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Information Studies

Sentiment Strength Detection for Social Media Text
Artificial Agents, Answer Ranking and Art Installations

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CYBEREMOTIONS

UNIVERSITY OF WOLVERHAMPTON

Social Web Sentiment Strength Detection: *SentiStrength* goals

- Detect positive and negative sentiment *strength* in short informal text
- Develop workarounds for lack of standard grammar and spelling
- Harness sentiment expression forms unique to electronic communication (e.g., :-) or haaappppyyy!!!)
- Classify positive 1 to 5 AND negative -1 to -5 sentiment *simultaneously*

Thelwall, M., Buckley, K., & Paltoglou, G. (2012). Sentiment strength detection for the social Web. *Journal of the American Society for Information Science and Technology* , 63(1), 163-173

Thelwall, M., Buckley, K., Paltoglou, G., Cai, D., & Kappas, A. (2010). Sentiment strength detection in short informal text. *Journal of the American Society for Information Science and Technology*, 61(12), 2544-2558.

Core SentiStrength Algorithm

- 2,489 positive and negative sentiment term stems and strengths (1 to 5), e.g.
  - ache = -2, dislike = -3, hate=-4, excruciating -5
  - encourage = 2, coolest = 3, lover = 4
- Rule: Sentiment strength is highest in sentence; or highest sentence if multiple sentences

positive, negative

-2

◆ My legs (ache).

1, -2

3

◆ You are the (coolest).

3, -1

◆ I (hate) Paul but (encourage) him.

2, -4

-4

2

There is no score of 0: 1 means no positivity; -1 means no negativity

Extra steps

spelling correction   nicce -> nice

booster words alter strength   **very** happy

negating words flip sentiments   **not** nice

repeated letters boost sentiment/+ve   niiiice

emoticon list   :) =+2

exclamation marks count as +2 unless –ve   hi!

repeated punctuation boosts sentiment   good!!!

negative sentiment ignored in qns.   u h8 me?

consecutive sentiment boost   lovely charming

sentiment idiom list   shock horror = -2

Also dummy idioms: "I like" =+2; "is like" = +1

Online as http://sentistrength.wlv.ac.uk/

Evaluation with human coders

Data set	Positive scores - correlation with humans	Negative scores - correlation with humans
YouTube comments	0.589	0.521
MySpace comments	0.647	0.599
Tweets	0.541	0.499
Sports forum posts	0.567	0.541
Digg.com news posts	0.352	0.552
BBC forum posts	0.296	0.591
All 6 data sets	**0.556**	**0.565**

SentiStrength agrees with humans as much as they agree with each other

1 is perfect agreement, 0 is random agreement

Why the bad results for the BBC and Digg?

Irony, sarcasm and expressive language

- David Cameron must be very happy that I have lost my job.

- It is really interesting that David Cameron and most of his ministers are millionaires.
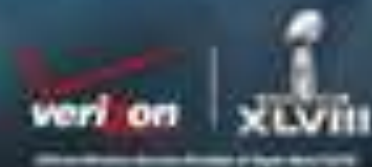
- Your argument is a joke.

$

- Used for light displays on the London Eye during the Olympics
- 10 commercial users; available in 6-18 languages

Empire State Building Lightshow

AWD or 4WD Which is Better?

I have a Subaru Outback with All wheel drive. My sister has a Jeep with 4 Wheel drive. I'm curious is one better than the other? From what I've read 4WD is better for off roading but I thought Subaru (all wheel) was great at that! I've never had any problems driving my subaru in many different... show more

⭐ 4 following   ✴ 38 answers

Answers

Relevance ⌄
Rating
Newest
Oldest

4WD: Maximum torque goes to all wheels simultaneously. Can be toggled on or off in most cases.
AWD: Your car computer decides the appropriate amount of torque that goes to each wheel. Stays

4WD is better for off road. If you are not using it for off roading, get AWD. Reason being: With 4WD traction on the road because all wheels are turning at the same speed. When turning, the inside whe down to maintain traction. With good old 4WD, your car is working against that. Therefore you lose traction on the road, especially at higher speeds. AWD is a lot newer. It gives you better control and traction. It does this by determining how much torque goes where. AWD isn't just rip off of 4WD. Quite the contrary. AWD is the "smarter" version of 4WD. It's the best of both worlds in my opinion, plus better performance in some vehicles than RWD would have been.

Benjamin Nagy · 10 hours ago

👍 4   👎 0   1 comment

Yahoo! Answers
-Answer ranking

4wd can be turned on or off . That means you only use it when you have to.
Awd is always on . That means its on even when you have no use for it .

Kucuktunc, O., Cambazoglu, B.B., Weber, I., & Ferhatosmanoglu, H. (2012).
A large-scale sentiment analysis for Yahoo! Answers,
Proceedings of the 5th ACM International Conference on Web Search and Data Mining.

Marcin Skowron, OFAI

Mozdeh: Sentiment-based searches

Analyse   Networks   Data   Subprojects   About

Boolean Search (or)

Previous

Next

☐ Show original text (slow)

More help

to match all words; AND/OR priority IGNORED: processing is left to right

ering | Co-word comparisons

○ 1   ID of first item to show

◉ 2013.7.28 ▼   First date to show

38   Results to show

☐ Hide #tags and @s

☐ Hide duplicates (v. slow)

eturn results from this
abel tweeters (case sensitive)

ts only from this Tweeter/feed ID

▼   Select alternative subproject

der

Advanced Search Tips

AND - results must match the part of the query to the left of AND and the term to the right
OR - is the default and is ignored
( ) - brackets can be used in conjunction with AND for more complex Boolean searches
-    - (minus) before term excludes all matches of the query to the left of the term also
        matching the term (e.g., put -term at query end to exclude matches containing term).
" " - quotes ensure that the exact phrase in quotes matches the search (slow)

3   <= +ve sentiment <=   5   1   <= -ve sentiment <=   5
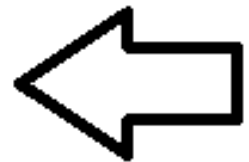
can a proud dad get a shout out for his daughter jenny wedding today #jennychriswedding
my dad is in a super mad mood and he all sassy and has a terrible attitude dad stop you can't get mad at me after
to start tonight me and my dad watch it every year
me to a chinese for tea to cheer me up love
l i hope you wouldnt dad lol and yea i know i might come out there today
dy love each other very much dad we we did is fuck
o talk to my dad
eatest person to walk the face of this

Feed #6277 Info:
URL: OfficialTRIGMI
Topic: dad
Name: #TRIGMI☜☆☞#BMB

Item #12647 Text:
@timholmgren lol i hope you wouldnt dad lol
and yea i know i might come out there today

Pulse Visualization D:\test\AutosReviewsDB_30c_10gen_10leaf_10go.mdb

File   View

Major / Minor Cat   **Docs**   **Clusters for Volkswagen Golf**

drive handling recommend people runs

small long diesel fuel

lot german bought tdi

gas mileage makes price performance time

vw, service miles feel money quality year

Total sentences 3042   Coverage 55.00%   ☐ Include Unclustered

Cluster: vw, service   Threshold Low ——————|———— High

Microsoft Pulse

Positive | Negative | Other

The problems may not have been so bad if my local VW dealer had responded to concerns.
VW knew what it was doing when it only gave the 2 year 25,000 mile warranty, I'm afraid it will be too expensive to service after that, so I'll probably dun
Do yourself a BIG BIG favor, Stay away from VW, Yea I know, their commercials are all cute and inviting, but trust me you WILL WITHOUT A DOUBT RE
Last time I took it in for an alignment, their service techs informed me that my strut bushings were worn out and recommended that they were replaced.
According to people that review VW Jettas, GTIs, Golfs in caranddriver.com, some of them are dissatisfied with the quality they get from their VW cars.

Sentiment Analysis Today

Embedded with in social media
Monitoring sites as one tool amongst many
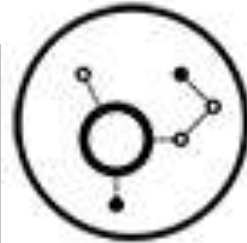
Pulsar

PULSAR
Social Data Intelligence

Pulsar is a new breed of social intelligence platform that's re-inventing social media monitoring (TRAC), customer service (FLOW) and enterprise collaboration (TEAM).

Go beyond keyword tracking to map brand audiences, track how content spreads, and manage your teams to engage effectively with your customers in social media.

Tomorrow: Intelligent social technology in motorhomes

SentiStrength
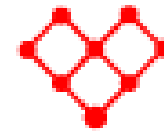
Institut "Jožef Stefan"
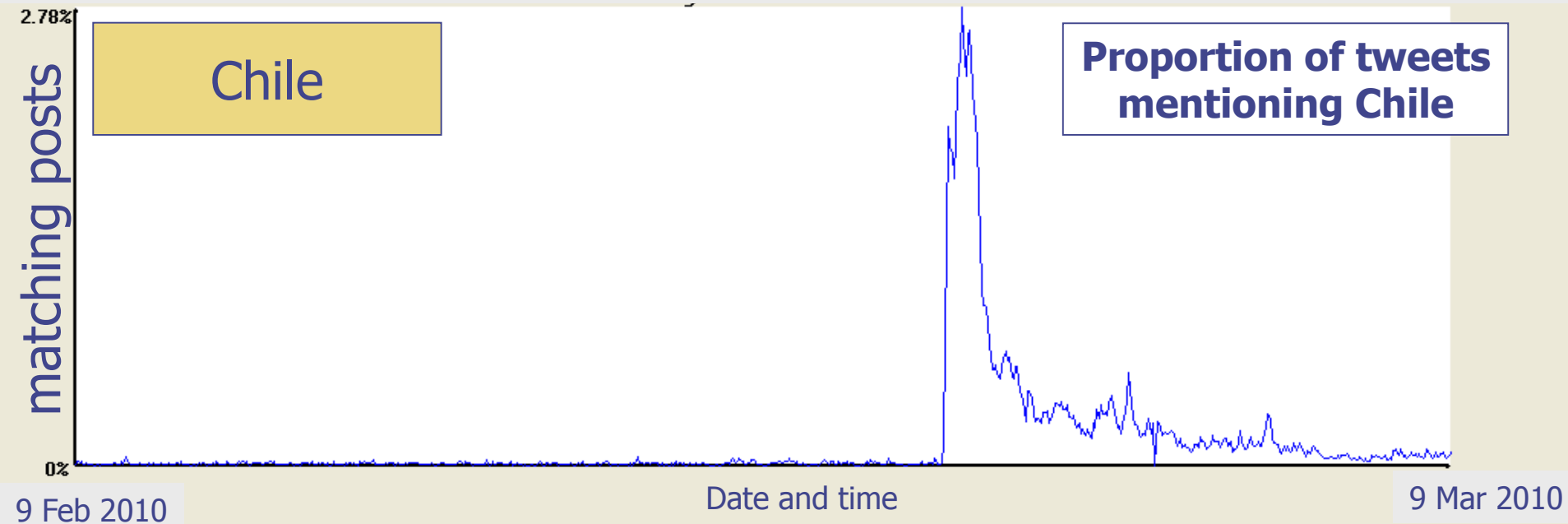
ADRIA 50 1965 2015

Dynamic transport routing

SentiStrength

2. Twitter – sentiment in major media events

- Analysis of a corpus of 1 month of English Twitter posts (35 Million, from 2.7M accounts)
- Automatic detection of spikes (events)
- Assessment of whether sentiment changes during major media events

CYBER**EMOTIONS**

Chile

Proportion of tweets mentioning Chile

matching posts

2.78%

0%

9 Feb 2010 — Date and time — 9 Mar 2010

Sentiment strength — Subj.

5

Increase in –ve sentiment strength

Av. +ve sentiment
Just subj.
Av. -ve sentiment
Just subj.

9 Feb 2010 — Date and time — 9 Mar 2010

% matching posts

#oscars

Proportion of tweets mentioning the Oscars

7.308%

0%

9 Feb 2010 — Date and time — 9 Mar 2010

Sentiment strength

5

Subj.

Increase in **–ve** sentiment strength

Av. +ve sentime
Just subj.
Av. -ve sentime
Just subj.

9 Feb 2010 — Date and time — 9 Mar 2010

3. YouTube Video *comments*

- 1000 comm. per video via *Webometric Analyst* (or the YouTube API)
- Good source of social web text data
- Analysis of all comments on a pseudo-random sample of 35,347 videos with < 1000 comments

THAT'S RIGHT.

BB UR AMAZING :D

iTrolledABearOnce 19 minutes ago

Museum Dinosaur Interacts With Kids

j0eg0d 116 videos ⊻   Subscribe

0:05 / 1:29   360p
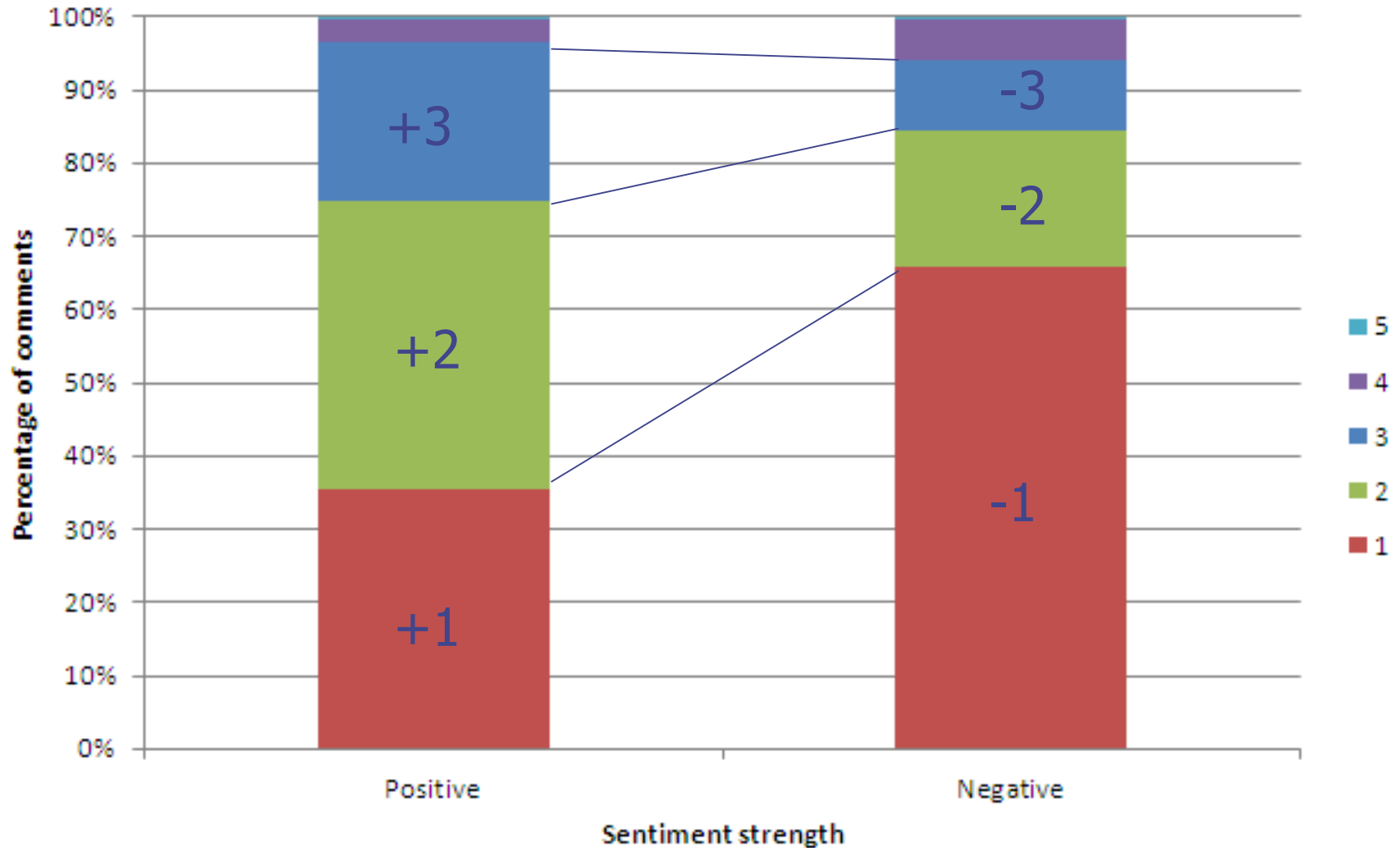
👍 Like 👎   + Add to ▾   Share   🏳

442,828

665 likes, 16 dislikes

Dinosaur interacts with children in the Los Angeles Natural History Museum.

Sentiment in YouTube comments

YouTube comments tend to be weakly positive

Trends in YouTube comment sentiment

- +ve and −ve sentiment strengths negatively correlate for videos (Spearman's rho -0.213)
- # of comments on a video correlates with −ve sentiment strength (Spearman's rho 0.242, p=0.000) and negatively correlates with +ve sentiment strength (Spearman's rho -0.113) – **negativity** drives commenting even though it is rare!

Thelwall, M., Sud, P., & Vis, F. (2012). Commenting on YouTube videos: From Guatemalan rock to El Big Bang. *Journal of the American Society for Information Science and Technology* 63(3), 616–629.

4. Issue adaptation

- Sentiment analysis sometimes performs badly on social web texts relevant to as specific issue or topic due to unusual uses of words
  - E.g., "pistol" is not negative and flame" is mildly positive for olympic tweets
  - E.g., "fire" and "flame" are very negative in the context of UK riots tweets

Issue adaptation methods 1: Mood

- ◆ Mood is set to negative or positive
  - ■ E.g.. UK Riots: negative, Olympics: positive
- ◆ Expressions of sentiment without polarity are interpreted as negative if there is a negative mood, positive if a positive mood.
  - ■ E.g., "Miiiikee!!!" is positive for olympics, negative for riots.

Mood results

	Train. corpus size	Test corpus size	Train. corr. pos. mood	Train. corr. neg. mood	Test corr. pos. mood	Test corr. neg. mood
UK riots	847	846	0.360	0.435	**0.324**	**0.410**
AV ref.	8846	8847	0.415	0.321	**0.404**	**0.302**

Alternative vote referendum in the UK

Issue adaptation methods 2: Issue-specific words

- Using a corpus of classified texts:
- Check SentiStrength classification of each text against human code
- For each disagreement, record terms in text
- For each term, count the number of times it is in texts classified as too positive/too negative
- Manually check the top words for domain-specific terminology to add to the lexicon

Example – UK riots words added to the lexicon

Term	Weight
arrest	-2
arrested	-2
baton	-2
batoned	-3
birminghamriots	-2
brainwashing	-3
caught	-2

Example – Alternative vote words added to the lexicon

| Term	Weight
ace	3
ass	-2
better	2
cut	-2
fairer	2
fearmongerers	-3

Results

An improvement of up to 8% - depending on the topic.

Damping Sentiment Analysis

- Intuition: in online communication, if a text has a very different sentiment from previous texts in the same monolog/dialog/discussion then it may be a sentiment analysis classification error

- Develop damping method to align sentiment scores closer to the average

Example classification error

Tweet (first 3 from Stacey, last from Claire)	Neg. score
@Claire she bores me too! Haha x	-2
@Claire text me wen your on your way x x x	-1
@Claire u watch BB tonight? I tried one of them bars..reem! x x x	-1
@Stacey lush in they ... do u watch American horror story ... Cbb was awsum tonight bunch of bitches !!	-4
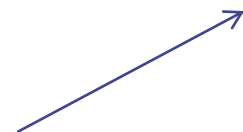
Damping rules

1. **If** the classified positive sentiment of text A differs by at least 1.5 from the average positive sentiment of the previous 3 posts, **then** adjust the positive sentiment prediction of text A by 1 point to bring it closer to the positive average of the previous 3 terms.

2. **If** the classified negative sentiment of text A differs by at least 1.5 from the average negative sentiment of the previous 3 posts, **then** adjust the negative sentiment prediction of text A by 1 point to bring it closer to the negative average of the previous 3 terms.

   e.g., 4, 4, 4, **1** -> 4, 4, 4, **2** and 1, 1, 2, **4** -> 1, 1, 2, **3**

Data sets

- **BBC World news discussions (BWNpf)**
- RunnersWorld (RWtf)
- Twitter monologs (Tm)
- **Twitter dialogs (Td)**

Results

- Damping improves sentiment classification by a small amount in some cases but makes it worse in others
- The four different types of damping have different effects on performance
  - +ve/-ve sentiment increase/decrease
- Sentiment damping *can* work but needs a lot of testing to find the right types for a particular data set.

5. Language adaptation

- Translate lexicons
- Create development corpus of 500+ human-classified texts
- Test and adapt lexicons and parameters (e.g., for French: alwaysSplitWordsAtApostrophes)
- Create an evaluation corpus of 1000 human-classified texts
- Evaluate final version.

Conclusions

Fast and accurate for general social web texts

Needs improvement for tough tasks – politics, sarcasm, context

A useful component of bigger tasks