

The Quest to Automate Fact-Checking

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Fact-checking is growing, but human challenges remain

- 64 active fact-checking sites in the world, up from 44 in 2014
- New sites in Russia, Canada, Nepal, Northern Ireland
- Falsehoods growing faster than fact-checkers
- Labor-intensive journalism
 - 1 fact-check = 1 day of work

Computation + Fact-checking = Opportunities

- Create tools, apps to assist journalists doing fact-checking
 - Finding factual claims (ClaimBuster)
 - Analyzing claims (iCheck)
- Create tools, apps to assist consumers
 - Browser extensions to match claims & fact-checks (TruthGoggles - achievable)
 - Instant matching of claims and fact-checks (The Holy Grail)

The Holy Grail

Instant
automated matching
of political claims
and fact-checks



The Holy Grail



The Holy Grail



The Holy Grail



Technical hurdles for pop-up fact-checking

- Most fact-checks published in old blog formats such as WordPress
- Most are not in structured journalism format that would allow more flexibility, easier matching
- Current publishers have inconsistent coding (if any) for video, campaign ads
- Vagueness, natural language variation
 - “Preventive health care saves money”
 - “Does preventive care save money? No.”

Next Steps

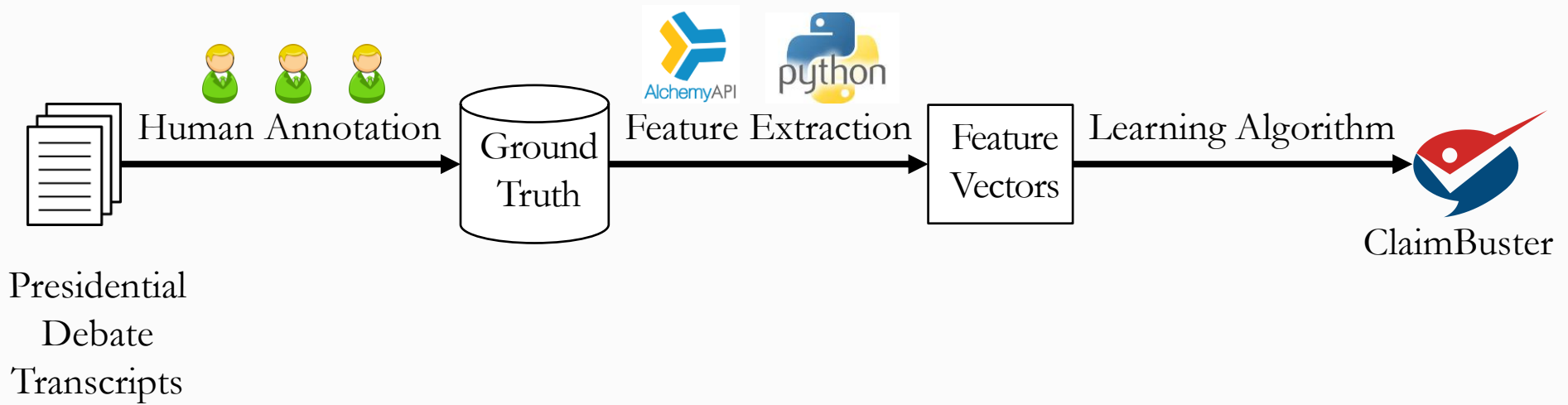
- Build ClaimBuster, which detects factual claims
- Develop apps to detect political messages in video/audio
 - YouTube / Browser extension (achievable)
 - Cable / Broadcast TV app (difficult)
 - Apple TV app (difficult)



ClaimBuster

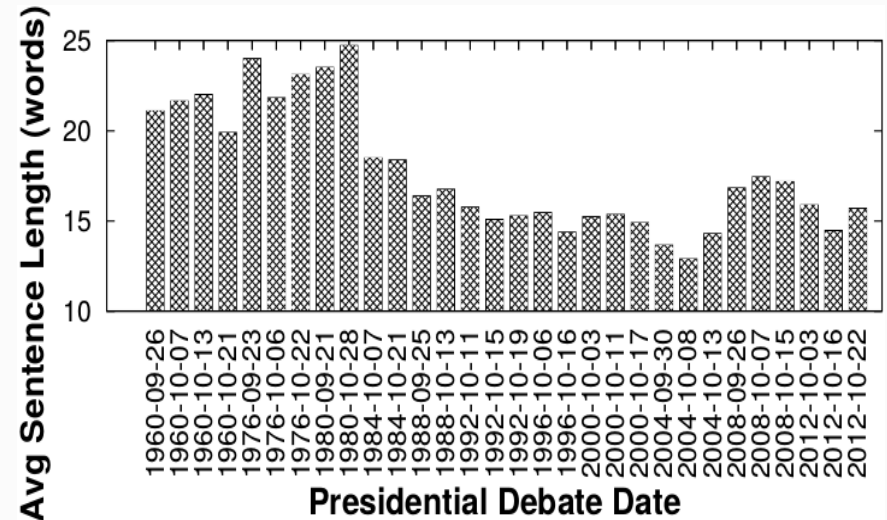
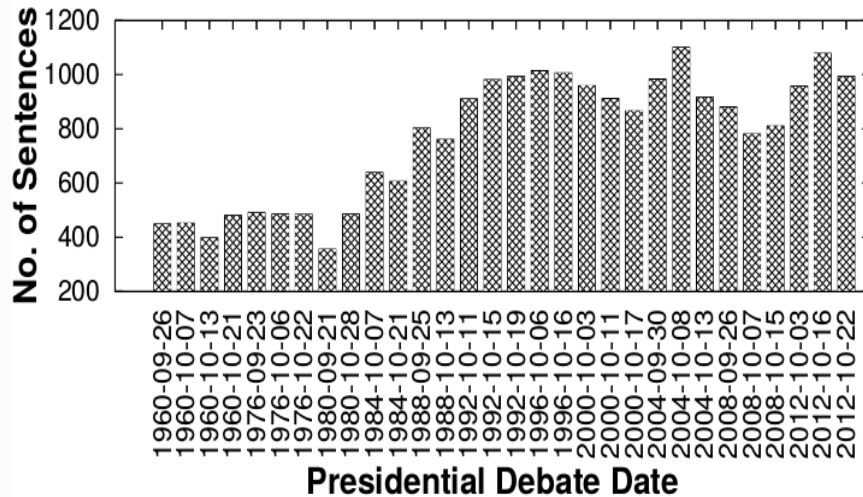
Detects Check-worthy Factual Claims in Political Discourses

Overview



Presidential Debate Transcript

- Source: <http://www.debates.org/index.php?page=debate-transcripts>
- All **30** debates (11 elections) in history: 1960, 1976—2012
- **20k** sentences by presidential candidates: removed very short (< 5 words) sentences



Example of Sentences & Problem Modeling

Important factual claims (CFS)

“We spend less on the military today than at any time in our history.” “The President’s position on gay marriage has changed.” “More people are unemployed today than four years ago.”

Unimportant factual claims (UFS)

“I was in Iowa yesterday.” “My mother enjoys cooking.” “I ran for President once before.”

Sentences with no factual claims [opinions, questions] (NFS)

“Iran must not get nuclear weapons.” “7% unemployment is too high.” “My opponent is wishy-washy.” “I will be tough on crime.” “Why should we do that?” “Hello, New Hampshire!” “Our plan is to reduce tax rate by 10%.”

Goal

Given a sentence, find the class it belongs to.

A supervised learning problem

Ground Truth Collection

- Developed a data collection platform bit.ly/claimbusters
- In 3 months, we accumulated 226 participants.
- Used 600 screening sentences to detect spammers & low-quality participants.
- Used the sentences which are agreed by at least 2 top-quality participants.
- 8015 such sentences.

Class	Count
CFS	1673
UFS	482
NFS	5860

Ol: Wages are going up for the first time in a decade.

[More Context](#)

Will the general public be interested in knowing whether (part of) this sentence is true or false?

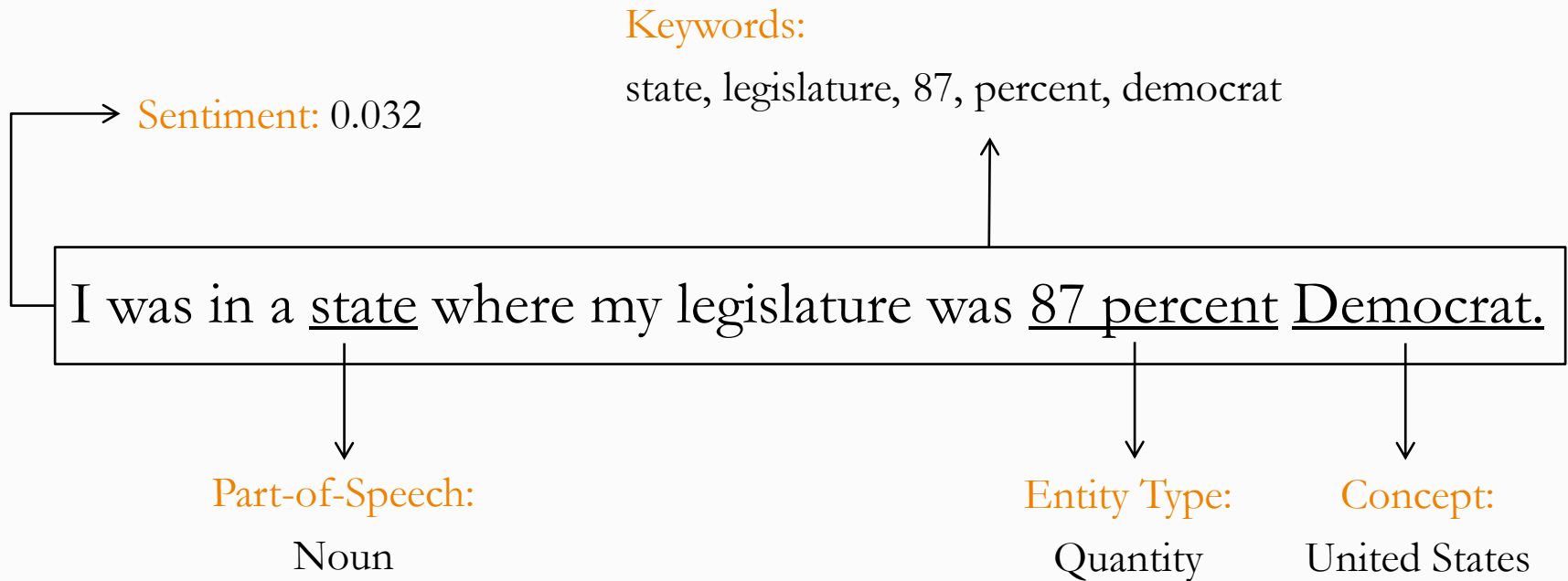
☐ There is **no** factual claim in this sentence.

☐ There is a factual claim but it is **unimportant**

☐ There is an **important** factual claim.

[Submit](#) [Skip this sentence](#) [Modify My Previous Responses](#)

Feature Extraction



Sentiment: [-1.0 to 1.0]

Words: tf-idf scores of 6130 words (excluding rare words)

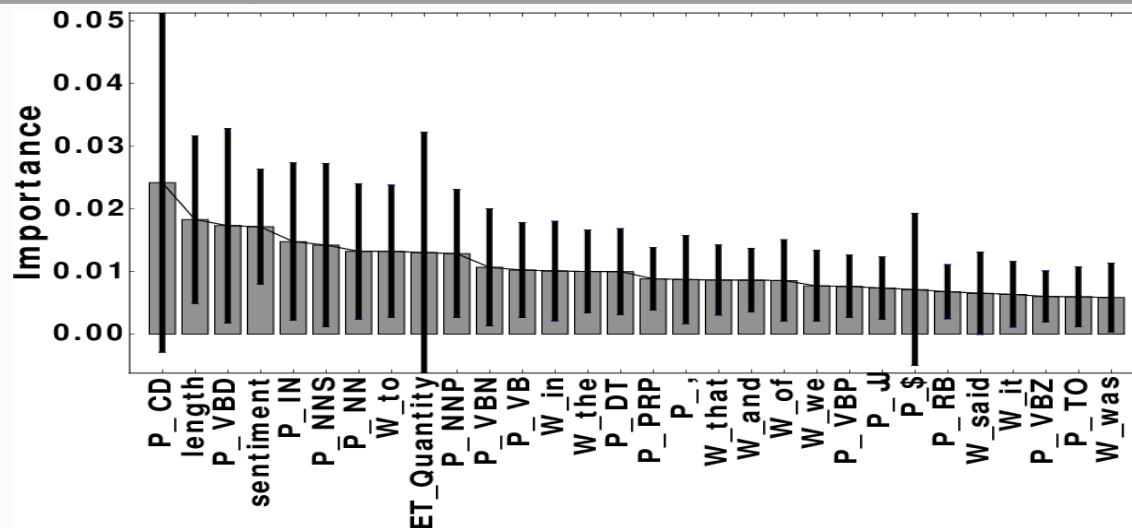
POS Tag: 43 tags

Entity Type: 26 types

Feature Selection

- Total 6201 features
- Used a Random Forest Classifier to calculate importance of each feature.
- Most Important Feature: POS tag 'Cardinal Number'

Word	percent; people; jobs
POS tag	noun; cardinal number; past tense; preposition
Entity Type	Quantity; Country; FieldTerminology; Person
Concept	United States Senate; Barack Obama



Evaluation [classification]

- 4-fold cross validation.
- Algorithms: Naive Bayes, Random Forest & Support Vector Machine.
- Support Vector Machine performed better than others in general.

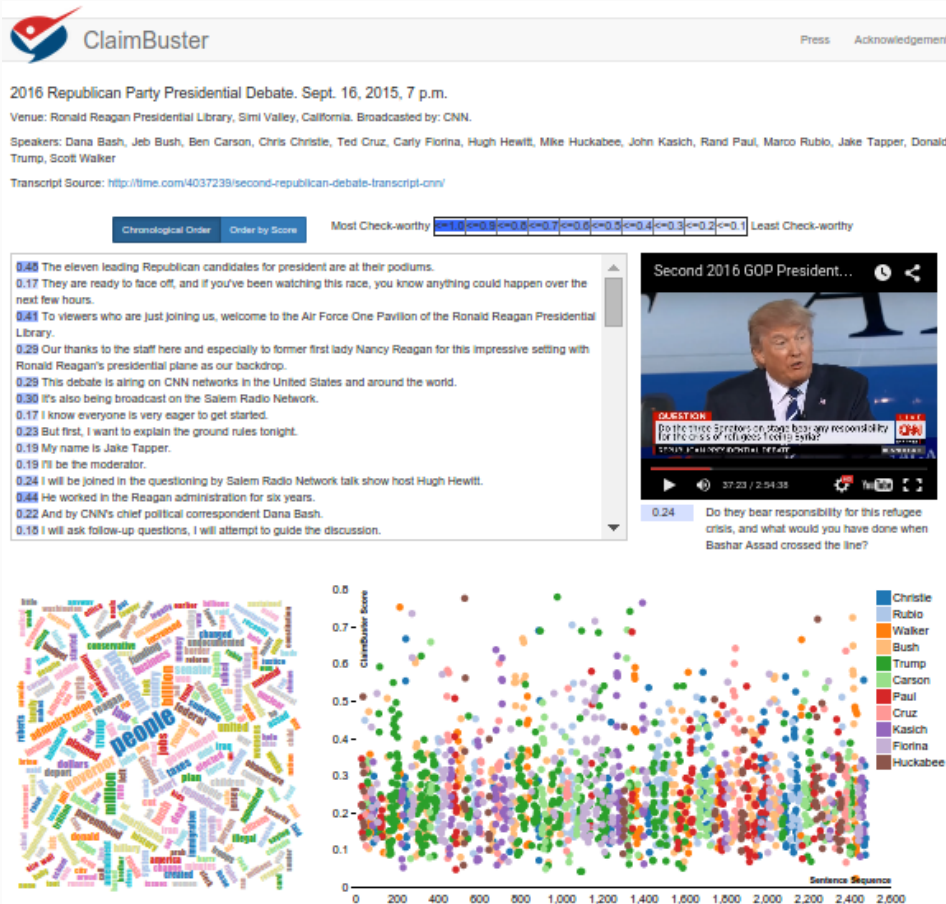
	Precision	Recall	F-measure
NFS	0.90	0.96	0.93
UFS	0.65	0.26	0.37
CFS	0.79	0.74	0.77

Case Study: #GOPDebate2015

- Near real-time experiment with 2015 first Republican primary debate transcript.
- Transcript grabbed from Closed Captions using TextGrabber device.
- 1393 sentences.
- **71%** of the facts checked by CNN, factcheck.org & PolitiFact were present in ClaimBuster ranked top **(18%)** sentences.

Demo

<http://idir.uta.edu/claimbuster>



Next Step: Many Things to Look at

- Automatically detect check-worthy claims from social media data, websites, live streams, etc.
- Check claims by matching with a curated repository of fact-checks.
- Better engagement with professional fact-checkers and voters by providing them instant fact-checks.

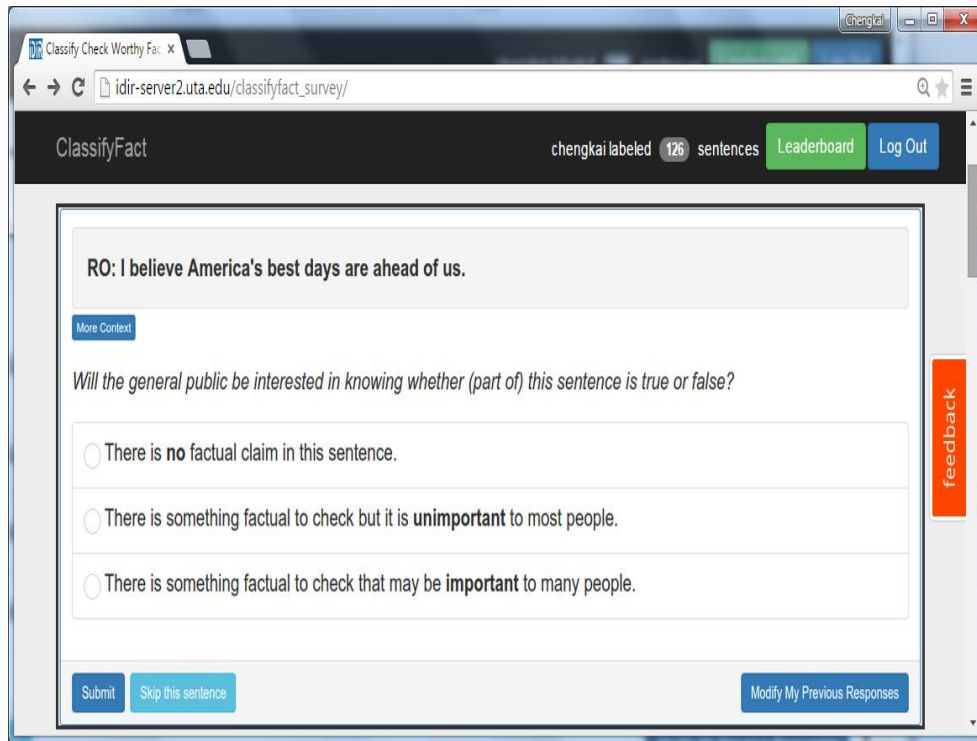
Acknowledgment



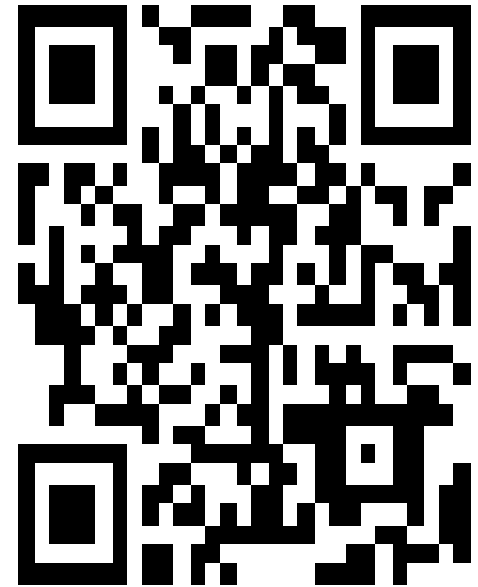
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Thank You! Please help us label the data

http://bit.ly/claimbusters



The screenshot shows a web browser window with the address bar displaying "idir-server2.uta.edu/classifyfact_survey/". The page title is "ClassifyFact". In the top navigation bar, it says "chengkai labeled 126 sentences" next to a "Leaderboard" button and a "Log Out" button. The main content area displays a sentence: "RO: I believe America's best days are ahead of us." Below this sentence is a "More Context" button. A question is posed: "Will the general public be interested in knowing whether (part of) this sentence is true or false?". There are three radio button options: "There is **no** factual claim in this sentence.", "There is something factual to check but it is **unimportant** to most people.", and "There is something factual to check that may be **important** to many people." At the bottom of the form are three buttons: "Submit", "Skip this sentence", and "Modify My Previous Responses". A vertical "feedback" button is located on the right side of the main content area.



Case Study: #GOPDebate2015

CNN Claim	Associated sentence(s)[From TextGrabber]	Score
1	Part of this iranian deal was lifting the international sanctions on general sulemani.	0.415
2	I would go on to add – >> you don't favor – >> i have never said that.	0.511
3	A majority of the candidates on this stage supported amnesty.	0.295
4	Timely the medicaid is growing at one of the lowest rates in the country.	0.534
4	We went from \$8 billion in the hole to \$5 million in the black.	0.773
5	And the mexican government is much smarter, much sharper, much more cunning and they send the bad ones over because they don't want to pay for them.	0.215
6	[Not found in the transcript]	N/A

Evaluation [ranking]

- Measured accuracy of top-K sentences.
- ClaimBuster has a strong agreement with high-quality human coders on the check-worthiness of sentences

K	P@K	NDCG@K
25	1	1
50	1	1
100	0.960	0.970
200	0.940	0.951
300	0.853	0.881
500	0.690	0.840