

# PHEME

## *Computing Veracity Across Media, Languages, and Social Networks*

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# The 3Vs of Big Data

- Social media is big data:
  - Volume:
    - Twitter: 500,000,000 tweets a day;
    - Facebook: 9 million messages per hour
  - Velocity:
    - Twitter: avg 5,700 tweets per second (TPS); peak in 2013: 143, 199 TPS
    - Facebook: 150,000 messages per minute; 50,000 links shared per minute
  - Variety
    - Short text, social network graph, user interaction graphs, images, videos

<https://blog.twitter.com/2013/new-tweets-per-second-record-and-how>  
<http://www.statisticbrain.com/facebook-statistics/>



PHEME focuses on a **fourth** crucial, but hitherto largely unstudied, **challenge: veracity**

- We coined the term *phemes*
  - **memes** are thematic motifs that spread through social media in ways analogous to genetic traits
  - **phemes** add truthfulness and deception to the mix
  - named after ancient Greek PHEME, “*embodiment of fame and notoriety, her favour being notability, her wrath being scandalous rumours*”

# Social Media is Rife with Phemes



File Edit View History Bookmarks Tools Help

How riot rumours spread on Tw... +

www.guardian.co.uk/uk/interactive/2011/dec/07/london-riots-twitter

irdian visualisation london riots

See all rumours rumour is false London Eye set on fire

PLAY 1 2 3 4 5 << >>

400 Tweets/hour

0

9th August 01:07

### How the rumour unfolded

Shortly after 1am on Tuesday, August 9, @zadio posts a link to an image of the London Eye apparently ablaze with the heartfelt message: 'Oh my God! This can't be happening!' The tweet is quickly picked up.

“

Oh my god! This can't be happening at London Eye! #Londonriots #Londonriot #Prayforlondon <http://twitpic.com/6372vo>

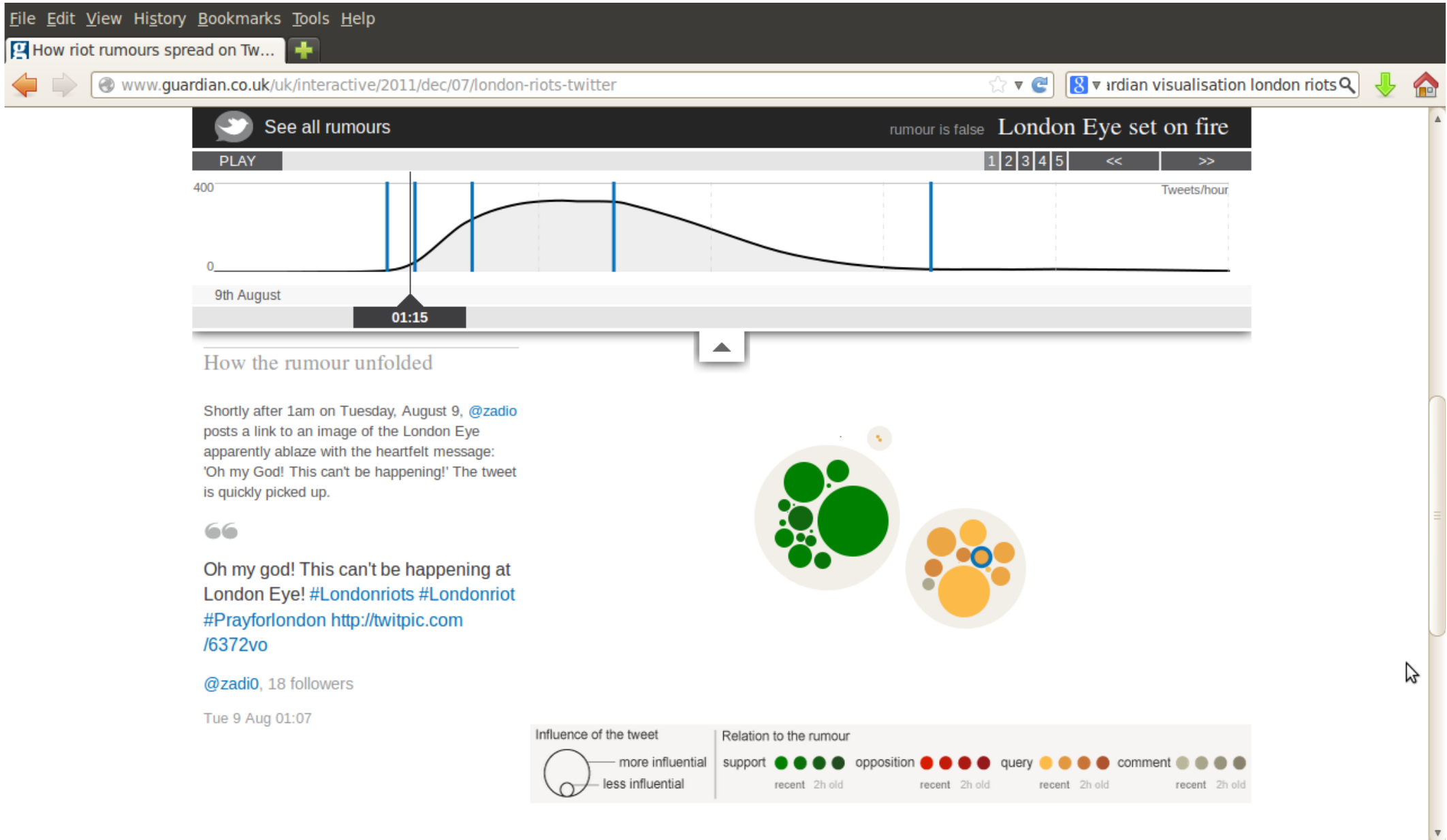
@zadi0, 18 followers

Tue 9 Aug 01:07

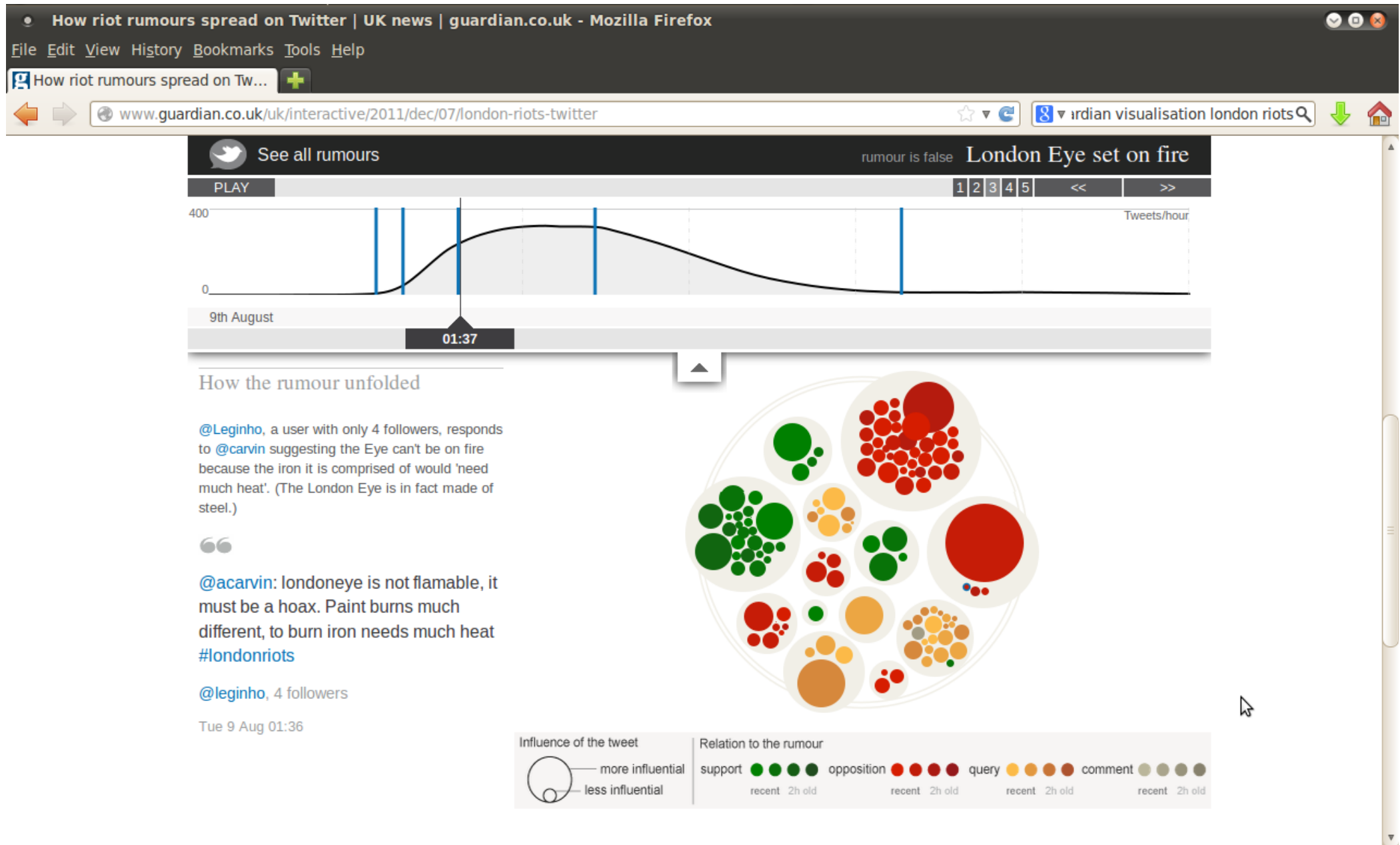
Influence of the tweet  
more influential  
less influential

Relation to the rumour  
support recent 2h old  
opposition recent 2h old  
query recent 2h old  
comment recent 2h old

# Social Media is Rife with Phemes (2)



# Social Media is Rife with Phemes (3)



## □ Technological challenges

- Analysis is post-hoc, on 7 known rumours

- Analysis and visualisations took months of researcher and programmer effort

## □ Rumours are challenging

- Some rumours could take days, weeks or even months to die out

- Ill-meaning humans can currently outsmart computers and appear genuine



- Create a computational framework for **automatic** discovery and verification of rumours, **at scale** and **fast**
  
- Draw on:
  - NLP: what's said
  - web science: a priori knowledge from Linked Data
  - social science: who spread it, why and how
  - information visualisation: visual analytics

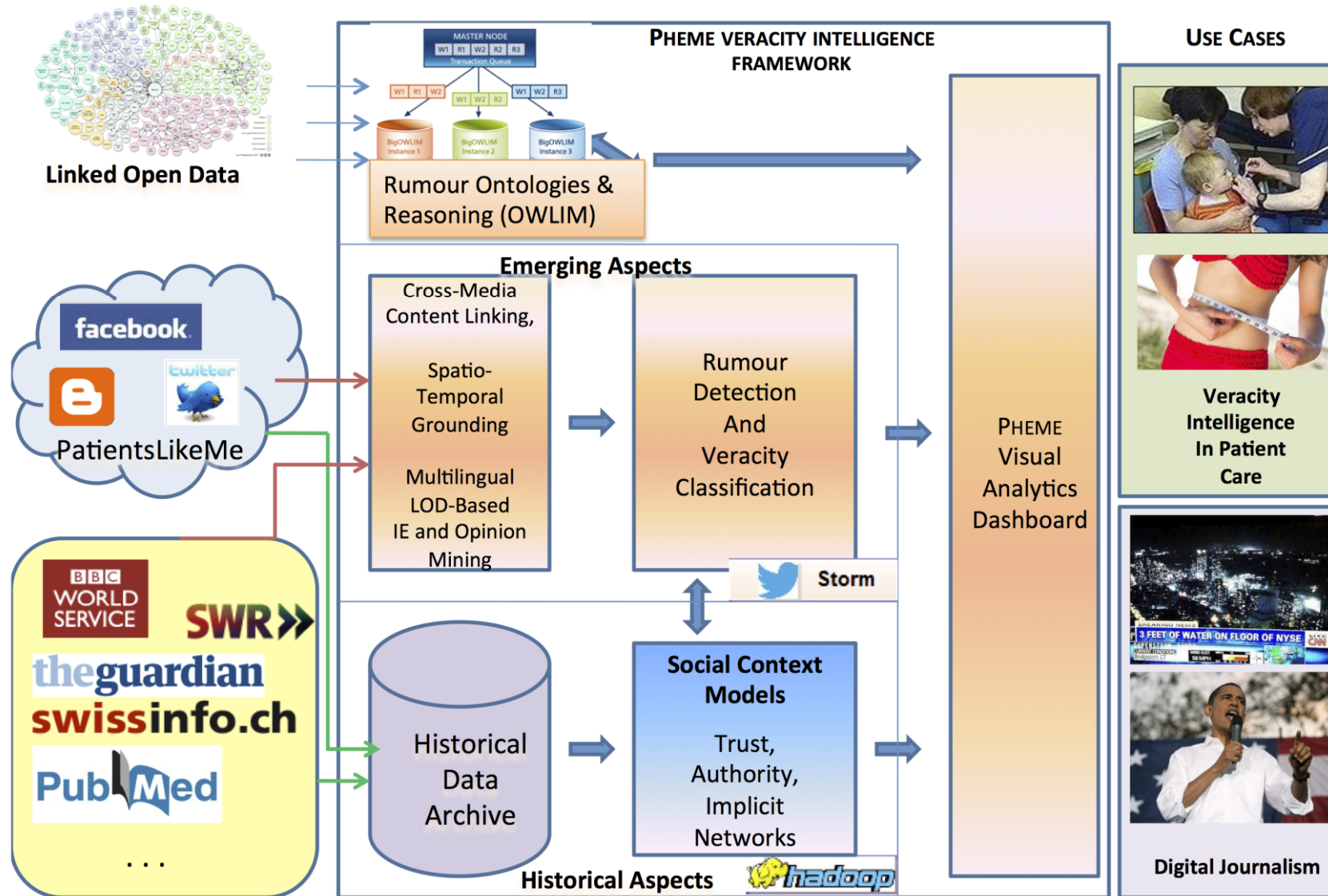


- Investigate models and algorithms for automatic extraction and verification of **four kinds of rumours** and their textual expressions (i.e. **phemes**):
  - **uncertain information** or **speculation** (e.g. an analyst claiming the Bank of England will raise interest rates at their next meeting),
  - **disputed information** or **controversy** (e.g. aluminium may or may not cause Alzheimer's),
  - **misinformation** (e.g. misrepresentation and quoting out of context), and
  - **disinformation** (e.g. Obama is a Muslim).

- **Objective 1:** Multi-lingual methods for cross-media detection of phemes
- **Objective 2:** Use a priori LOD knowledge
- **Objective 3:** Model pheme spread across media, social networks, and time
- **Objective 4:** Pheme visualisations: media maps, impact maps, geographical maps
- **Objective 5:** Test and evaluate the results



# Technology Outcome: Open Source Computational FW



# Commercial Impact (1): Smarter Software Products



- Who: ONTO
- Where:
  - Semantic Publishing
  - Search and Knowledge Management
- What:
  - KIM, OWLIM, FactForge, LinkedLifeData
  - PHEME will enable analysis and interlinking of `trusted` content with `untrusted` social media streams
  - Introduce models of social context



# Commercial Impact (3):

## Social Intelligence Products - iHUB



- Ushahidi: real-time sense making through social intelligence
  - Crowdsourced collection and curation of information
- SwiftRiver: Add some automatic content tagging
  - PHEME veracity tools help reduce costs of manual content curation and verification
  - Customisation to data journalism



# Commercial Impact (4): Tools for Digital Journalism



- PHEME will enhance open-source social intelligence tools for data journalism
- Enhanced productivity of SWI's editorial team
  - Tracking emerging news stories
  - Covering online discussions, getting the main arguments on the issue
  - Intelligent content aggregation across media and languages



# Societal Impact: Better Healthcare



- Patient Advice, Healthcare Policies, Healthcare Research
  - Rumour intelligence for direct use by clinicians and public health practitioners
  - Combine social media analysis with EHRs
    - What health-related rumours are discussed in patient-clinician consultations
    - Preventative medical advice, e.g. warn patients not to trust certain rumours, when researching their disease online





# The Consortium at a Glance



<b>Part. no.</b>	<b>Participant organisation name</b>	<b>Part. short name</b>	<b>Country</b>
Coordinator	The University of Sheffield	USFD	UK
2	University of Saarland	USAAR	DE
3	MODUL University Vienna	MOD	AT
4	Ontotext AD	ONTO	BG
5	ATOS Spain SAU	ATOS	ES
6	Kings College London	KCL	UK
7	iHUB	USH	KE
8	swissinfo.ch	SWI	CH
9	University of Warwick	UWAR	UK



# Previous collaborations



- USFD, Thierry Declerck (now USAAR), ONTO – TrendMiner
- USFD, ATOS, ONTO – Khresmoi, TAO
- USFD, MOD – uComp, DecarboNet
- USFD, KCL – mining health records (GATE)
- UWAR, USH – informal collaboration
- USFD, UWAR – informal collaboration on text mining for social media



# Contact Information



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