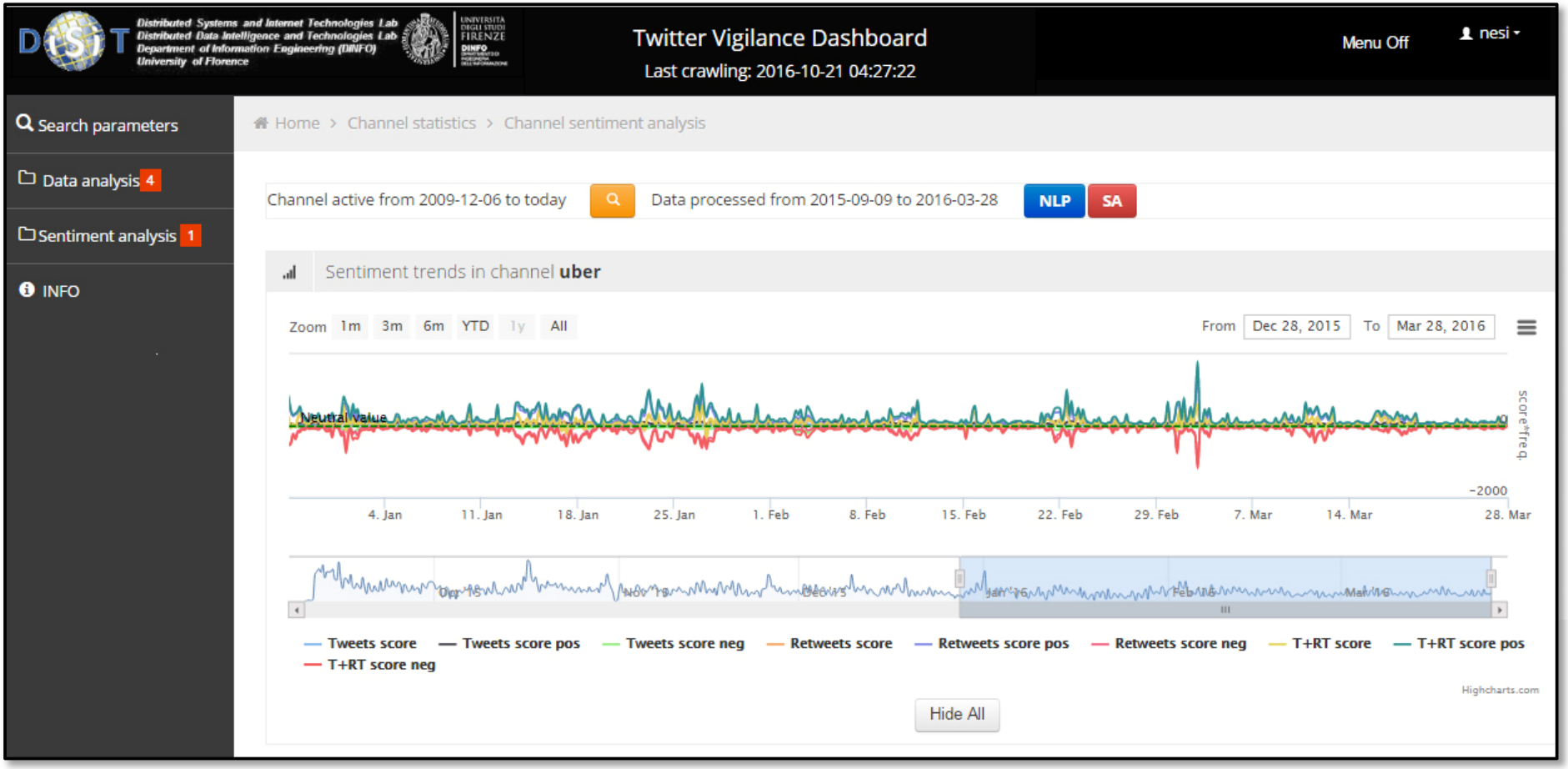
Twitter Vigilance – NLP & SA



Different NLP categories:

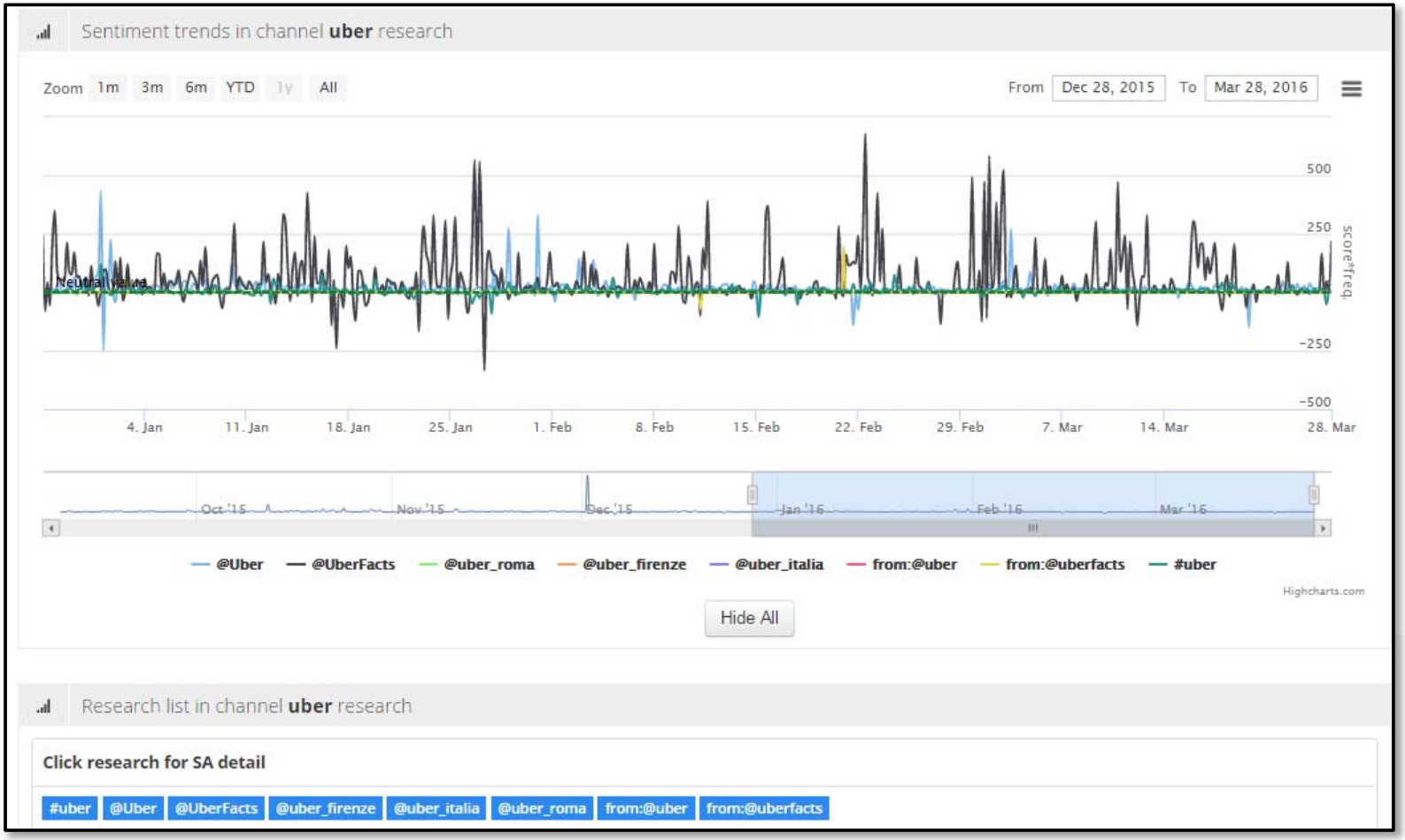
- ***Keywords (nouns)***
- ***Adjectives***
- ***Verbs***

Twitter Vigilance – NLP & SA



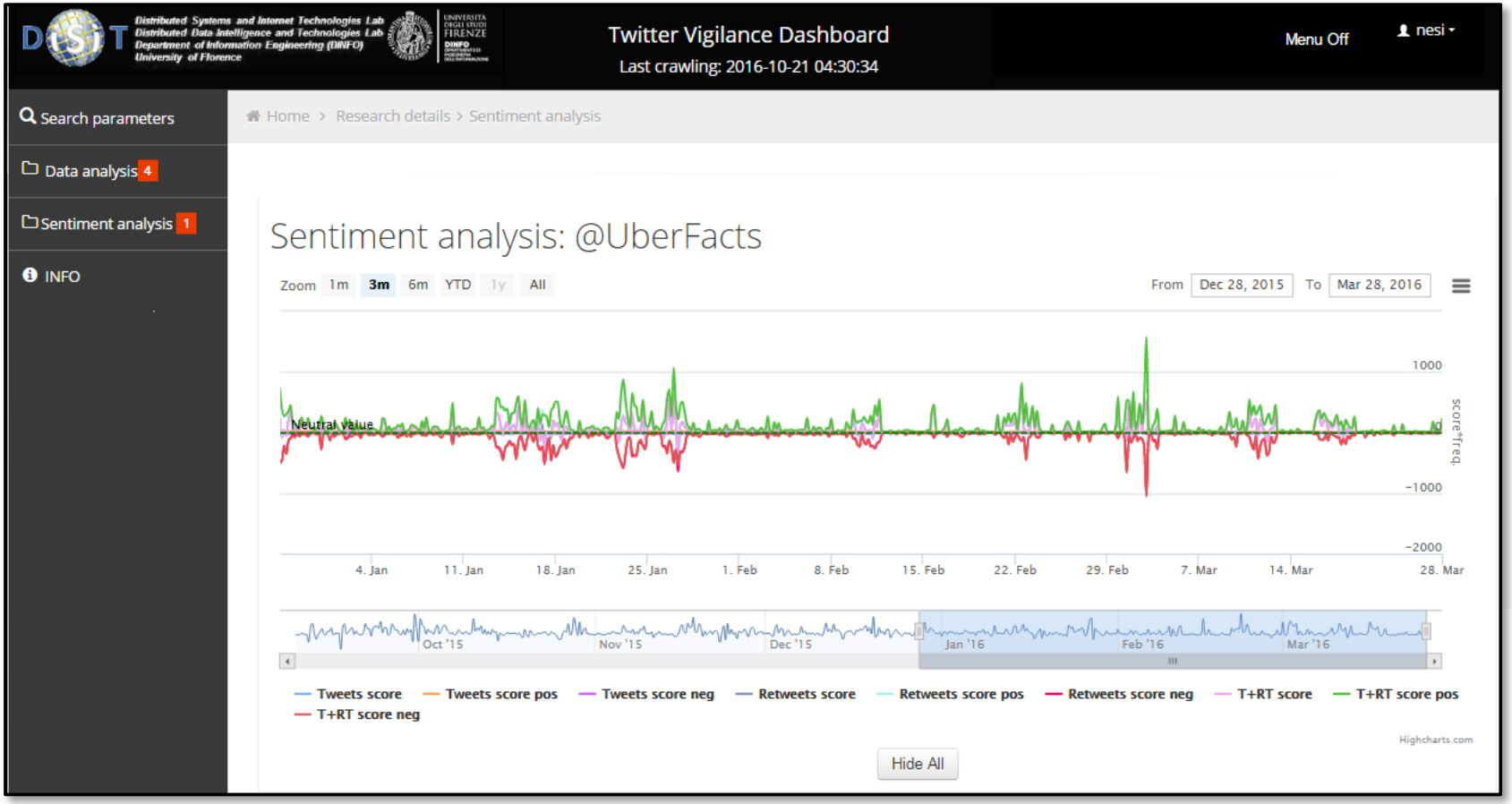
- Sentiment Analysis (SA) of Tweets content at Channel Level.

Twitter Vigilance – NLP & SA



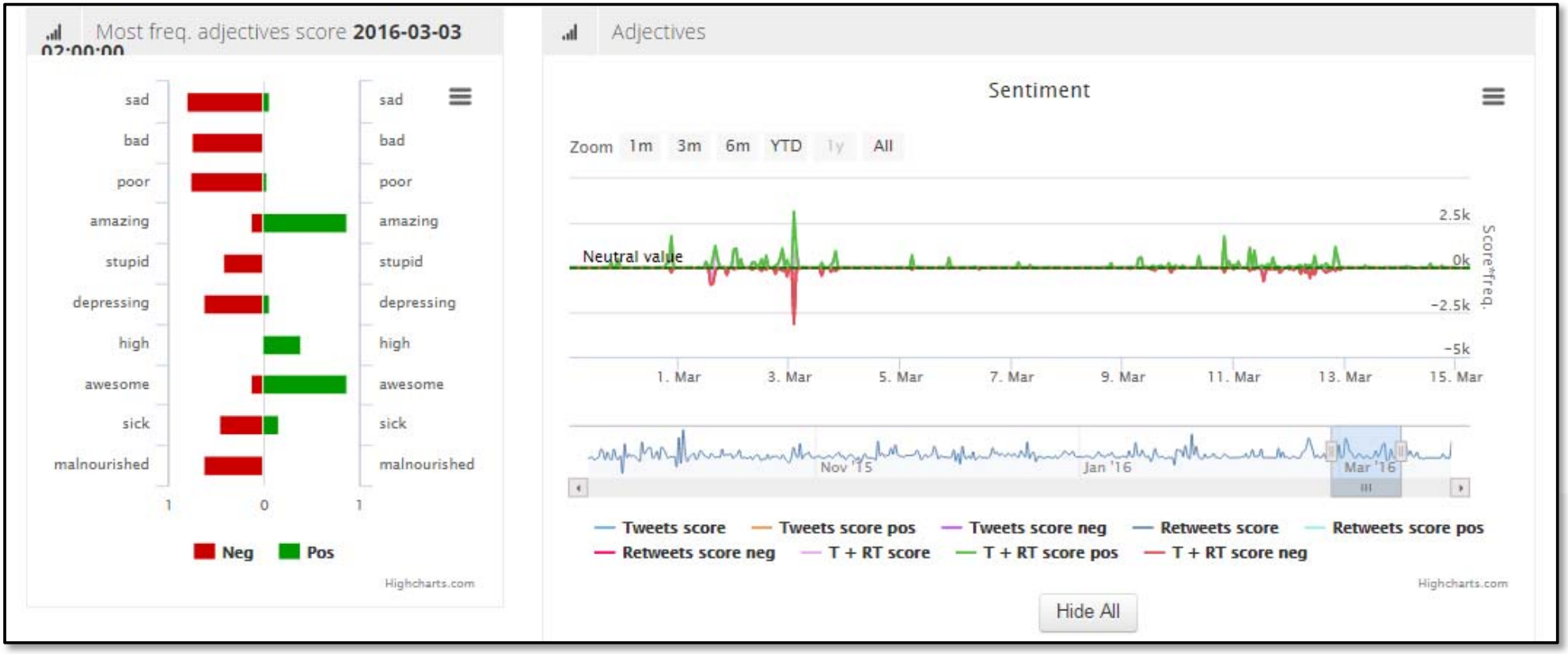
- Sentiment Analysis (SA) of Tweets content for each Search of a specific Channel.

Twitter Vigilance – NLP & SA



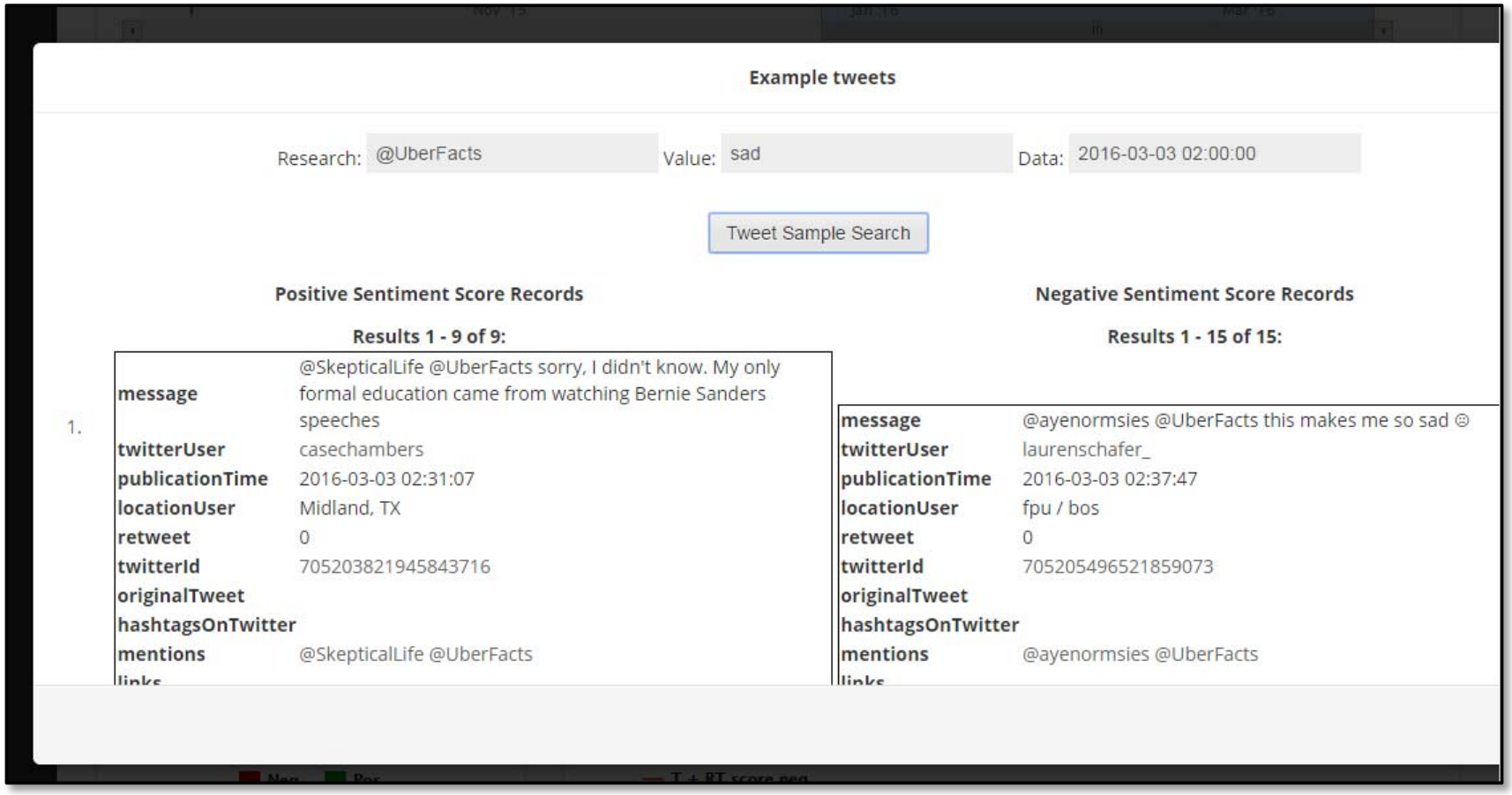
- Sentiment Analysis (SA) of Tweets content at Search Level.

Twitter Vigilance – NLP & SA



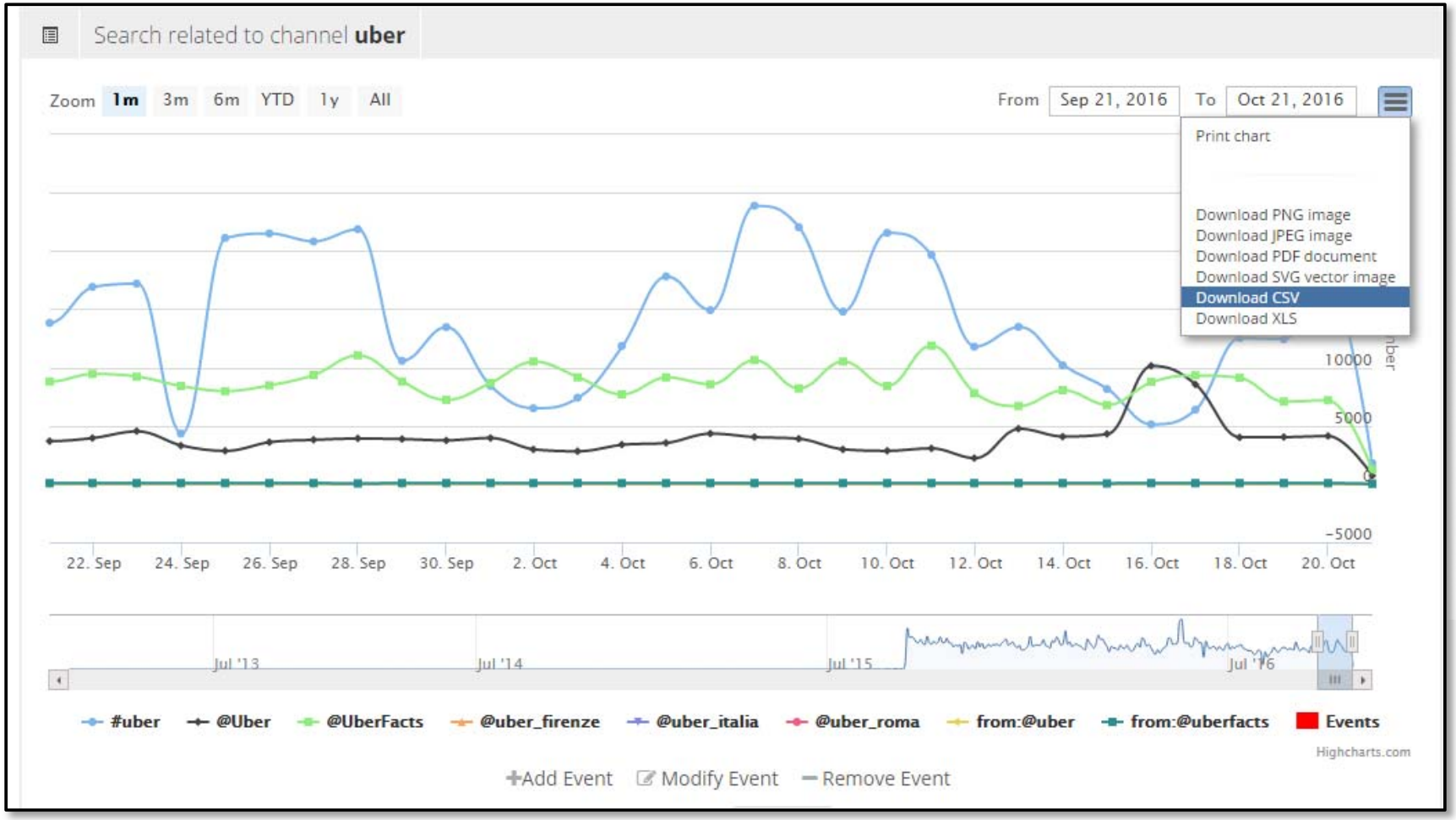
- Sentiment Analysis (SA) at Search level specifically for Keywords, Adjectives and Verbs.

Twitter Vigilance – NLP & SA



- Show samples and details of those Tweets which most have effects upon the Sentiment Analysis final computation results.

Twitter Vigilance – Data Download



- It is possible to download data for further processing and analysis
- It is possible to specify the date time interval

Agenda

1. Introduction: What is Twitter
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3. Twitter Vigilance how it is working
4. Exercitation Work Plan

Facciamo le Esercitazioni

- 5 Gruppi
- 3-4 Persone per gruppo con Skill Diverso
  - noi facciamo I gruppi
- Compiti diversi:
  - Uber:……
  - TPL:……
  - Firenze "Turismo":……
  - Xfactor:……
  - Firenze "Meteo":……

Non Disclosure

- Accedendo ai dati e all'account di TV per il vostro elaborato accettate le seguenti condizioni:
  - Non siete autorizzati a
    - comunicare a terzi i dati che ottenete da Twitter Vigilance in nessuna forma, anche se elaborati (non potete passarli neanche ai docenti degli altri corsi)
    - Passare a terzi la vostra password
    - Pubblicare I risultati delle vostre elaborazioni, se non in agreement con il DISIT lab.
  - Siete responsabili di cosa accade dentro il vostro account che avra' una durata limitata al corso
  - Ci autorizzate a pubblicare i risultati che ottenete in ogni forma ci possa essere utile, riconoscendovi un acknoledgement (ringraziamento)

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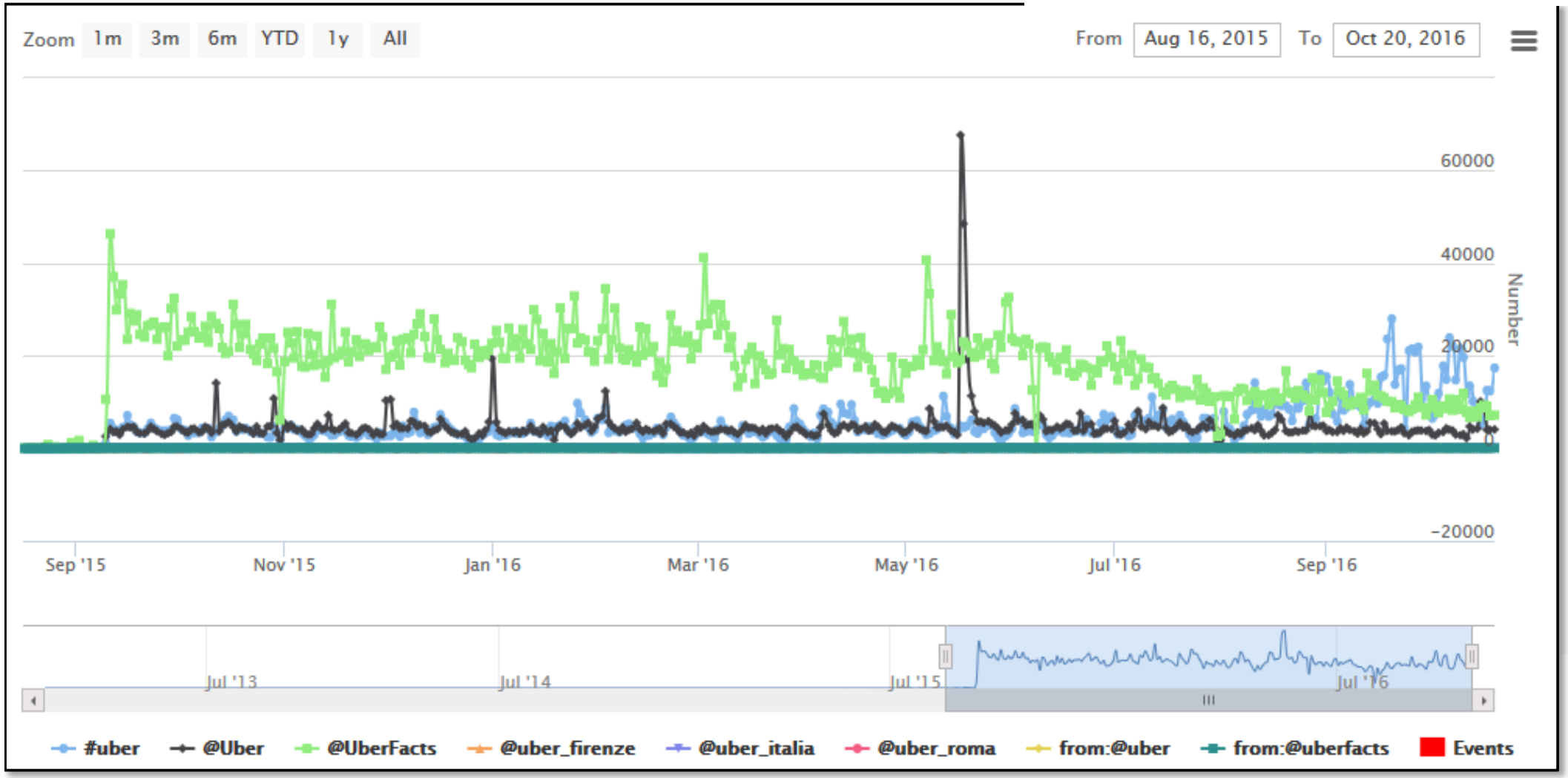
Canale "Uber"

#uber @Uber @UberFacts @uber_firenze @uber_italia @uber_roma from:@uber from:@uberfacts



Twitter Vigilance

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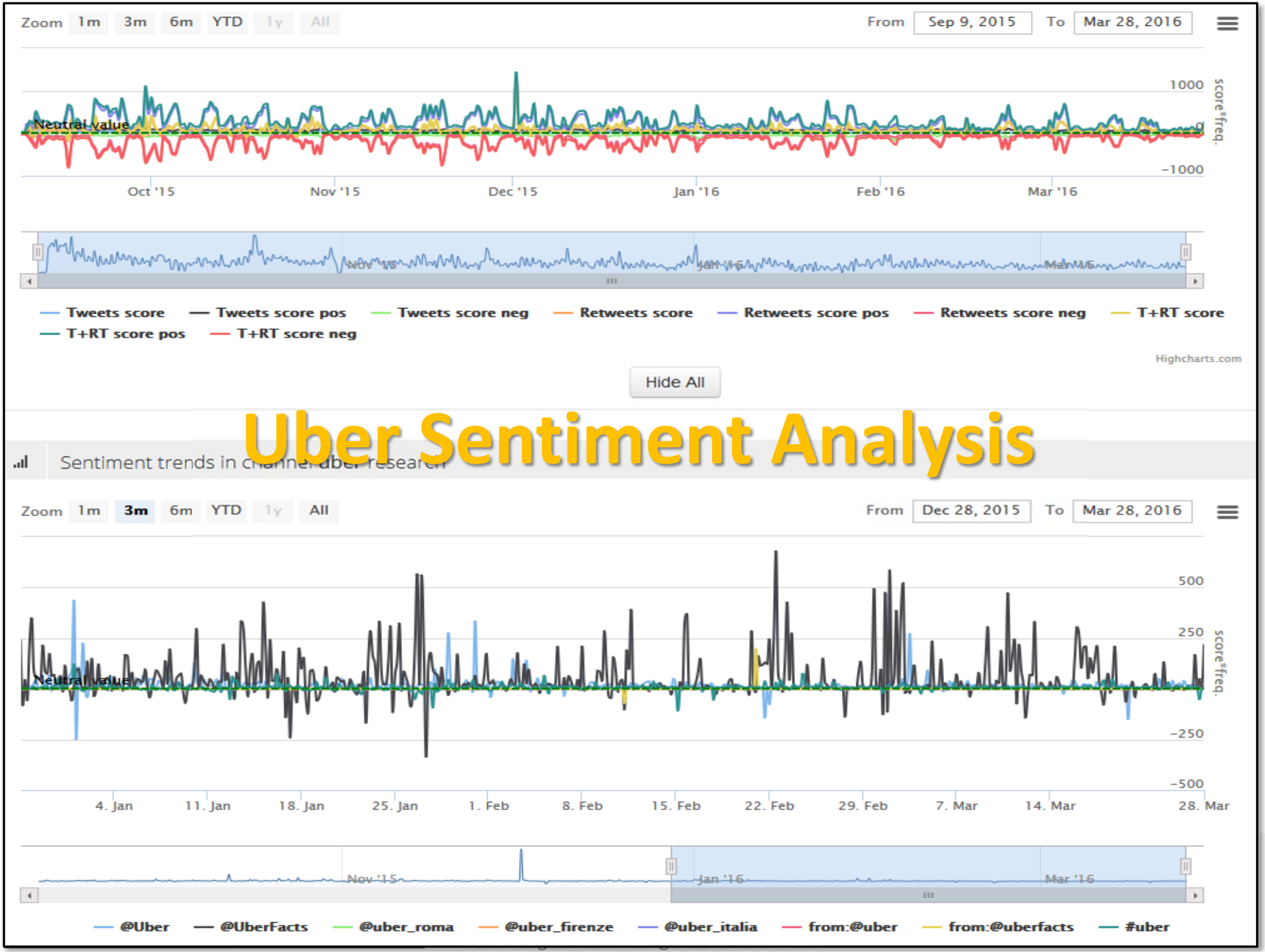
Zoom 1m 3m 6m YTD 1y All
From Sep 9, 2015 To Mar 28, 2016
1000
0
-1000
score*freq.
Neutral value
Oct '15
Nov '15
Dec '15
Jan '16
Feb '16
Mar '16
Tweets score
Tweets score pos
Tweets score neg
Retweets score
Retweets score pos
Retweets score neg
T+RT score
T+RT score pos
T+RT score neg
Highcharts.com
Hide All
Uber Sentiment Analysis
Sentiment trends in channel: uber research
Zoom 1m 3m 6m YTD 1y All
From Dec 28, 2015 To Mar 28, 2016
500
250
-250
-500
score*freq.
Neutral value
4. Jan
11. Jan
18. Jan
25. Jan
1. Feb
8. Feb
15. Feb
22. Feb
29. Feb
7. Mar
14. Mar
28. Mar
Nov '15
Jan '16
Mar '16
@Uber
@UberFacts
@uber_roma
@uber_firenze
@uber_italia
from:@uber
from:@uberfacts
#uber

Canale "Uber"

- 11 Milioni di Tweet
- L'azienda e/o il servizio stanno perdendo l'attenzione del mercato
- Cosa ha determinato alcuni dei picchi ?
  - Potevano essere previsti ?
- Identificazione delle Sorgenti di rumore
- Identificazione di nuove Keywords/Search

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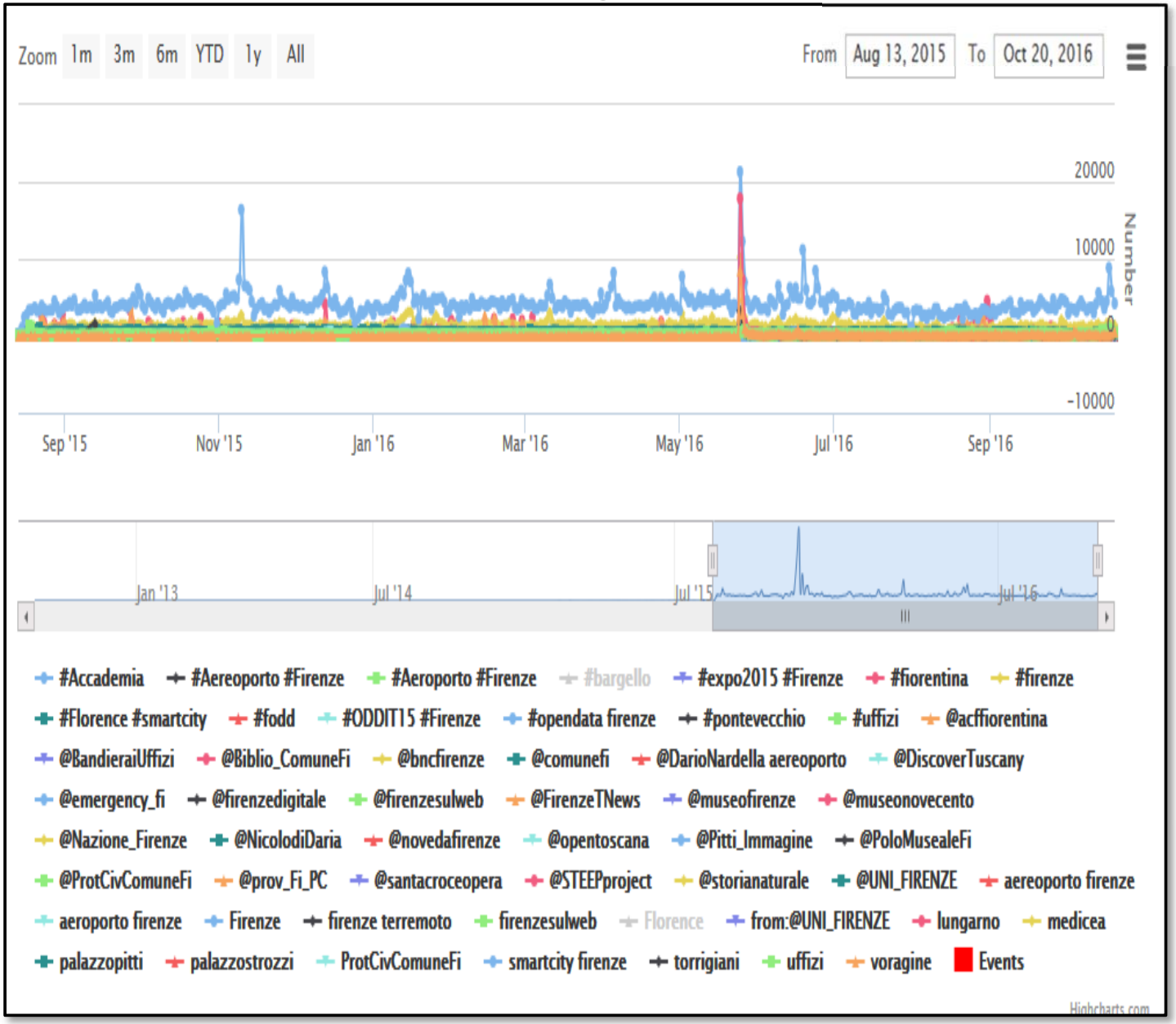
Canale "Firenze"



#Accademia #Aereoporto #Firenze
#Aeroporto #Firenze #bargello
#expo2015 #Firenze #fiorentina #firenze
#Florence #smartcity #fodd
#ODDIT15 #Firenze #opendata firenze
#pontevecchio #uffizi @acffiorentina
@BandieraiUffizi @Biblio_ComuneFi
@bncfirenze @comunefi
@DarioNardella aereoporto
@DiscoverTuscany @emergency_fi
@firenzedigitale @firenzesulweb
@FirenzeTNews @museofirenze
@museonovecento @Nazione_Firenze
@NicolodiDaria @novedafirenze
@opentoscana @Pitti_Immagine
@PoloMusealeFi @ProtCivComuneFi
@prov_Fi_PC @santacroceopera
@STEEPproject @storianaturale
@UNI_FIRENZE aereoporto firenze
aeroporto firenze Firenze
firenze terremoto firenzesulweb Florence
from:@UNI_FIRENZE lungarno medicea
palazzopitti palazzostrozzi
ProtCivComuneFi smartcity firenze
torrigiani uffizi voragine

Twitter Vigilance

Canale "Firenze"

- 7 Milioni di Tweets
- Identificazione delle Sorgenti di rumore
- Identificazione di Keywords/Search giuste, e non inserire le altre
- Quali sono le metriche correlate con i servizi piu' ricercati
  - Cosa cercano I turisti, dove vanno, cosa fanno
  - Cosa non gli e' piaciuto ?, Cosa gli e' piaciuto di piu' ?
  - Perche tornano ?
- I cittadini cosa dicono?

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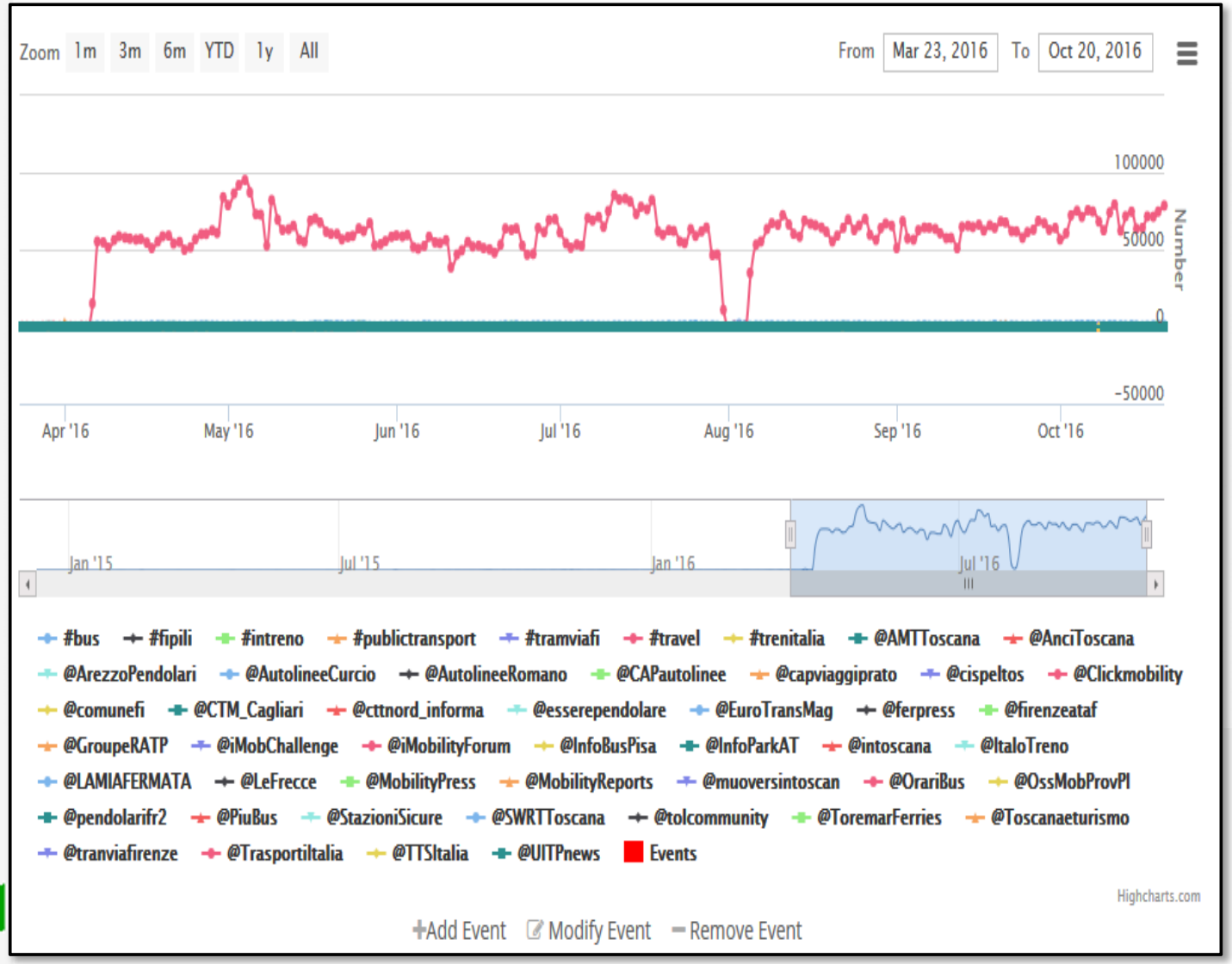
Trasporto Pubblico

#bus #fipili #intreno #publictransport #tramviafi #travel #trenitalia @AMTToscana @AnciToscana @ArezzoPendolari @AutolineeCurcio @AutolineeRomano @CAPautolinee @capviaggiprato @cispeltos @Clickmobility @comunefi @CTM_Cagliari @cttnord_informa @esserependolare @EuroTransMag @ferpress @firenzeataf @GroupeRATP @iMobChallenge @iMobilityForum @InfoBusPisa @InfoParkAT @intoscana @ItaloTreno @LAMIAFERMATA @LeFrecce @MobilityPress @MobilityReports @muoversintoscan @OrariBus @OssMobProvPI @pendolarifr2 @PiuBus @StazioniSicure @SWRTToscana @tolcommunity @ToremarFerries @Toscanaeturismo @tranviafirenze @Trasportiltalia @TTSItalia @UITPnews

- Canale "TPL", 12 M tweet



TPL

- Identificazione delle Sorgenti di rumore
- Identificazione di Keywords/Search giuste, e non inserire le altre
- Quali metriche sono correlate con l'apprezzamento del servizio
  - Confronto fra i vari operatori di TPL sulla base della qualita'/apprezzamento
- Tipologia delle lamentele degli utenti

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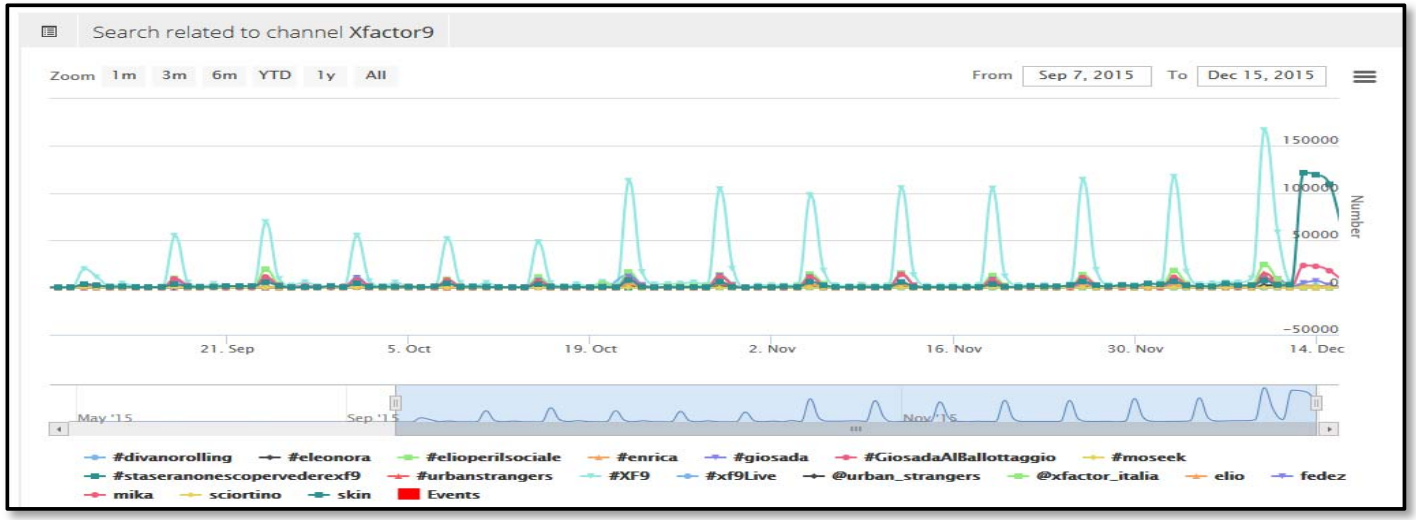
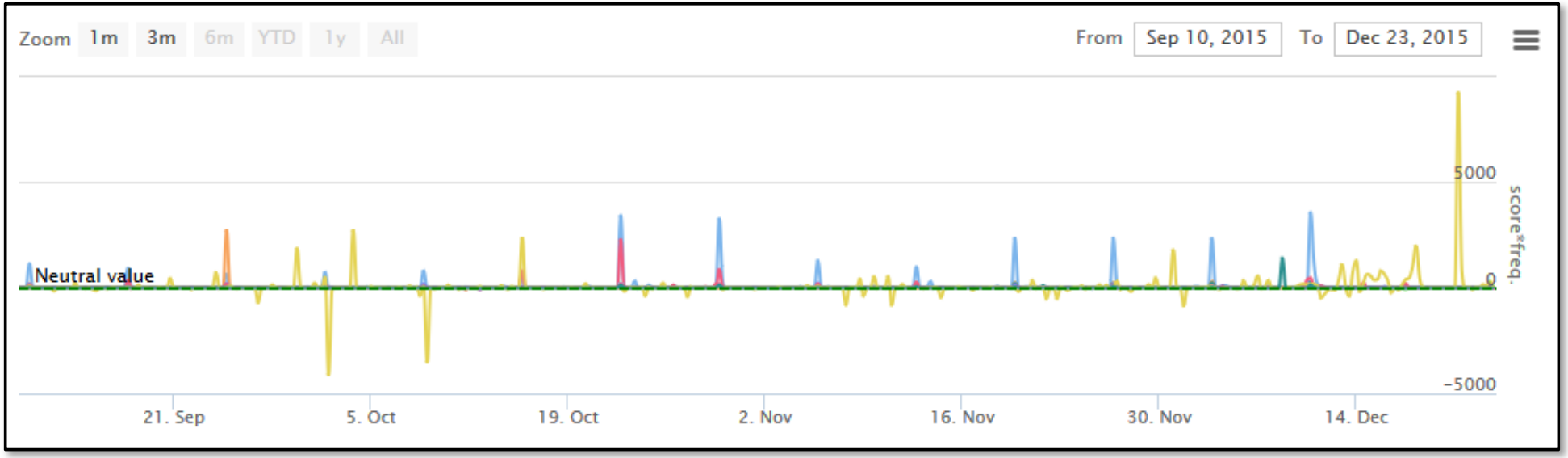
Canale "XFactor9", "xf10"



#divanorolling #eleonora #elioperilsociale #enrica #giosada #GiosadaAlBallottaggio #moseek #staseranonescopervederexf9 #urbanstrangers #XF9 #xf9Live @urban_strangers @xfactor_italia elio fedez mika sciortino skin

- 2 Milioni di Tweet



Twitter Vigilance

Canale "XFactor9", "xf10"

- Identificazione delle Sorgenti di rumore
- Identificazione di Keywords/Search giuste, e non inserire le altre
- Quali metriche sono correlate con:
  - il vincitore di Xfactor9
  - il numero di telespettatori
  - casi di abbandono, come l'anno presa I concorrenti ?
- Che tipo di risposta hanno avuto I giudici ?

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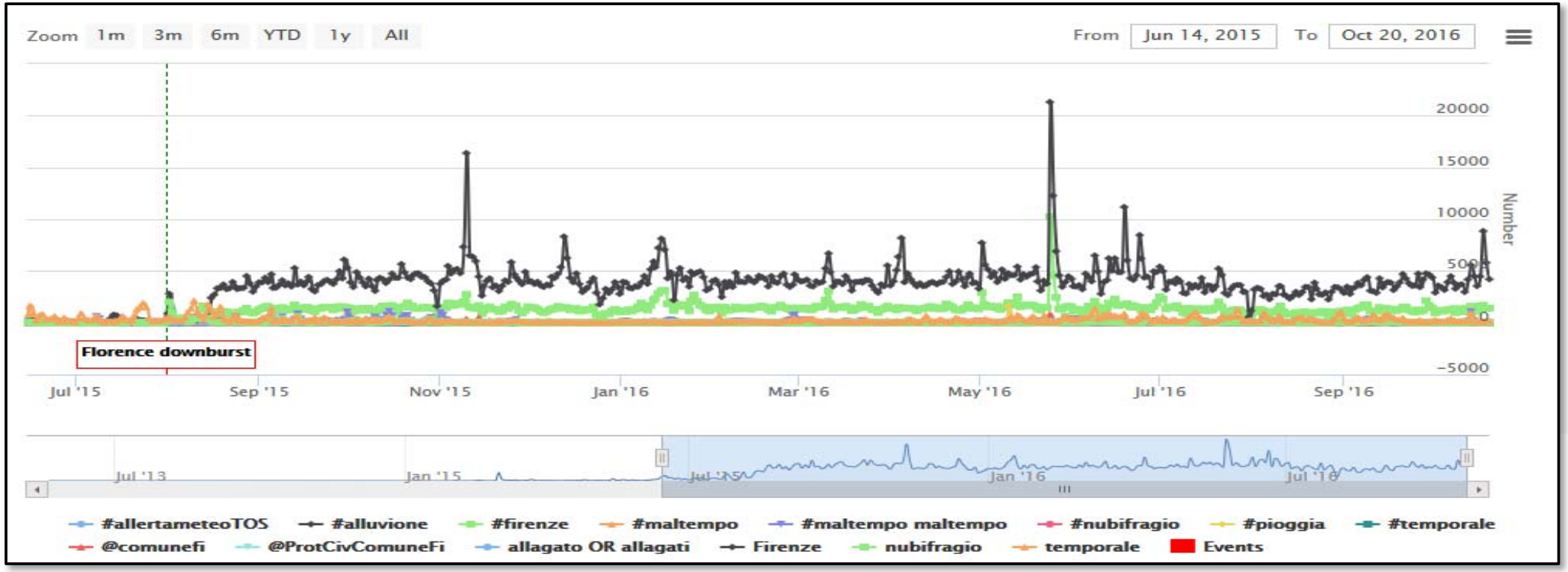
Meteo

- Canale "Maltempo Firenze"
- 2 Milioni di Tweet

#allertameteoTOS #alluvione #firenze #maltempo #maltempo maltempo #nubifragio #pioggia #temporale @comunefi @ProtCivComuneFi allagato OR allagati Firenze nubifragio temporale



Twitter Vigilance

Meteo

- Identificazione delle Sorgenti di rumore
- Identificazione di Keywords/Search giuste, e non inserire le altre
- Identificare altre keyword ?
- Che percentuale di questi tweet riguarda veramente firenze
- Che correlazione c'e' fra eventi meteo gravi e il numero di Tweet, Retweet, etc.
- Che anticipo medio si ha fra I primi tweet virali su Twitter riguardo ad eventi meteo gravi e le notifiche della protezione civile?
- Quali metriche sono correlate con il maltempo a Firenze

Come si Lavora

- Analizzate I dati prima!!!!!!! Da utenti guest
- Vi vengono dati degli account vuoti
- Dovete creare il vostro/i canale/i: XXXGruppoXXX
- Rimettono dentro le Search (gia presenti) che ritenete opportune per ogni canale
  - Aggiungono nuove search → aspettare un paio di giorni poiché i dati sono molti e anche voi siete in molti: non esagerate con il numero delle search nuove !!!!! Max 5 nuove search per ogni gruppo
- Analizzate I nuovi dati, scaricando il data set specifico nell'intervallo specifico
- Utilizzo di Excel o R
- Estrazione dei risultati e realizzazione di una micro relazione: descrizione, cose buone, cose cattive, risultati…

- END