Dictionary methods

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Today: Measuring expressed sentiment in documents
Goal: Classify (measure) sentiment in texts
Method: Dictionary methods

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Game Plan:

1) Dictionaries
2) Applying dictionaries to text to measure sentiment
3) Applications, interpretation, and pitfalls

Key Terms:

- Dictionary
- Sentiment analysis
- Word weights

Dictionaries

- Dictionaries are lists of words belonging to a category.

Dictionaries

```
## 1      2-faced  negative
## 2      2-faces  negative
## 3           a+  positive
## 4     abnormal  negative
## 5      abolish  negative
## 6   abominable  negative
## 7   abominably  negative
## 8    abominate  negative
## 9  abomination  negative
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##  2       abandon      fear
##  3       abandon  negative
##  4       abandon   sadness
##  5     abandoned     anger
##  6     abandoned      fear
##  7     abandoned  negative
##  8     abandoned   sadness
##  9   abandonment     anger
## 10   abandonment      fear
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    - Binary: $\{$Positive $(+1)$, Negative (-1)$\}$

Dictionaries

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## 1      abandon   -2
## 2    abandoned   -2
## 3     abandons   -2
## 4     abducted   -2
## 5    abduction   -2
## 6   abductions   -2
## 7        abhor   -3
## 8     abhorred   -3
## 9    abhorrent   -3
## 10      abhors   -3
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- Non-sentiment dictionaries: Words about sports, food, places...

Off the Shelf Dictionaries

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- Output as dictionary

Applying Dictionaries to Documents

- Vector of word counts: $\boldsymbol{X}_i = (X_{i1}, X_{i2}, \ldots, X_{iP})$, $i = (1, \ldots, N)$

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$Y_i \approx 0$ Ambiguous

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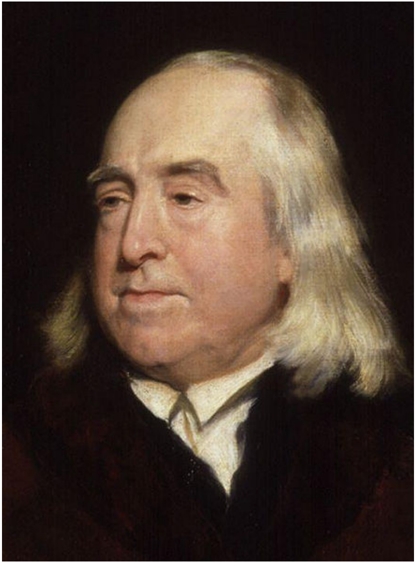

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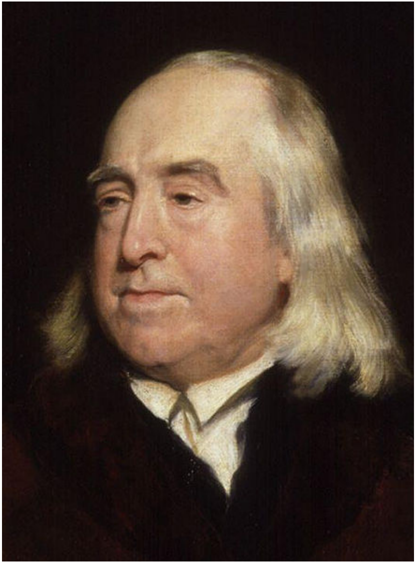

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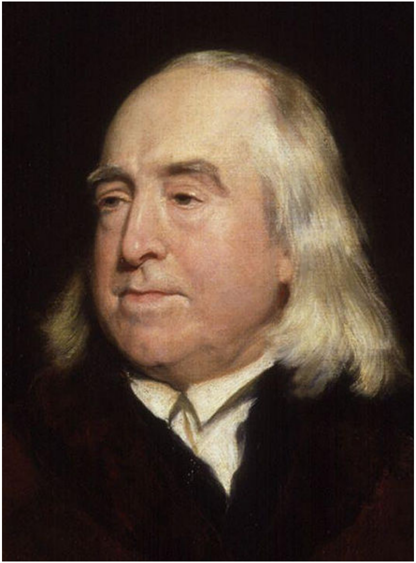

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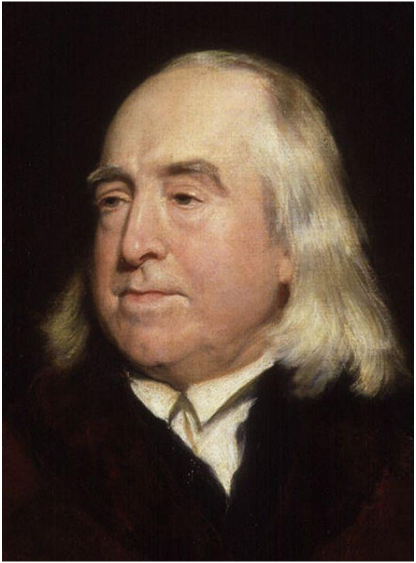

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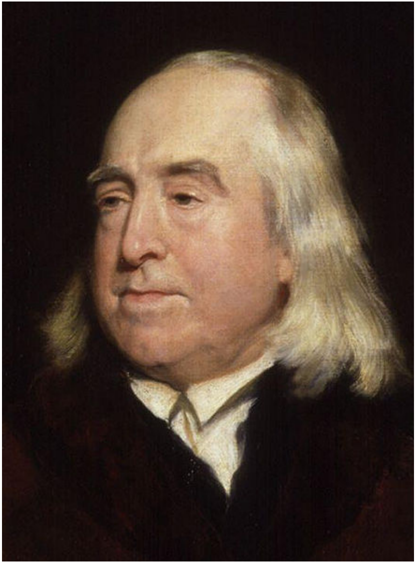

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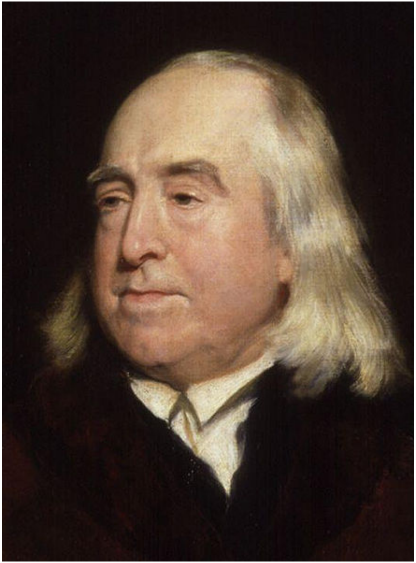

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Use Dictionary Methods

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$$\text{Happiness}_i = \frac{\sum_{p=1}^{P} \theta_p X_{ip}}{\sum_{p=1}^{P} X_{ip}}$$

Lyrics for
Michael Jackson's Billie Jean

"She was more like a beauty queen
from a movie scene.
⋮
And mother always told me,
be careful who you love.
And be careful of what you do
'cause the lie becomes the truth.
Billie Jean is not my lover,
She's just a girl who claims
that I am the one.
⋮

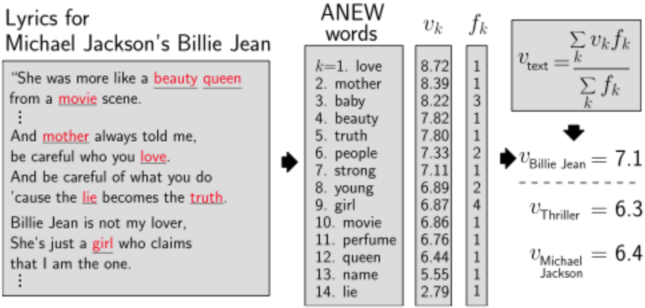
ANEW words	v_k	f_k
k=1. love	8.72	1
2. mother	8.39	1
3. baby	8.22	3
4. beauty	7.82	1
5. truth	7.80	1
6. people	7.33	2
7. strong	7.11	1
8. young	6.89	2
9. girl	6.87	4
10. movie	6.86	1
11. perfume	6.76	1
12. queen	6.44	1
13. name	5.55	1
14. lie	2.79	1

$$v_{\text{text}} = \frac{\sum_k v_k f_k}{\sum_k f_k}$$

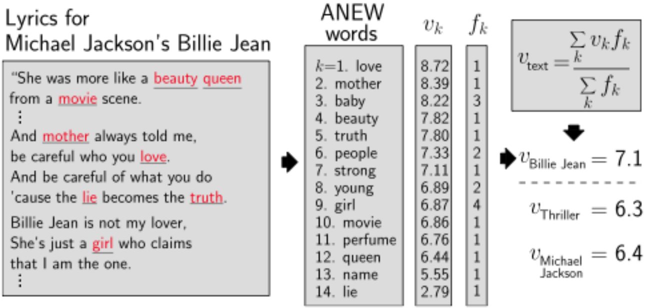
$$v_{\text{Billie Jean}} = 7.1$$

$$v_{\text{Thriller}} = 6.3$$

$$v_{\text{Michael Jackson}} = 6.4$$



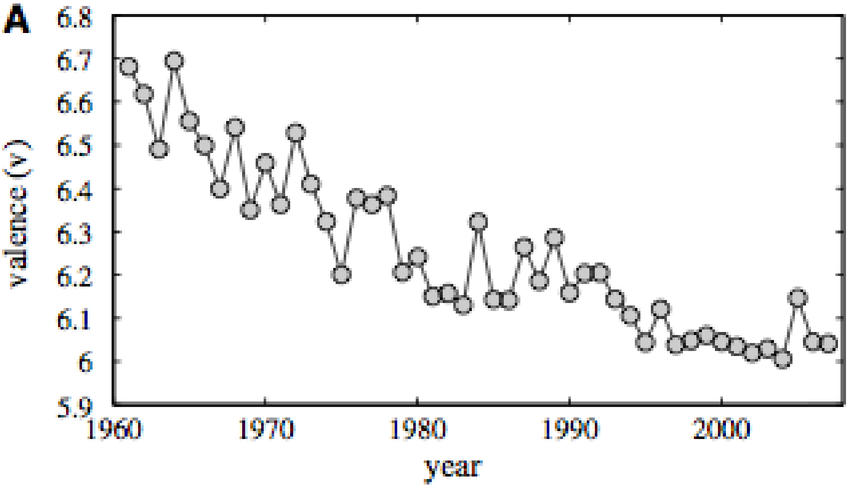
Happiest Song on Thriller?



Happiest Song on Thriller?

P.Y.T. (Pretty Young Thing) (This is the right answer!)

Happiness in Society



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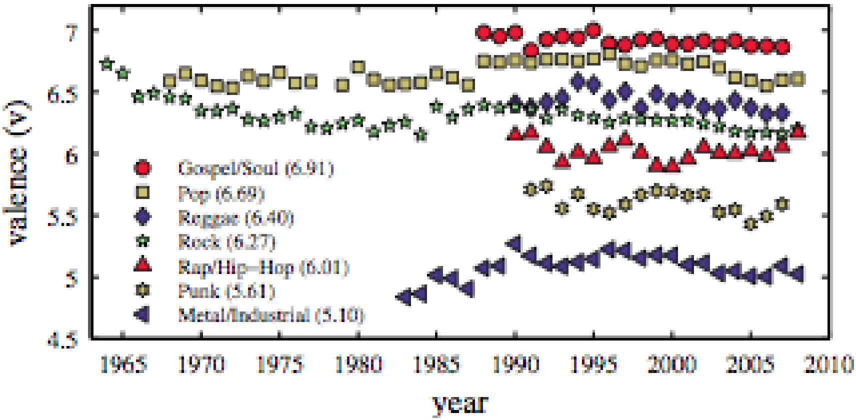

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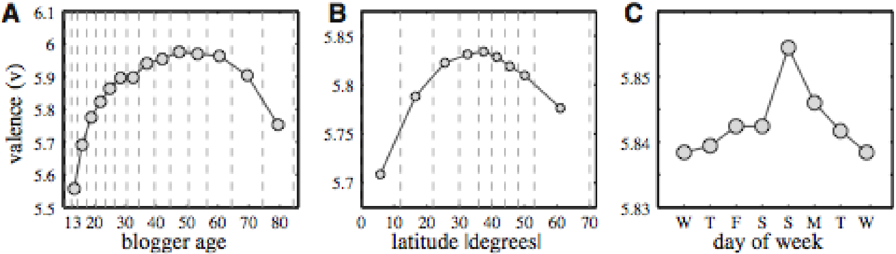
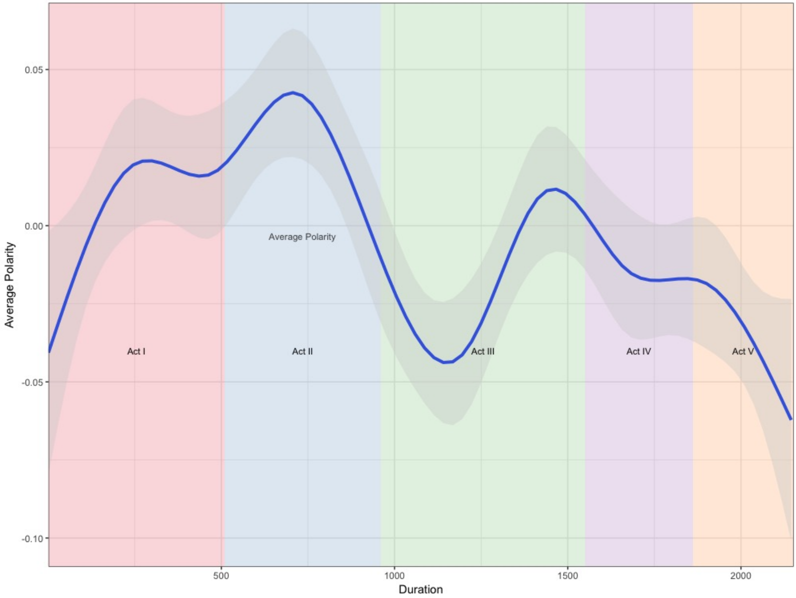


Visualizing Plots: Romeo & Juliet



Emotional Contagion on Facebook

www.pnas.org

Experimental evidence of massive-scale emotional contagion through social networks

Emotional Contagion on Facebook

Use with Caution!

- Most dictionary methods do not take into account qualifiers (e.g. "no good").

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