

Sentiment of two women

Sentiment analysis and social media

Lillian Lee

Cornell University

Bo Pang

YAHOO!
RESEARCH

“Romance should never begin with sentiment. It should begin with science and end with a settlement.”

--- Oscar Wilde, *An Ideal Husband*

the rise of sentiment analysis

many applications and interesting questions

+ improvements in analytical techniques

+ availability of new data sets for tuning these techniques

= **huge interest and progress** in recognizing and analyzing subjective language

our three main points

- ❖ sentiment analysis is **harder** than many people think
- ❖ sentiment analysis is **more important** than many people think
- ❖ sentiment analysis involves **many problems and many approaches** --- let's talk about these in the Q&A

an **example**

(romance should begin with a search)

(romance should begin with a search)



what is sxsw?

(romance should begin with a search)



what is sxsw?

easy: first result on any search engine

(romance should begin with a search)



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easy: first result on any search engine



it's a lot of money; is it worth it?

(romance should begin with a search)

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it's a lot of money; is it worth it?

?

is sxsw|worth it

is sxsw **worth it**

is sxsw **free**

is sxsw **interactive worth it**

(automatic query suggestion
can tell you a lot)

is sxsw|worth it

is sxsw worth it

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is sxsw worth it



Search

Instant is on ▼

About 779,000 results (0.15 seconds)

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Mar 24, 2009 ... One question arises in the Lone Star soaked afterglow of **SXSW**: Do we Austinites love it or hate it?

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[Should a band go to SXSW at all costs? - sxsw southbysouthwest ...](#) 🔍

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is sxsw worth it

[Is Sxsw Worth It - News Results](#)



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[SXSW Show Preview: Killer Tofu \[**SXSW** Party Preview\]](#)

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Is **SXSW** worth going to? ... Is **SXSW** worth going to? 1:55 PM Jan 20th, 2010 via Twitter for iPhone

twitter.com/ThePeterHa/status/8001336817 - [Cached](#)

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FourScore

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let me try my favorite
review site for this...

let me try my favorite
review site for this...

South By Southwest

 34 reviews  [Rating Details](#)

Categories: [Local Flavor](#), [Festivals](#) [\[Edit\]](#)

Austin, TX 78751

(512) 467-7979

sxsw.com

Good for Kids: No

let me try my favorite
review site for this...

South By Southwest

★★★★☆ 34 reviews [Rating Details](#)

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too many to read through
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Good for Kids: No

too many to read through
(for busy and important
people) ...

... yet too small a sample
to draw conclusions from
the average rating

sentiment analysis is **harder** than many people think

a piece of cake (...?)

an *extremely* simple setting: is a given review on a known topic positive or negative?

“It may be a bit early to make such judgments, but Battlefield Earth may well turn out to be the worst movie of this century.” (Elvis Mitchell, May 12, 2000)

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don't we just need to look for “worst”, “best”, “love”, “hate”, etc.?







a piece of cake (...?)

but people aren't that good at picking indicative cues.

 dazzling brilliant phenomenal excellent fantastic  suck terrible awful unwatchable hideous	58%
 gripping mesmerizing riveting spectacular cool awesome thrilling badass excellent moving exciting  bad cliched sucks boring stupid slow	64%








a piece of cake (...?)

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 love wonderful best great superb beautiful still  bad worst stupid waste boring ? !	69%

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we need to move beyond indicative terms

- ▲ 1. This laptop is a great deal.
- ◁▷ 2. The release of this laptop caused a great deal of hoopla.
- ▼ 3. Yeah, this laptop is a great deal ... and I've got a nice bridge you might be interested in.

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This film should be brilliant. It sounds like a great plot, the actors are first [rate], and the supporting cast is good as well, and Stallone is attempting to deliver a good performance. However, it can't hold up.

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what phrases indicate what, anyway?

the phrases

“amazing camera”

and

“decent quality”

in reviews have *negative* effects on demand for the corresponding products. (Archak, Ghose, and Ipeirotis 2007)

sometimes there aren't any indicative terms

She ran the gamut of emotions from A to B.

sometimes there aren't any indicative terms

She ran the gamut of emotions from A to B.

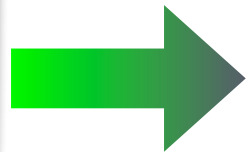
Read the book.

what the machine gets to see



what the machine gets to see

“bag-of-words representation”



and	Austen	beat	books	can't
conceal	dig	Everytime	frenzy	from
her	I	Jane	madden	me
my	over	own	Prejudice	Pride
read	reader	shin-bone	skull	so
that	the	to	up	

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what now???

Jane Austen's books madden me so that I can't conceal my frenzy from the reader. **Everytime I read 'Pride and Prejudice' I want to dig her up and beat her over the skull with her own shin-bone.**

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**the author might not be Mark Twain,
but the task could get harder...**

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opinion, about what


opinions about sxsw

opinions about sxsw




opinions about sxsw







jlscribbles @stse **rocks** the pool table at film party
#sxsw <http://twitpic.com/48p2ae>
32 minutes ago via Seesmic for Android



antonejohnson #iPad2 **rocks** #SXSW (@ Apple POP
UP Store) <http://picplz.com/X0hm>
about 1 hour ago via picplz



Hennartonline Missing you at #sxsw! How's
Germany? @thepaulmeyers @audi **rocks**!:-)
about 2 hours ago via Seesmic for Android



Tojosan @HRMargo Glad to have you along mam.
#hirefriday **rocks**!! #SxSW **rocks** as well. ((hugs))
about 2 hours ago via web



ukuleila Installed **#sxsw** mobile app **SUCKS!** Broke my phone :(

about 1 hour ago via Twitter for Android



Cocoabebe Settling in ans excited to be apart of **#sxsw** but **sucks** the hotel stops roomservice at 11pm and I called at 11:20 :(<http://4sq.com/hzbDov>

about 2 hours ago via foursquare



quikness Fighting a cold at **#SXSW** sucks. iPad2 helping to make it suck less ;-)

about 2 hours ago via HootSuite



Sunfell @acarvin I wish I was there– **SXSW** unfortunately falls during a time of year when I cannot get leave from work. That **sucks**.

about 3 hours ago via web



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Search tip

Use :(to find tweets with a negative or sad attitude.

Example: [flight](#) :(will find tweets containing "flight" and with a negative attitude.

[leila](#) Installed [#sxsw](#) mobile app **SUCKS!** Broke phone :(

at 1 hour ago via Twitter for Android



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SXSWWhit home from [#sxsw](#) night 1– had a great time tonight! just missed the [@rviplounge](#) at the ginger man though– totally bummed about that :(

4 minutes ago via web



HannahDeMilta Oh no :(RT [@redshoes](#): Lost passport near Hilton Austin. If you find it/hear of it please ping me. Australian passport name: Kim McKay [#sxsw](#)

9 minutes ago via web



barrettlane [@lgilchrist](#) [@jdmoran](#) [@zmsmith](#) so jealous you are all at [#sxsw](#) right now. Wish I was there with team [@yipit](#) :(

16 minutes ago via Twitter for iPhone

Realtime results for "sxsw sucks"



quikness Fighting a cold at [#SXSW](#) sucks. iPad2 helping to make it suck less ;-)

about 1 hour ago via HootSuite



samdotcom Being in 'the industry' and not being at [#SxSW](#) sucks...excruciating on social media. [#employedpeopleproblems](#)

about 4 hours ago via Twitter for Mac



paultreichler verizon wireless broadband connectivity at [#sxsw](#) sucks

about 8 hours ago via web



borisraskin sqlite is f'ing awesome. i just wanted to say that. also, i hope that [#sxsw](#) sucks this year. [#notjealous](#)

about 9 hours ago via web

fine-grained analysis is harder

fine-grained analysis is harder

- tasks with an “extraction” flavor will be harder

fine-grained analysis is harder

- tasks with an “extraction” flavor will be harder
- need more sophisticated analysis (that I will not go into) to model the complexity of language:
 - POS, parse trees, negation (not great != terrible)
 - sarcasm, ...

whose opinion?

The New York Times

Amazon Glitch Unmasks War Of Reviewers

By AMY HARMON

Published: February 14, 2004

Close observers of Amazon.com noticed something peculiar this week: the company's Canadian site had suddenly revealed the identities of thousands of people who had anonymously posted book reviews on the United States site under signatures like "a reader from New York."

The weeklong glitch, which Amazon fixed after outed reviewers complained, provided a rare glimpse at how writers and readers are wielding the online reviews as a tool to promote or pan a book -- when they think no one is watching.

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amazonmechanical turk
beta Artificial Intelligence

Your AccountHITs

All HITs | HITs Available To You

Search for containing

Timer: 00:00:00 of 60 minutes

Want to work on this HIT?

Write Product Reviews 25-50 Words
Requester: Mike Bayard
Qualifications Required: HIT approval rate (%) is not less than 95

Write a Positive 5/5 Review for Product on Website

Positive review writing.

- Use your best possible grammar and write in US English only
- Always give a 100% rating (as high as possible)
- Keep your entry between 25 and 50 words
- Write as if you own the product and are using it
- Tell a story of why you bought it and how you are using it
- Thank the website for making you such a great deal
- Mark any other negative reviews as "not helpful" once you post yours

Instructions:

The link below leads to a product on a website. Read-through the product's features and write a positive review for it using the guidelines above to the best of your ability. I have also provided the part number for this product and you can click on the links below to see it on several alternative websites. In order to post some reviews you will need to create an account on the site. You can use your own email address or open a new free webmail account (gmail, yahoo...) and use it to post with.

[CLICK HERE TO VIEW PRODUCT ASSIGNED TO THIS HIT](#)

MFG PART: F5U301

whose opinion?

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they think no one is watching.

“ Cyber Blackmail ala Trip Advisor ”

Nov 30, 2010, 6:00 PM



Destination Expert ?

for Tanzania, Serengeti National Park

I didn't want to hijack another thread so I thought I would start my own fun topic:

Ah yes, a new phenomenon in this tech age: Cyber Blackmail ala TripAdvisor. It has happened to me. You didn't read about it here because I paid the blackmailer. Read on:

The link below leads to a product on a website. Read-through the product's features and write a positive review for it using the guidelines above to the best of your ability. I have also provided the part number for this product and you can click on the links below to see it on several alternative websites. In order to post some reviews you will need to create an account on the site. You can use your own email address or open a new free webmail account (gmail, yahoo...) and use it to post with.

[CLICK HERE TO VIEW PRODUCT ASSIGNED TO THIS HIT](#)

MFG PART: F5U301

amazonmechanical turk
beta Artificial Intelligence

Your Account

HITs

All HITs | HITs Available To You

Timer: 00:00:00 of 60 minutes



Want to work on this HIT?

Accept HIT

on Website

yours

sentiment analysis is **more important** than many people think

consumers really (think they) care about opinions

consumers report being willing to pay 20%-99% more for a 5-star-rated item than a 4-star-rated item

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academics are **divided** on actual impact:

Houser and Wooders 2006: of eBay's \$1.6 billion of transactions in the fourth quarter of 2000, sellers' positive reputations added an estimated \$55 million to sales, while non-positives reduced sales by about \$15 million.

Duan, Gu, Whinston 2008: positive vs negative ratings have no effect on box office, only volume does

political opinions really (ought to) matter, too

in 2008, of the 44% of US residents (60% of Internet users) who got political information from the Internet:

- ❖ 33% said most sites they use share their point of view
- ❖ 21% said that most challenge their point of view

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(so maybe it's not all about polarization)

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the US gov't is trying to sort through these opinions. But, people sent 400,000 comments about just one rule (labeling organic food).

opinions are a lens on human behavior

economics: “Does a positive reputation increase revenue, or is word of mouth enough?”

political science: “How has public opinion about the death penalty changed, and what are the causes?”

sociology and social psychology: “How are people's opinions influenced by the opinions of their friends?”

some key problems

- ❖ transferring between languages and/or domains
is “unpredictable” positive or negative?
“impressionante” is both, but “impressive” is positive
- ❖ summarization and calibration
is your “3 stars” the same as mine?
- ❖ how do opinions spread and change?
- ❖ which opinions matter?
example issues: unhelpful reviews, review spam

read the book

more on applications, approaches, research directions,
connections to other fields, ...

opinion mining and sentiment analysis

bo pang and lillian lee

www.cs.cornell.edu/home/llee/opinion-mining-sentiment-analysis-survey.html

135 pp, 330+ references, full pdf posted
includes bibliographies, pointers to datasets, etc.