

Finding Deceptive Opinion Spam by Any Stretch of the Imagination

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Motivation

- Consumers increasingly rate, review and research products online
- Potential for opinion spam
 - Disruptive opinion spam
 - Deceptive opinion spam

Portland Marriott Downtown Like 1

Hotel class ★★★★★
1401 SW Naito Parkway, Portland, OR 97201

 Reviews you can trust

1-10 of 51 reviews

« 1 2 ... 6 »

Sort by [Date ▼]

English first ▾



nitropin...
Auburn, WA
9 reviews

“A great riverfront getaway via Amtrak and free Streetcar!”



Date of review: Apr 22, 2011

As other reviewers have stated, yes the rooms are small but don't let that detour you from staying here. I'm still giving this hotel 5 stars based on the quality and level of service we received from everybody here. We payed a little extra online for the breakfast package and it was well worth it. The breakfast was a full...

[more](#) ▾

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★★★★★ **Great Customer Service!!**, April 7, 2011

By [akaempf](#) - [See all my reviews](#)

Amazon Verified Purchase (What's this?)

This review is from: [Apple iPad 2 MC984LL/A Tablet \(64GB, Wifi + AT&T 3G, White\) NEWEST MODEL \(Personal Computers\)](#)

"WE SHIP TECH" is a great reliable company. I ordered the iPad2 late 3/30 @ 10:50pm and received the iPad2 4/1. When I wrote an email to them on the 3/31 they responded in about 20 min max. It's so hard to find great customer service and not get scammed these days that "We Ship Tech" is a breath of fresh air!! I would surely use them again and highly recommend them to anyone who expects great products & service. Thank you We Ship Tech!!!!

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★★★★★ Works Just as expected, May 14, 2007

By [Laurie B. Cook](#) - [See all my reviews](#)

REAL NAME

This review is from: Belkin F5U301 CableFree 4-Port USB 2.0 Hub with Dongle (Electronics)

Supplies good range and does provide true wireless USB. Software worked right out of the box. I have been recommending this nifty little device to all my friends. Very useful device.

Motivation

Which of these two hotel reviews is deceptive opinion spam?

Date of review: Jun 9, 2006

4 people found this review helpful

I have stayed at many hotels traveling for both business and pleasure and I can honestly say that The James is tops. The service at the hotel is first class. The rooms are modern and very comfortable. The location is perfect within walking distance to all of the great sights and restaurants. Highly recommend to both business travellers and couples.

Date of review: Jun 9, 2006

4 people found this review helpful

My husband and I stayed at the James Chicago Hotel for our anniversary. This place is fantastic! We knew as soon as we arrived we made the right choice! The rooms are BEAUTIFUL and the staff very attentive and wonderful!! The area of the hotel is great, since I love to shop I couldn't ask for more!! We will definitely be back to Chicago and we will for sure be back to the James Chicago.

Motivation

Which of these two hotel reviews is deceptive opinion spam?

Answer:

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Overview

- Motivation
- Gathering Data
- Human Performance
- Classifier Performance
- Conclusion

Gathering Data

- Label existing reviews
 - Can't manually do this
 - Duplicate detection (Jindal and Liu, 2008)
- Create new reviews
 - Mechanical Turk

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Gathering Data

- Mechanical Turk
 - 20 hotels
 - 20 reviews / hotel
 - Offer \$1 / review
 - 400 reviews

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 - 400 reviews

Home → United States → Illinois (IL) → Chicago → Chicago Hotels → James Chicago

James Chicago

Hotel class ★★★★★

55 East Ontario, Corner of Rush and Ontario, Chicago, IL 60611

📞 877.526.3755 🌐 [Hotel website](#) ✉️ [E-mail hotel](#)

What travelers say about James Chicago

- Great location (33)
- Room service (20)
- Very nice (18)
- Trader joe (16)
- Boutique hotel (15)
- Magnificent mile (14)
- Very good (13)
- Michigan avenue (13)
- Comfortable bed (10)
- Friendly and helpful (8)

👁️ Reviews you can trust

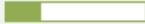
Filter traveler reviews

[Write a Review](#)

Trip type

- All reviews (449)
- Business reviews (94)
- Couples reviews (194)
- Family reviews (28)
- Friends reviews (60)
- Solo travel reviews (62)

Traveler rating

- All (449)
- Excellent (278) 
- Very good (116) 
- Average (23) 
- Poor (19) 
- Terrible (13) 

Gathering Data

- Mechanical Turk
 - 20 hotels
 - 20 reviews / hotel
 - Offer \$1 / review
 - 400 reviews

1-10 of 449 reviews

<< 1 2 ... 45 >>

Sort by [Date ▼] [Rating]

English first



emmabake...
Farnborough, UK
2 contributions

"Amazing Hotel"



Date of review: Apr 25, 2011 - **New**

Stayed at this hotel in May 2010. Came on business from the UK with my husband for the Snack and Candy Expo at McCormick Place and decided that this place was an easy taxi ride away but within walking distance for our spare time. Wow, the hotel was amazing, one of the best we've stayed in. Our room wasn't ready...

[more](#) ▼

Gathering Data

- Mechanical Turk
 - 20 hotels
 - 20 reviews / hotel
 - Offer \$1 / review
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Gathering Data

- Mechanical Turk
 - 20 hotels
 - 20 reviews / hotel
 - Offer \$1 / review
 - 400 reviews
- Average time spent:
 - > 8 minutes
- Average length:
 - > 115 words

Gathering Data

- 400 truthful reviews
 - TripAdvisor.com
 - Lengths distributed similarly to deceptive reviews

Overview

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- Human Performance
- Classifier Performance
- Conclusion

Human Performance

- Why bother?
 - Validates deceptive opinions
 - Baseline to compare other approaches

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Human Performance

- Why bother?
 - Validates deceptive opinions
 - **Baseline to compare other approaches**

Human Performance

- 80 truthful and 80 deceptive reviews
- 3 undergraduate judges
 - Truth bias
- 2 meta-judges

Human Performance

| | | | TRUTHFUL | | | DECEPTIVE | | |
|-------|---------|--------------|----------|-------------|-------------|-------------|------|------|
| | | Accuracy | P | R | F | P | R | F |
| HUMAN | JUDGE 1 | 61.9% | 57.9 | 87.5 | 69.7 | 74.4 | 36.3 | 48.7 |
| | JUDGE 2 | 56.9% | 53.9 | 95.0 | 68.8 | 78.9 | 18.8 | 30.3 |
| | JUDGE 3 | 53.1% | 52.3 | 70.0 | 59.9 | 54.7 | 36.3 | 43.6 |

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Human Performance

Performed at chance
(p-value = 0.1)

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Performed at chance
(p-value = 0.5)

- 80 truthful and 80 deceptive reviews
- 3 undergraduate judges
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Classified fewer than 12% of opinions as deceptive!

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| META | MAJORITY | 58.1% | 54.8 | 92.5 | 68.8 | 76.0 | 23.8 | 36.2 |
| | SKEPTIC | 60.6% | 60.8 | 60.0 | 60.4 | 60.5 | 61.3 | 60.9 |

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No more truth bias!

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Classifier Performance

- Three feature sets
 - Genre identification
 - Psycholinguistic deception detection
 - Text categorization
- Linear SVM

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Classifier Performance

- Genre identification
 - 48 part-of-speech (PoS) features
 - Baseline automated approach
- Expectations
 - Truth similar to informative writing
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Classifier Performance

| Approach | Features | Accuracy | TRUTHFUL | | | DECEPTIVE | | |
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Outperforms human judges!
(p-values = {0.06, 0.01, 0.001})

Classifier Performance

| TRUTHFUL/INFORMATIVE | | | DECEPTIVE/IMAGINATIVE | | | |
|----------------------|------------------|---------------|-----------------------|--------------------------------|--------------|--------------|
| Category | Variant | Weight | Category | Variant | Weight | |
| NOUNS | Singular | 0.008 | VERBS | Base | -0.057 | |
| | Plural | 0.002 | | Past tense | 0.041 | |
| | Proper, singular | -0.041 | | Present participle | -0.089 | |
| | Proper, plural | 0.091 | | Singular, present | -0.031 | |
| ADJECTIVES | General | 0.002 | | Third person singular, present | 0.026 | |
| | Comparative | 0.058 | | Modal | -0.063 | |
| | Superlative | -0.164 | | ADVERBS | General | 0.001 |
| PREPOSITIONS | General | 0.064 | | | Comparative | -0.035 |
| DETERMINERS | General | 0.009 | | | PRONOUNS | Personal |
| COORD. CONJ. | General | 0.094 | | Possessive | | -0.303 |
| VERBS | Past participle | 0.053 | PRE-DETERMINERS | General | 0.017 | |
| ADVERBS | Superlative | -0.094 | | | | |

- Rayson et. al. (2001)
 - Informative on left, imaginative on right

Classifier Performance

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| | Superlative ★ | -0.164 | | General | 0.001 |
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e.g., best, finest

- Rayson et. al. (2001)

e.g., most

– Informative on left, imaginative on right

Classifier Performance

- **Linguistic Inquire and Word Count** (Pennebaker et al., 2007)
 - Counts instances of ~4,500 keywords
 - Regular expressions, actually
 - Keywords are divided into 80 dimensions across 4 broad groups

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Classifier Performance

- Linguistic processes
 - e.g., average number of words per sentence
- Psychological processes
 - e.g., talk, happy, know, feeling, eat
- Personal concerns
 - e.g., job, cook, family
- Spoken categories
 - e.g., yes, umm, blah

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|---|----------|----------|----------|------|------|-----------|------|------|
| | | | P | R | F | P | R | F |
| GENRE IDENTIFICATION | POS | 73.0% | 75.3 | 68.5 | 71.7 | 71.1 | 77.5 | 74.2 |
| PSYCHOLINGUISTIC DECEPTION DETECTION | LIWC | 76.8% | 77.2 | 76.0 | 76.6 | 76.4 | 77.5 | 76.9 |

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Outperforms PoS!
(p-value = 0.02)

Classifier Performance

- Text categorization (n-grams)
 - Unigrams
 - Bigrams⁺
 - Includes unigrams
 - Trigrams⁺
 - Includes unigrams and bigrams

Classifier Performance

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| TEXT CATEGORIZATION | UNIGRAMS | 88.4% | 89.9 | 86.5 | 88.2 | 87.0 | 90.3 | 88.6 |
| | BIGRAMS | 89.6% | 90.1 | 89.0 | 89.6 | 89.1 | 90.3 | 89.7 |
| | LIWC+BIGRAMS | 89.8% | 89.8 | 89.8 | 89.8 | 89.8 | 89.8 | 89.8 |
| | TRIGRAMS | 89.0% | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 |

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| | LIWC+BIGRAMS | 89.8% | 89.8 | 89.8 | 89.8 | 89.8 | 89.8 | 89.8 |
| | TRIGRAMS | 89.0% | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 |

Outperforms all
other methods!

Classifier Performance

| LIWC+BIGRAMS | |
|--------------------------|------------|
| TRUTHFUL | DECEPTIVE |
| - | chicago |
| ... | my |
| on | hotel |
| location | ,_and |
|) | luxury |
| allpunct _{LIWC} | experience |
| floor | hilton |
| (| business |
| the_hotel | vacation |
| bathroom | i |
| small | spa |
| helpful | looking |
| \$ | while |
| hotel_. | husband |
| other | my_husband |

- Spatial difficulties (Vrij et al., 2009)
- Psychological distancing (Newman et al., 2003)

Classifier Performance

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| small | spa |
| helpful | looking |
| \$ | while |
| hotel_. | ★ husband |
| other | ★ my_husband |

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Overview

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Conclusion

- First large-scale gold-standard deception dataset
 - http://www.cs.cornell.edu/~myleott/op_spam
- Evaluated human deception detection performance
- Developed automated classifiers capable of nearly 90% accuracy
 - Relationship between deceptive and imaginative text
 - Importance of moving beyond universal deception cues

Conclusion

- First large-scale gold-standard deception dataset
 - http://www.cs.cornell.edu/~myleott/op_spam
- Evaluated human deception detection performance
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Thank you. Questions?

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