COMP34412
Workshop 6

Sentiment Analysis
AKA: Opinion extraction, Opinion mining,
Sentiment mining, Subjectivity analysis

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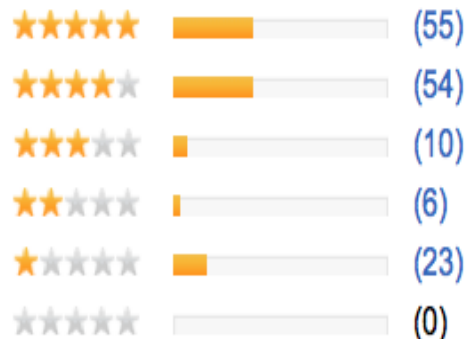# Customer satisfaction

HP Officejet 6500A E710N Multifunction Printer

Product summary   Find best price   **Customer reviews**   Specifications   Related items

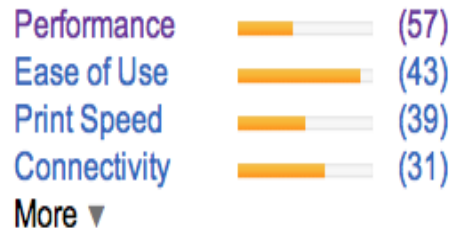**$121.53 - $242.39** (14 stores)

☐ Compare

Average rating ★★★½☆ (144)

★★★★★		(55)
★★★★☆		(54)
★★★☆☆		(10)
★★☆☆☆		(6)
★☆☆☆☆		(23)
★★★★★		(0)

Most mentioned

Performance		(57)
Ease of Use		(43)
Print Speed		(39)
Connectivity		(31)

More ▼

Show reviews by source

Best Buy (140)

CNET (5)

Amazon.com (3)

Positive or negative movie review?

- *unbelievably disappointing*

- *Full of zany characters and richly applied satire, and some great plot twists*

- *this is the greatest screwball comedy ever filmed*

- *It was pathetic. The worst part about it was the boxing scenes.*

Sentiment Analysis

- Sentiment analysis is the detection of **attitudes**

  "enduring, affectively coloured beliefs, dispositions towards objects or persons"

- Simplest task:

  - Is the attitude of this text *positive* or *negative*? Or neutral

- More complex:

  - Rank the attitude of this text from 1 to 5

Sentiment Analysis

■ More advanced task: extract more details

1. **Holder (source)** of attitude
2. **Target (aspect)** of attitude
3. **Type** of attitude
   - ■ From a set of types (e.g. *like, love, hate, value, desire*, etc.)
   - ■ **Polarity** (*positive, negative, neutral,* together with *strength)*
4. **Text** containing the attitude
   - ■ Sentence or entire document

Baseline Algorithm 1

- **Use a sentiment (polarity) lexicon**
  - simple look-up

- **Several lexicons available**
  - E.g. **MPQA Subjectivity Cues Lexicon** (2718 positive; 4912 negative; each word annotated for intensity (strong, weak))
  - E.g. **SentiWordNet**: all WordNet synsets automatically annotated for degrees of positivity, negativity, and neutrality/objectiveness
    - [estimable(J,1)] "deserving of respect or high regard"
      Pos .75 Neg 0 Obj .25

- **However,**
  - Word's sentiment polarity **depends on context**
  - Not everyone agrees on polarity of words

Disagreements between polarity lexicons

Christopher Potts, Sentiment Tutorial, 2011

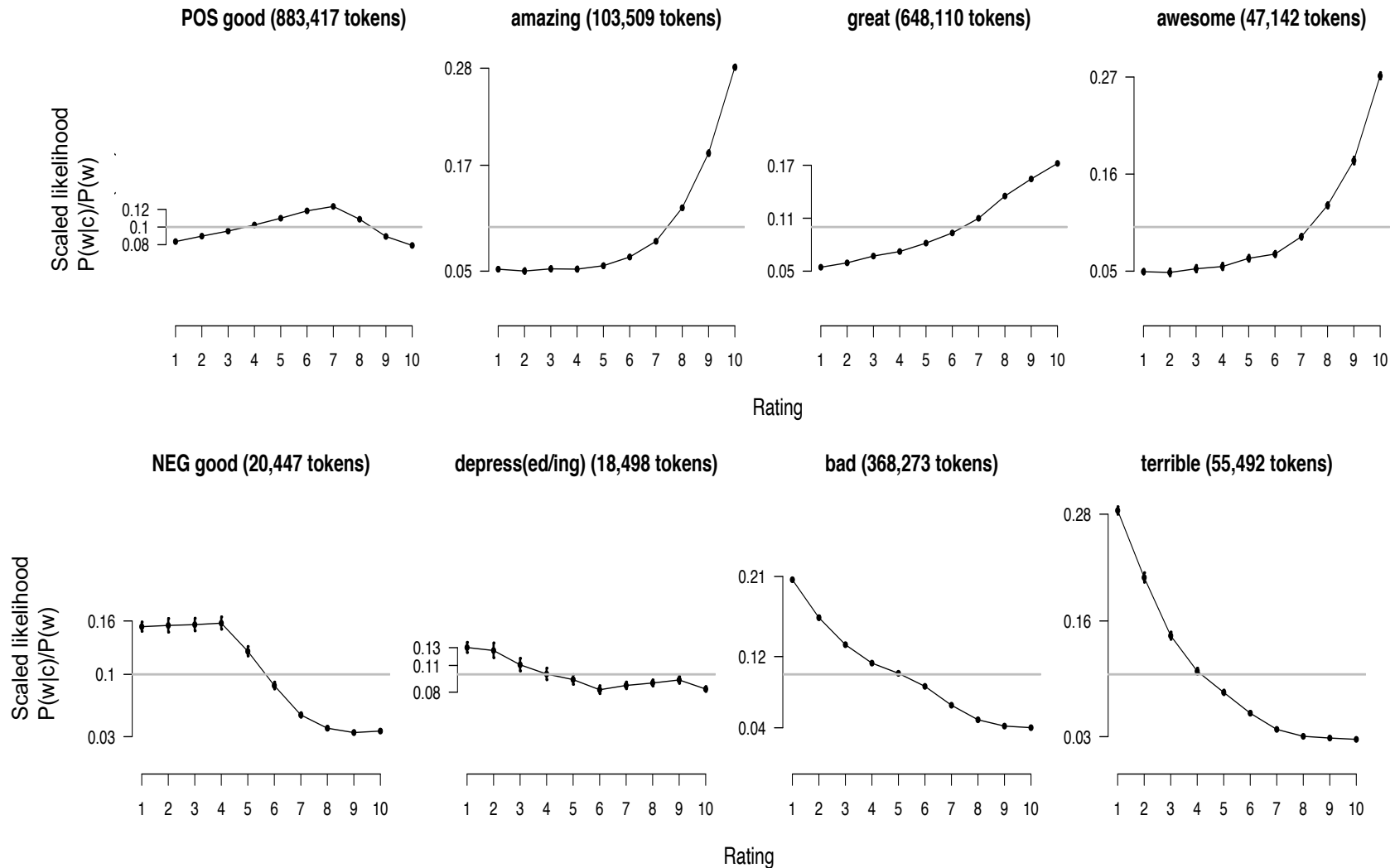|	Opinion Lexicon	General Inquirer	SentiWordNet	LIWC
MPQA	33/5402 **(0.6%)**	49/2867 **(2%)**	1127/4214 **(27%)**	12/363 **(3%)**
Opinion Lexicon		32/2411 **(1%)**	1004/3994 **(25%)**	9/403 **(2%)**
General Inquirer			520/2306 **(23%)**	1/204 **(0.5%)**
SentiWordNet				174/694 **(25%)**
LIWC				

Analyzing the polarity of words

- How likely is each word to appear in each sentiment class?
- Count("bad") in 1-star, 2-star, 3-star, etc.
- But can't use raw counts:
- Instead, **likelihood:**

$$P(w \mid c) = \frac{f(w,c)}{\sum_{w \in c} f(w,c)}$$

- Make them comparable between words
  - □ **Scaled likelihood:**

$$\frac{P(w \mid c)}{P(w)}$$

Potts, Christopher. 2011. On the negativity of negation. SALT 20, 636-659.

Analyzing the polarity of words

Potts, Christopher. 2011. On the negativity of negation. SALT 20, 636-659.

Sentiment analysis is hard

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

- Expectations
  - *Well as usual Keanu Reeves is nothing special, but surprisingly, the very talented Laurence Fishbourne is **not so good** either, I was surprised.*

NLTK demo

Sentiment Analysis with Python NLTK Text Classification

This is a demonstration of **sentiment analysis** using a `NLTK 2.0.4` powered **text classification** process. It can tell you whether it thinks the text you enter below expresses **positive sentiment**, **negative sentiment**, or if it's **neutral**. Using **hierarchical classification**, *neutrality* is determined first, and *sentiment polarity* is determined second, but only if the text is not neutral.

Analyze Sentiment

Language

english ▾

Enter text

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

Enter up to 50000 characters

Analyze

Sentiment Analysis Results

The text is **pos**.

The final sentiment is determined by looking at the classification probabilities below.

Subjectivity

* neutral: 0.1
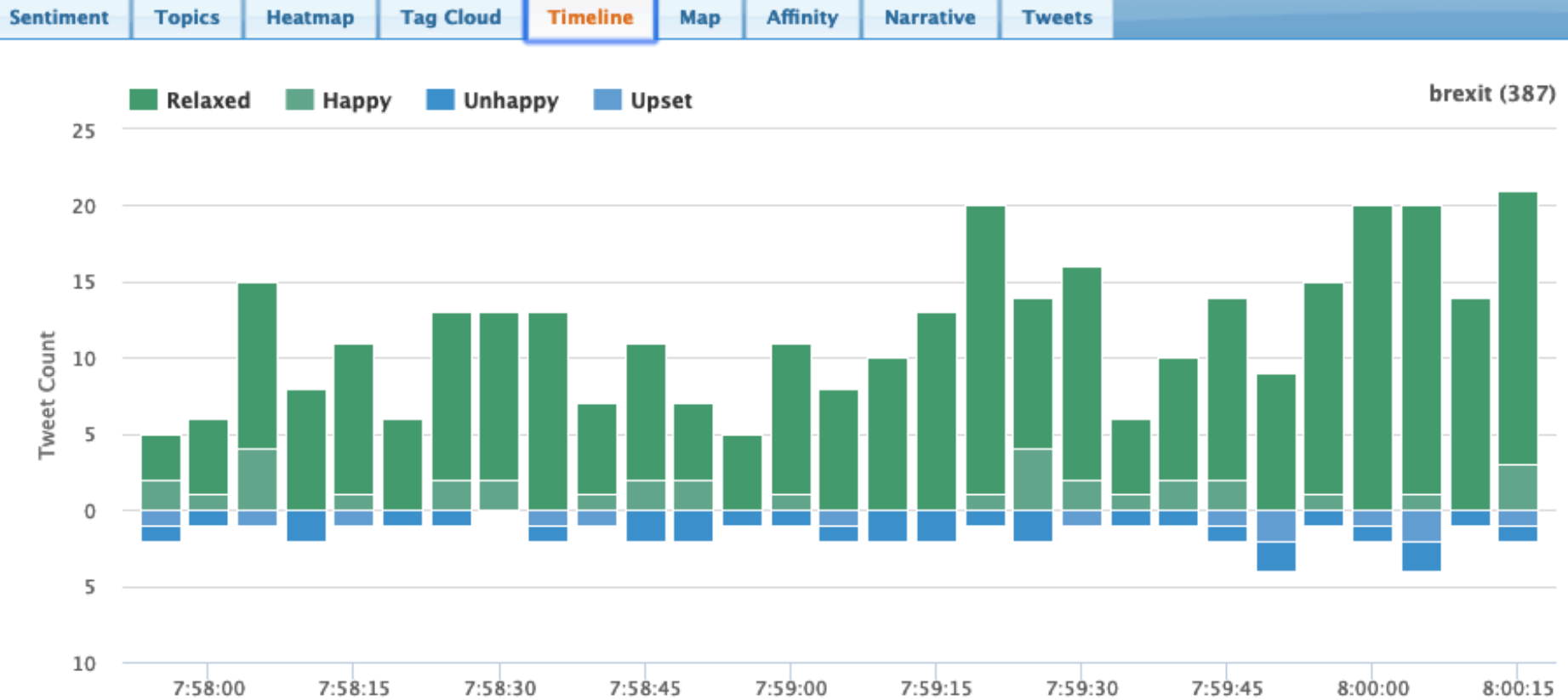* **polar: 0.9**

Polarity

* **pos: 0.8**
* neg: 0.2

https://text-processing.com/demo/sentiment/

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Twitter sentiment

https://www.csc2.ncsu.edu/faculty/healey/tweet_viz/tweet_app/

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Deeply moving

Sentiment Analysis | Information | **Live Demo** | Sentiment Treebank | Help the Model | Source Code

Please enter text to see its parses and sentiment prediction results:

```
This movie doesn't care about cleverness, wit or any other kind of intelligent humor.
Those who find ugly meanings in beautiful things are corrupt without being charming.
There are slow and repetitive parts, but it has just enough spice to keep it interesting.
```

You can also upload a file (limit 200 lines): Choose file No file chosen   ☐ Show trees in binary form   Submit

http://nlp.stanford.edu:8080/sentiment/rntnDemo.html