A Content Management Perspective on Fact-Checking

Julien Leblay **Ioana Manolescu** **Xavier Tannier**

INRIA-AIST Workshop on Fact Checking @INRIA

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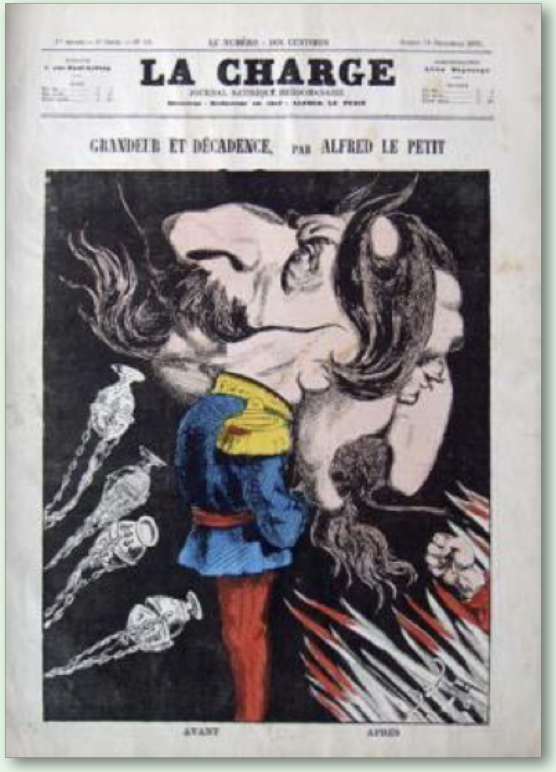
- Misinformation can stem from intentional deception effort, but also simply satire (Rubin et al. 2015) and "honest mistake"
- Fake news is as old as journalism, and hard to solve through political means

Example (Napoleon III vs the "rotary press")



Motivation and Goals

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  - Whether performed by journalists or other fact-checkers

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Observation

We do not believe it is feasible to "automate" fact-checking or journalistic work ; nor is it desirable, since journalistic content is authored by humans.Instead, we are interested in the role content management plays as a provider of models, algorithms and tools.

Outline

1 Computational Fact Checking

2 State ot the art

3 Perspectives

Definition(s)

Definition (Fact checking)

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Other definitions have been given (detail in the survey section.)

Fact checking ingredients

From the above definition, we can derive conclude :

- For a claim to pass fact check, it must
  - (i) the fact leaves little to no room for alternative interpretations,
  - (ii) it is backed by sufficient references to sources,
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- Some claims may be crafted to mislead, i.e., look valid given some context or source that is either irrelevant or flawed.

The need for transparency

The International Fact-Checking Network (IFCN), an organization sponsored by the Poynter Institute to "promote excellence in fact checking" [1] :

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5. A commitment to open and honest corrections.

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The limits of fact checking

- **Confirmation bias :** people are more likely to believe what fits their prior views.
  - Leads to the man-made part of the **echo chamber**.
  - Automated recommendation system amplify the phenomenon, making it harder for users to break out of their **filter bubbles**.
  - The actual impact of filter bubbles and echo chambers being studied[Garrett(2009), Garrett(2016)].

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The "arms race" between misinformation and fact checking is still on and probably will be so for a while.

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Definition (Fact checking [Babakar and Moy(2016)])

Fact checking is a four-stage process where media sources are

(i) media sources are **monitored**,

(ii) claims are **spotted**,

(iii) claims are **checked**,

(iv) fact checking analysis **results** are created and **published**.

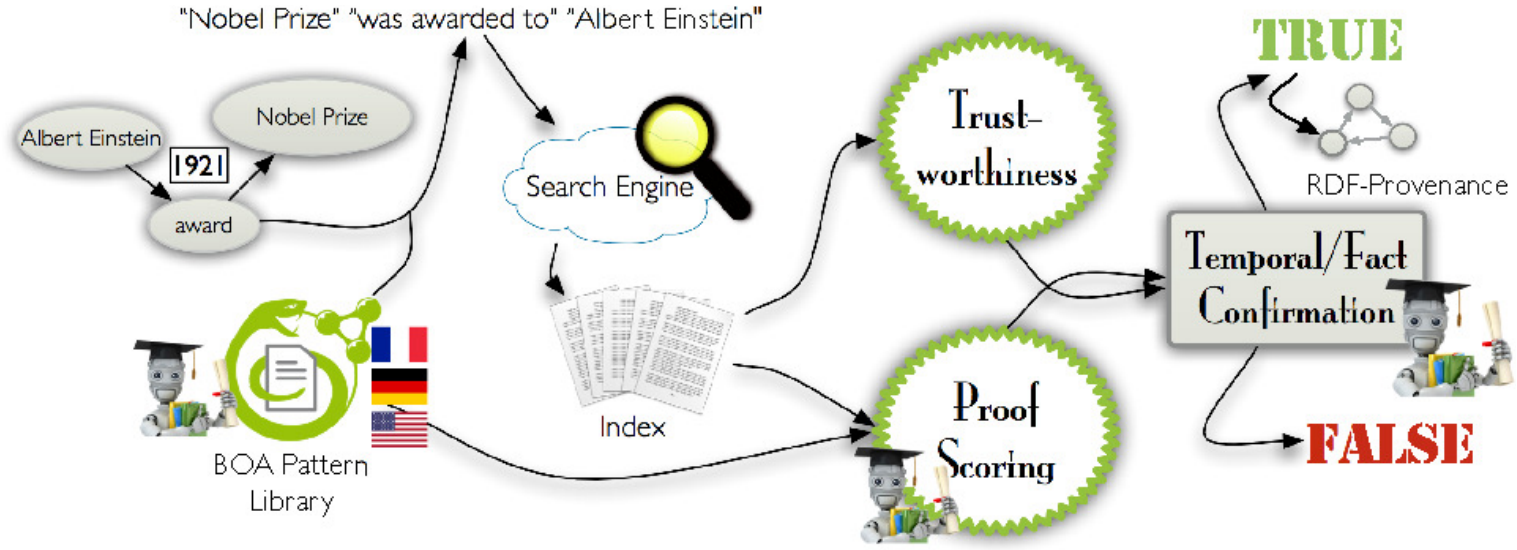
Overview

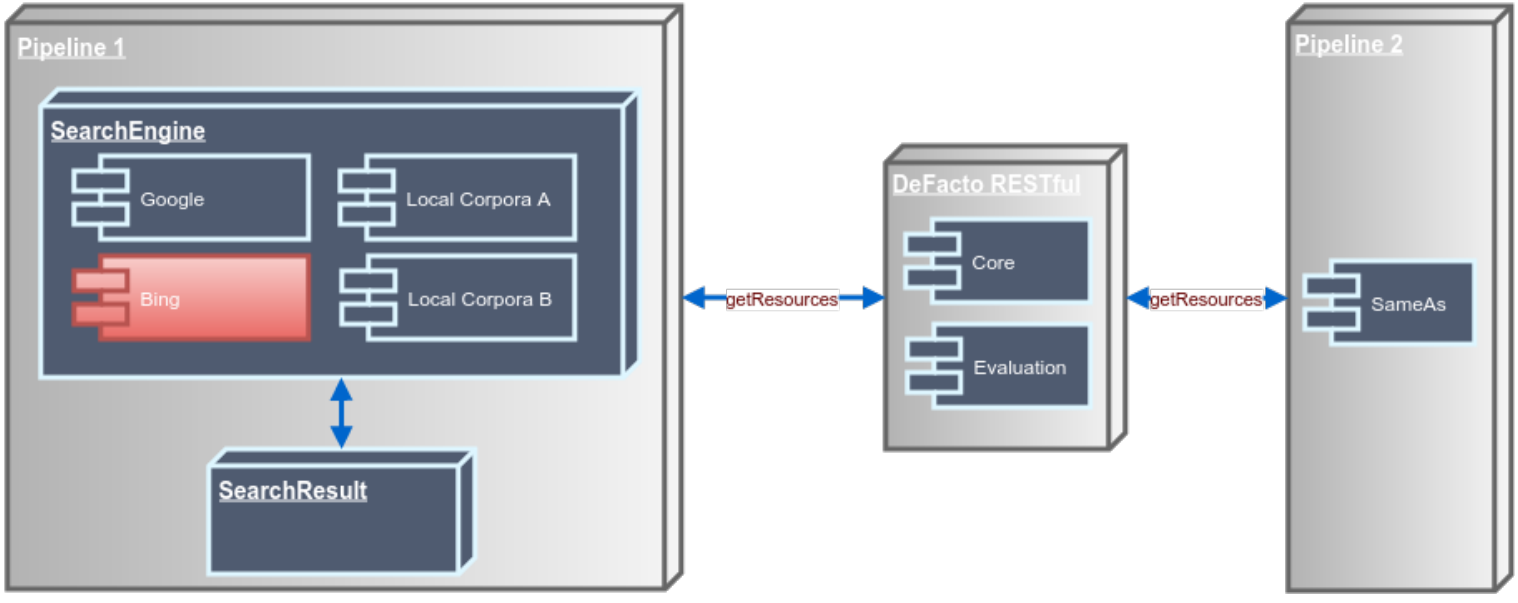
A very active research and development area today.

Legend	
Black boxes :	tasks involved in fact checking
Blue boxes :	inputs and outputs

FIGURE – Fact checking tasks, ingredients, and relevant works : an overview.

End-to-end systems : DeFacto





End-to-end systems : DeFacto

Charlie Sheen spouse Brooke Mueller

90.09% overall DeFacto score, fact holds for the year 2008 - 2011

263 websites containing the fact.

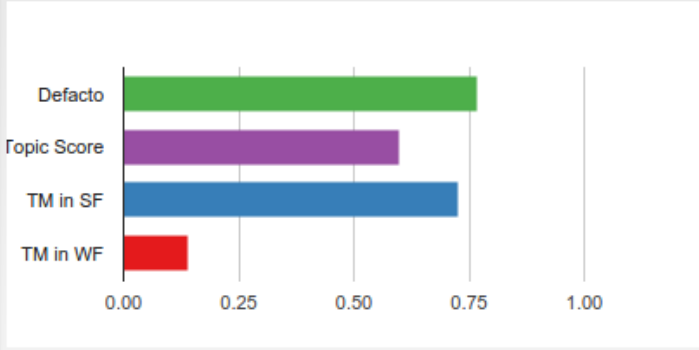
open proofs

spouse 74

Examples

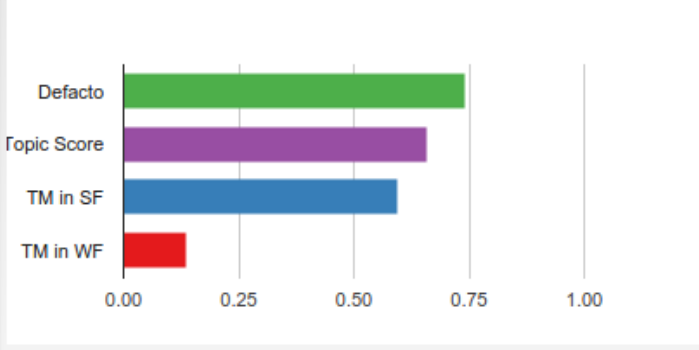
- Ahna O'Reilly, spouse, James Franco
- Alexandra Christmann, spouse, Ben Kingsley
- Alexis Valdés, spouse, Paulina Gálvez
- Andrew Pruett, spouse, Abigail Spencer
- Anna Torv, spouse, Mark Valley
- Blake Lively, spouse, Penn Dayton Badgley
- Brian McFadden, spouse, Delta Goodrem

TMZ Live: Charlie Sheen -- Brooke Mueller's Blocking Our Sons ...



1. Z Live: **Charlie Sheen** -- **Brooke Mueller**'s Blocking Our Sons' Care TMZ
2. **Charlie Sheen** -- **Brooke Mueller**'s Blocking Our Sons' Care TMZ Live 11.

Charlie Sheen slams ex-wife Brooke Mueller on eve of her ...



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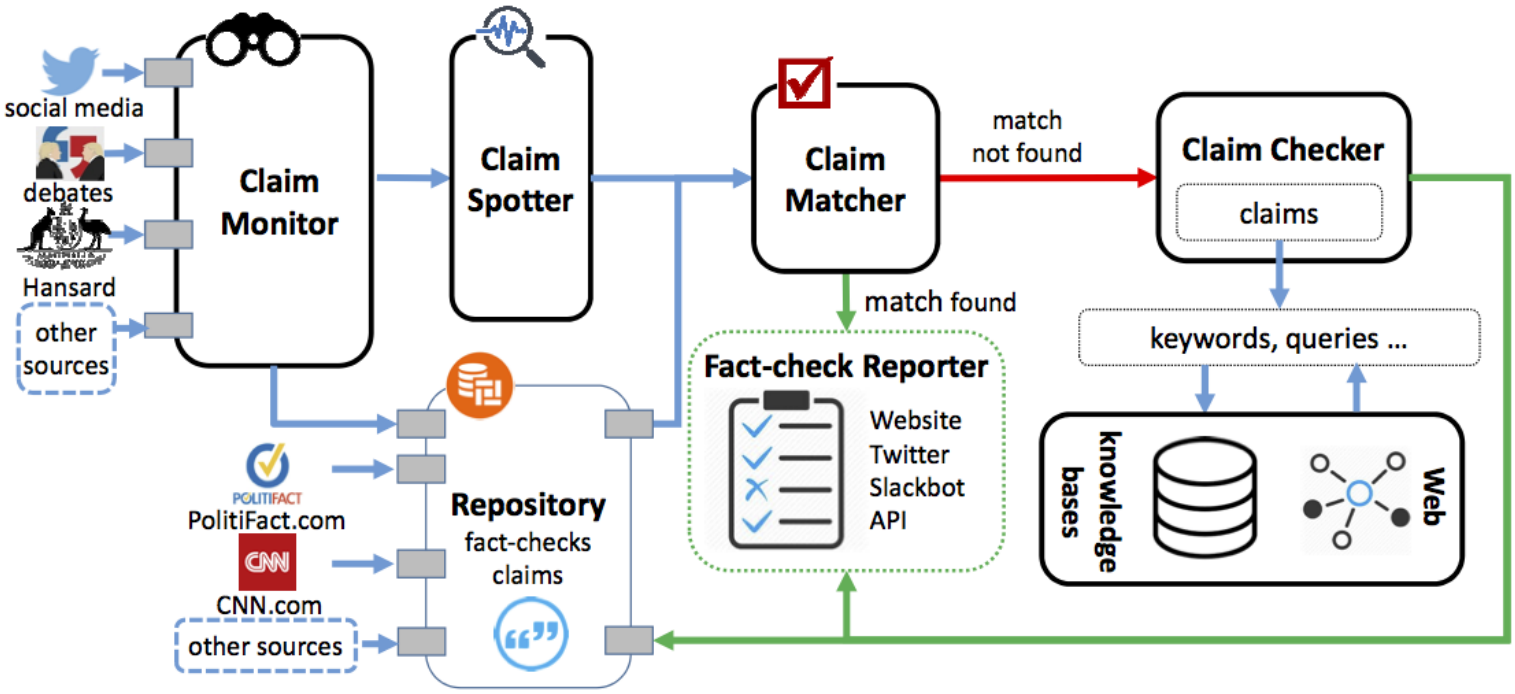
End-to-end systems : ClaimBuster



End-to-end systems : ClaimBuster

2016 Third Presidential Debate. Oct. 19, 2016, 9 p.m. EST

Chronological Order | Order by Score

Least Check-worthy >=0.1 >=0.2 >=0.3 >=0.4 >=0.5 >=0.6 >=0.7 >=0.8 >=0.9 >=1.0 Most Check-worthy

is tougher. But they know what's going on. They know it better than anybody. They want strong borders. They feel we have to have strong borders. I was up in New Hampshire the other day. The biggest complaint they have -- it's with all of the problems going on in the world, many of the problems caused by Hillary Clinton and by Barack Obama. All of the problems -- the single biggest problem is heroin that pours across our southern border. It's just pouring and destroying their youth. It's poisoning the blood of their youth and plenty of other people. We have to k[illegible]ders. We have to keep the drugs out of our country. We are -- right now, we're getting the drugs, they're getting the cash. We need strong borders. We need absolute -- we cannot give amnesty. Now, I want to build the wall. We need the wall.

Fact-check this

Claim Checker - Knowledge Bases

Consulting the knowledge bases produced the following results:

Truth Rating Indeterminable

Question Asked
What is all of the problems-- the single biggest problem?

Response Recieved
The single biggest problem in communication is the illusion that it has ...

Claim Matcher

We found the following claims which have been professionally fact-checked. Check them out!

Truth Rating True

Claim
"Heroin .. pours across our southern borders."

Speaker Donald Trump

URL politifact

Truth Rating True

Claim Checker - Search Engine

We found the following information after processing some search engine results:

All of the problems -- the single biggest problem is heroin that pours across our southern border. It's just pouring and destroying their youth.

Similarity Rating 0.8320502943378437

URL source

"I was up in New Hampshire the other day," Trump said in the debate. "The biggest

GENIUS

FILTER BY All Annotations

The biggest complaint they have -- it's with all of the problems going on in the world, many of the problems caused by Hillary Clinton and by Barack Obama

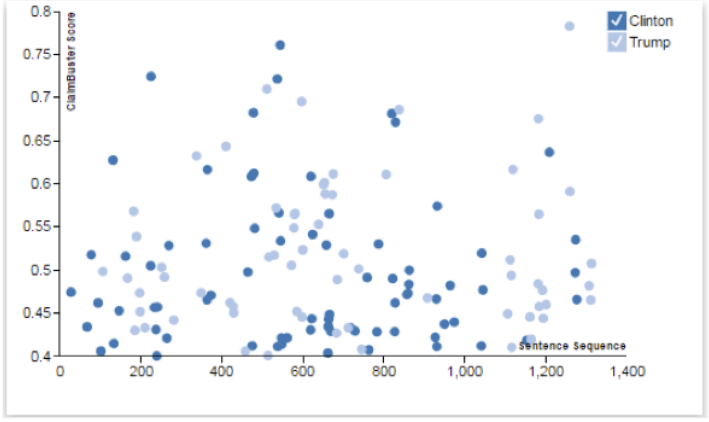
JosueCaraballo 17d

Is that true? What is the source?

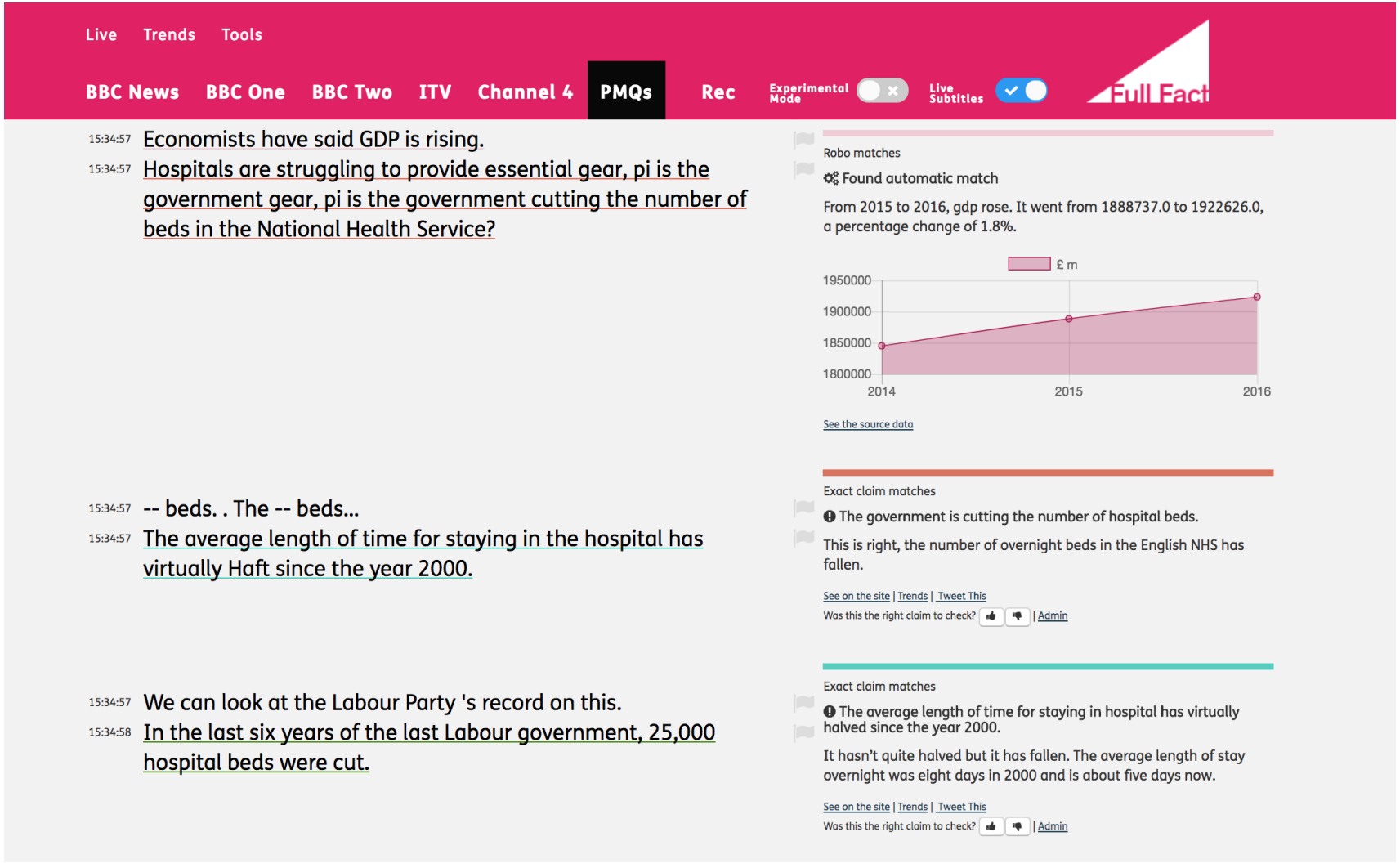
report abuse

Upvote

Add a comment



End-to-end systems : FullFact.org



End-to-end systems : FullFact.org

Live Trends Tools

Dashboard Search

FullFact

nurses have been using

Searched for nurses have been using, found 1 claims

Nurses have been using food banks.

Claim

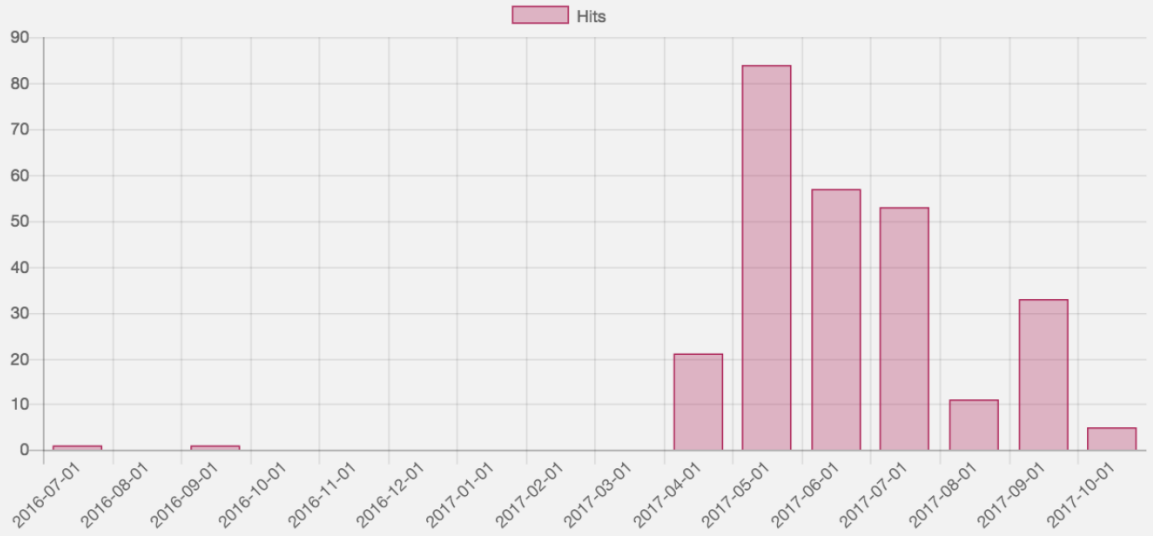
Nurses have been using food banks.

Conclusion

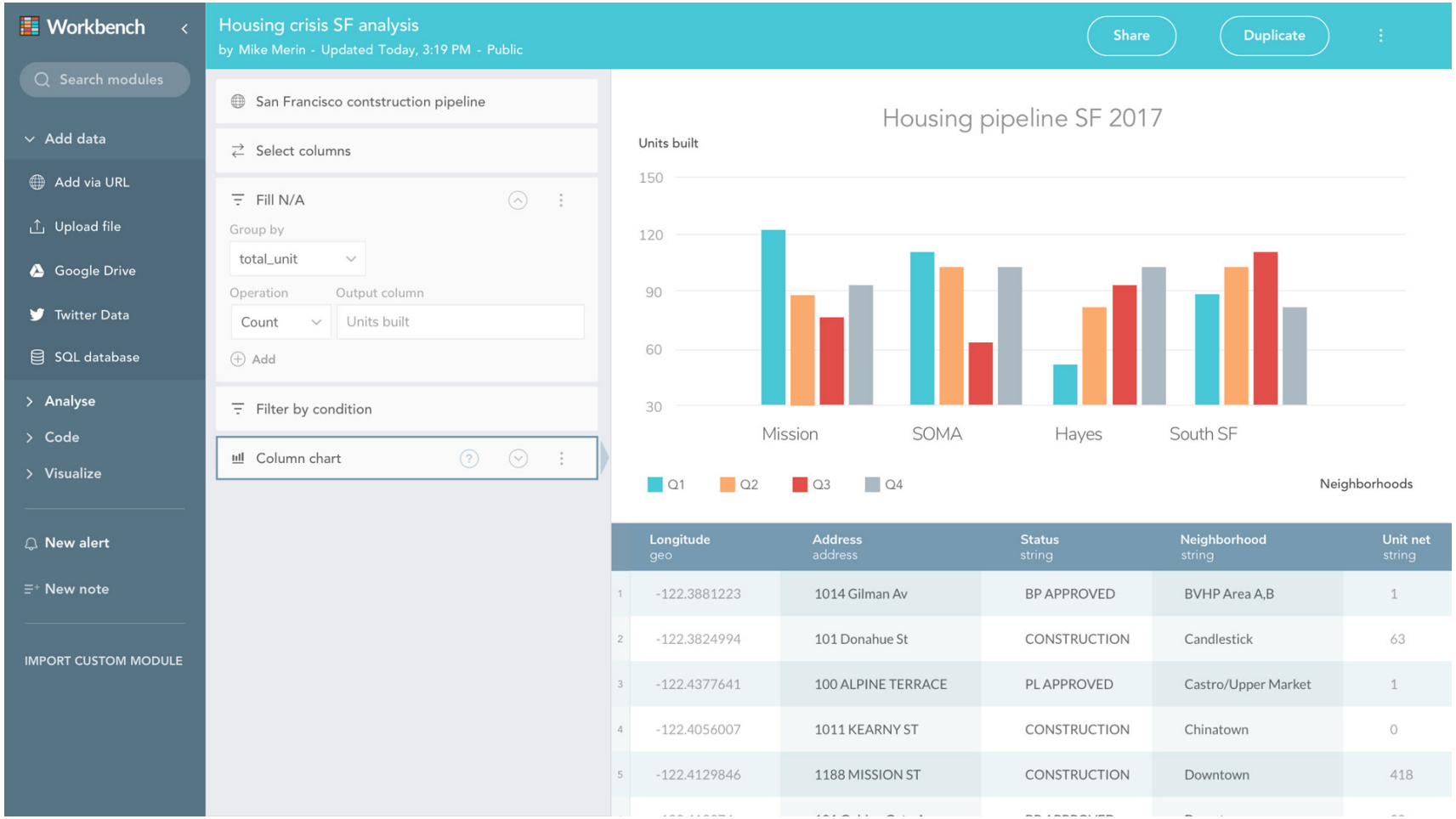
Media reports show that at least some individual nurses and trainees have visited food banks. We don't have solid evidence of the scale of use.

Read the factcheck

We've seen this claim 266 times since Jul 2016



End-to-end systems : CJ WorkBench



Data source

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  DeFacto [Lehmann et al.(2012)Lehmann, Gerber, Morsey, and Ngomo, Gerber et al.(2015)Gerber, Esteves, Lehmann, Bühmann, Usbeck, Ngomo, and Speck] (search engines) ;
- **Reference corpus Stance detection** aims to determine whether a text in favor of a given target, against it, neutral or unrelated.
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Claim extraction

Definition (Claim detection [Levy et al.(2014)Levy, Bilu, Hershcovich, Aharoni, and

Given a topic (short sentence) and a set of relevant articles, their goal is to automatically extract concise statements from the articles that directly support or contests the given topic.

Claim extraction, w.r.t. to reference base.

- In [Levy et al.(2014)Levy, Bilu, Hershcovich, Aharoni, and Slonim], the authors provide manually labeled benchmark dataset and a classification approach based on a cascade of classifiers.
- **DisputeFinder** [Ennals et al.(2010)Ennals, Trushkowsky, and Agosta] indentifies within within text, claims covered by a reference database containing disputed claims.
  In the extraction phase, phrases are transformed in bags of words through stop word removal, stemming etc. and matched against the database.
- **FullFact** ongoing work [Babakar and Moy(2016)] is researching claim extraction from text feeds, but also, audio and video streams ;
- A follow-up on **De-Facto** [Gerber et al.(2015)Gerber, Esteves, Lehmann, Bühmann, Usbeck, Ngomo, and

Claim extraction (continued)

Claim check-worthiness.

- Using neural networks [Park and Cardie(2014)]and [Guggilla et al.(2016)Guggilla, Miller, and Gurevych] classify sentences as verifiable and unverifiable
- ClaimBuster [Hassan et al.(2015)Hassan, Li, and Tremayne, Hassan et al.(2017)Hassan, Zhang, Arslan, Caraballo, Jimenez, Gawsane, Hasan, Josep uses SVMs to monitors data sources such as social media, TV programs and websites. Classes include :
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Claim extraction (continued)

Claim check-worthiness.

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Separating fact from opinions.

- [Yu and Hatzivassiloglou(2003)] separates claims between facts and opinions with an opinion question answering system perspective.
- [Walker et al.(2012)Walker, Tree, Anand, Abbott, and King] for research on deliberation and debate

Claim accuracy assessment

- **DeFacto** [Lehmann et al.(2012)Lehmann, Gerber, Morsey, and Ngomo, Gerber et al.(2015)Gerber, Esteves, Lehmann, Bühmann, Usbeck, Ngomo, and Speck] provides evidence potentially proving the claim is text snippets found in a Web page, sufficiently close to the claim.

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1) Matches claims against previously checked claims from trusted repositories.
2) If no similar claim is found, reverts to Web search engines and question answering systems such as Wolfram Alpha.
3) Combines the responses into a visual interface.

In a separate study, the authors show a strong correlation between the output of their system, and that claims checked by professionals at CNN and PolitiFact.

Claim accuracy assessment (continued)

- The **Fast and Furious FactCheck Challenge**[5] proposed to classify news articles (not claims) among the categories True, False, Somewhat True and Somewhat False using any combination of human and automated tools ;

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- The **SemEval**'s Semantic Textual Similarity task [Agirre et al.(2013)Agirre, Cer, Diab, and Gonzalez-Agirre] offers a graded and typed definition of semantic similarity

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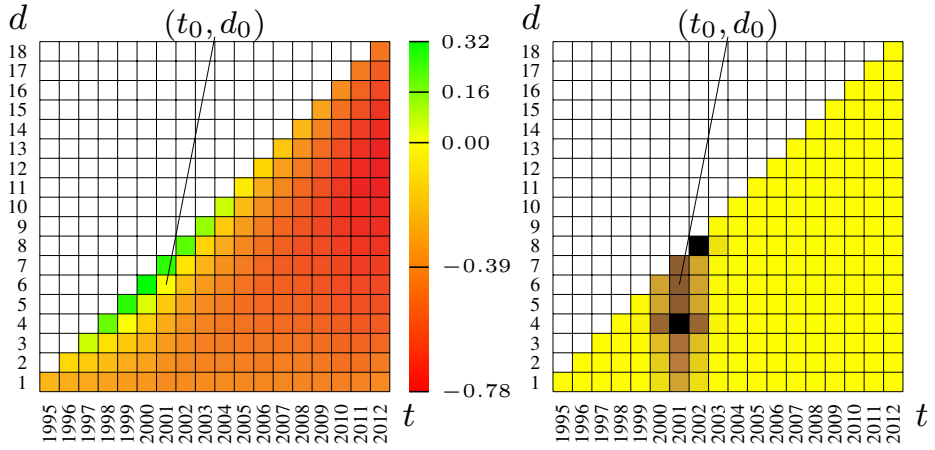
Putting claims into perspective

- Query perturbation approach [Wu et al.(2014)Wu, Agarwal, Li, Yang, and Yu].



(a) Relative strength of results (b) Sensibility of parameter settings

FIGURE – Strength and sensibility for the Giuliani's claim : "Adoptions went up 65 to 70 percent when [he] was mayor [of New York City]."

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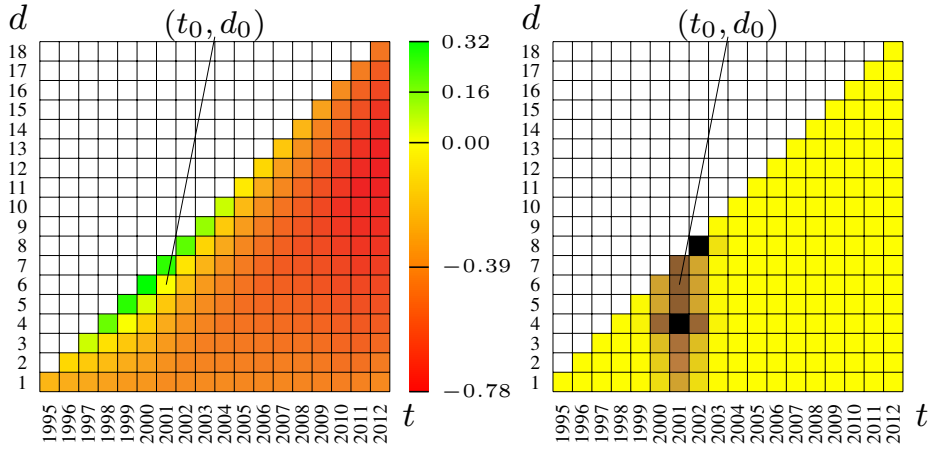

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- In [Wu et al.(2017a)Wu, Agarwal, Li, Yang, and Yu, Wu et al.(2017b)Wu, Gao, Agarwal, and Yang] the work is extended to support notions of diversity and representativity.

Julien: [Insert image]

Putting claims into perspective (continued)

- Data mining techniques are used
  in [Belfodil et al.(2017)Belfodil, Cazalens, Lamarre, and Plantevit] to highlight claims about behaviors in voting or rating contexts.
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- Systems such
  as [Sato et al.(2015)Sato, Yanai, Miyoshi, Yanase, Iwayama, Sun, and Niwa] can be used provide a general and balanced picture of a complex issue (e.g. "casinos increase criminality").
  Crawls from a textual corpus in search for positive and negative stances, and outputs a summary of the articles for each stances.

Sharing and publishing fact checking results

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- Google introduced **ClaimReview** [8] in 2017. It uses articles annotated with this metadata to display links in search result

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Publishing ClaimReview using MicroFormat

```
<div itemscope="" itemtype="http://schema.org/ClaimReview">
  An example paragraph reviewing a claim expressed in another document.
  <dl>
    <dt>Date published:</dt>
    <dd itemprop="datePublished">2014-07-23</dd>
    <dt>Review url:</dt>
    <dd itemprop="url">http://www.politifact.com/texas/statements/2014/jul/23/rick-perr
    <dt>Review by:</dt>
    <dd>
     <span itemprop="author" itemscope="" itemtype="http://schema.org/Organization">
        <span itemprop="name"><a itemprop="url" href="http://www.politifact.com/">Polit
        <img itemprop="image" src="http://static.politifact.com/mediapage/jpgs/politifa
        <link itemprop="sameAs" href="http://twitter.com/politifact"/>
     </span>
    </dd>
  </dl>
  <h3>Claim reviewed:</h3>
    <blockquote itemprop="claimReviewed">
    More than 3,000 homicides were committed by 'illegal aliens' over the past six years
    </blockquote>
    <span itemprop="reviewRating" itemscope="" itemtype="http://schema.org/Rating">
      Rating: <span itemprop="ratingValue">1</span>
      (best score: <span itemprop="bestRating">6</span>),
      "<span itemprop="alternateName">True</span>".
      <img itemprop="image" src="http://static.politifact.com.s3.amazonaws.com/rulings/t
```

ClaimReview as used in Google News

Google News

Search

Headlines | Local | For You | U.S.

WSJ: Cohen paid porn star through private LLC created just weeks before election

CNN · 4h ago

RELATED COVERAGE

Trump Lawyer Used Private Company, Pseudonyms to Pay Porn Star 'Stormy Daniels'

Highly Cited · Wall Street Journal · 9h ago

World

Souring World Views of Trump Open Doors for China and Russia

New York Times · 17h ago

RELATED COVERAGE

World's Approval of U.S. Leadership Drops to New Low - Gallup News

Most Referenced · Gallup News · 12h ago

New Zealand Prime Minister Says She's Pregnant, Due

More 江東区 stories →

Fact Check

Donald Trump said Chrysler is leaving Mexico. It isn't

PolitiFact

Did Shelia Jackson Lee Tweet That Trump Wanted War with 'North Japan'?

Snopes.com

Fact-checking President Trump's 'Fake News Awards'

Washington Post

Fact-checking Cory Booker's statistic on attacks by white nationalist hate groups

PolitiFact

Did Melania Trump Copy Michelle

Outline

1 Computational Fact Checking

2 State ot the art

3 Perspectives

Needs and open problems

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- **Standardize** Beyond "ClaimReview" more standards are needed to cover additional elements such as protocols, tools and functions.

Societal aspect

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  - Timely, sharp and balanced results.
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- **Educate**
  - data literacy, envisioned as a set of math and statistic skills, through dedicated education modules at all levels

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  - popular formats (PDF, JSON, CSV, etc.), automatic data types detect, automatic back-up mechanisms, e.g. (cloud-storage), CMS functionalities

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