



Incentivized Review Prediction

Jiamin Han



Incentivized reviews, at least for Amazon, have become the online review equivalent of fake news — call them fake reviews.

Source: Racked.com

Data

- Sephora API
- 1000 Products
- 1 M reviews
- 7% incentivized



MARC JACOBS BEAUTY Dew Drops Coconut Gel Highlighter

SIZE 0.8 oz/ 24 mL • ITEM 1901982

★★★★★ 1K reviews | ❤️ 70K loves

\$44.00

ROUGE FREE
SHIPPING



LinhTrinh

Received free sample

Age 25-34

Skin Type Combination

Skin Tone Olive

Eye Color Brown



Get your summer glow on!

I put a a small dab on the back of my hand and apply it using my beauty blender. I dab a little on at a time and it leaves the most natural looking glow! I LOVE IT! I've tried other liquid and gel highlighters in the past and all were fails. They usually end up rubbing off my foundation or disappear into my base. This coconut del highlighter definitely did not disappoint and will last FOREVER! Would definitely recommend to friends and family.

18 Apr 2017

NOT HELPFUL (0)

HELPFUL (35)

“I love this product. It feels amazing!”

Preprocess

love
product

0.66	0.85	...	0.19	0.22
0.01	0.35	...	0.88	0.12

x

W1
W2

=

0.66	0.85	...	0.19	0.22
------	------	-----	------	------

K means

0	1	...	0	0
---	---	-----	---	---

feel
amazing

0.43	0.64	...	0.32	0.76
0.12	0.99	...	0.34	0.86

x

W3
W4

=

0.54	0.21	...	0.99	0.32
------	------	-----	------	------

0	0	...	1	0
---	---	-----	---	---

Latent topic for this review =

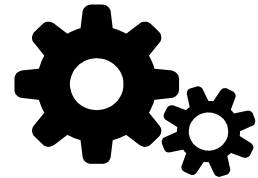
0	1	...	1	0
---	---	-----	---	---

Features

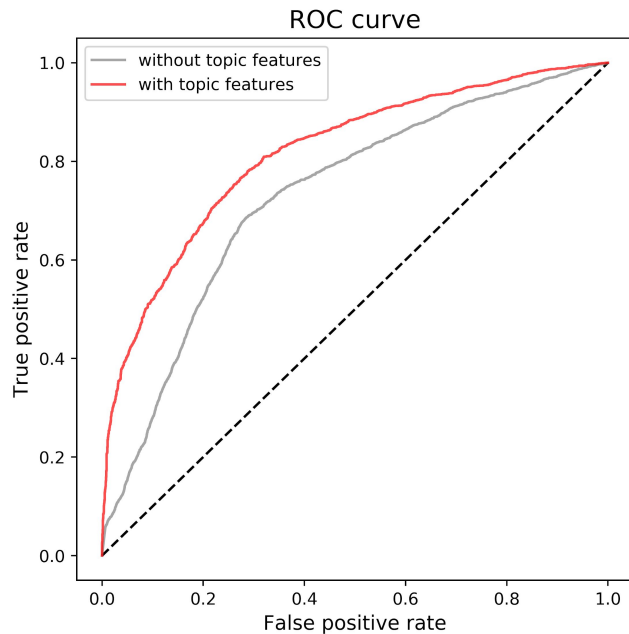
Product & reviewer
Latent topics

Model

Naive Bayes
Gradient boosting



Result



Without topical features:

AUC: 0.53

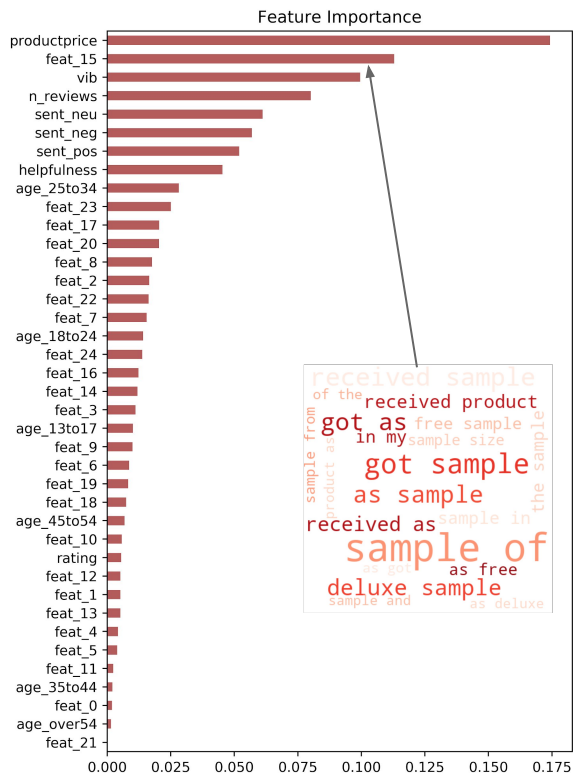
Recall: 0.25

With topical features:

AUC: 0.75

Recall: 0.76

Conclusion



karensj77



Exceptional results

I am in total awe about the SK-II GenOptics Aura. After two weeks of usage both morning and night I can say my skin feels better, looks smooth and alive. No sensitivity after application and this product is the easiest one cream to apply. Not multiple product, just one dropper and the results are present. Simply amazing and worth every penny. I received the product complimentary in exchange for an honest review. Here is my honesty after 3 weeks of usage.

NOT HELPFUL (0)

HELPFUL (0)

Predicted probability:0.90

Labeled incentivized rate: 7%

Predicted incentivized rate: 32%

Future



Deep learning

More feature engineering (e.g. product info, time)

Add products of different categories

Validate model with reviews from other websites

Thanks!

Any questions?



Appendix



beatyinsider



20 Dec 2016

meh

I received this product free for testing purposes from influenster. Bland and didn't do a whole lot. It smoothed things out slightly, but I have fairly smooth skin. It held my concealer throughout the day, but my concealer usually stays put well anyway. I'm gonna pass.

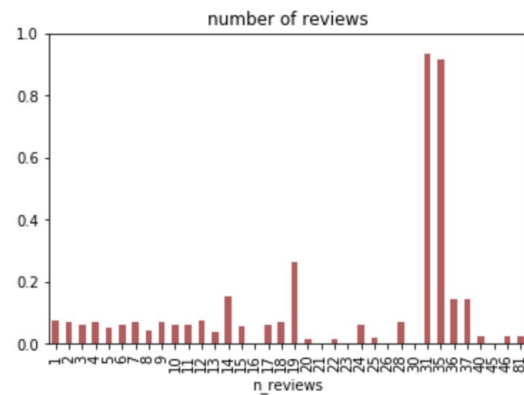
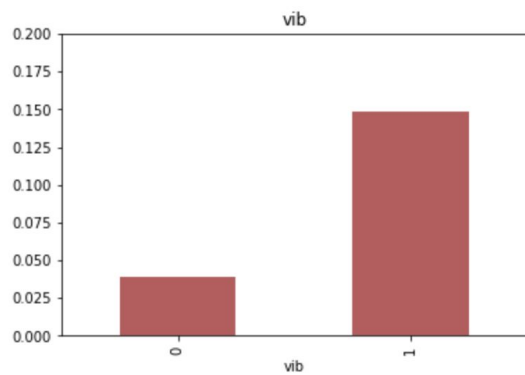
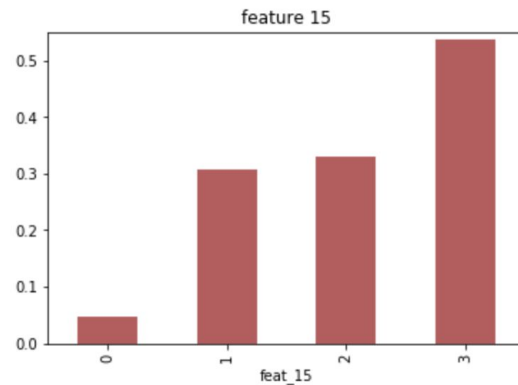
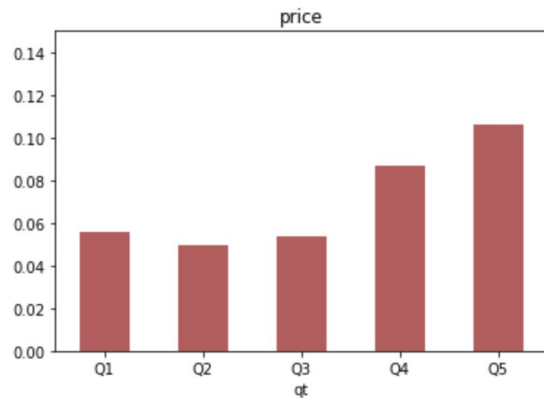
NOT HELPFUL (0)

HELPFUL (0)

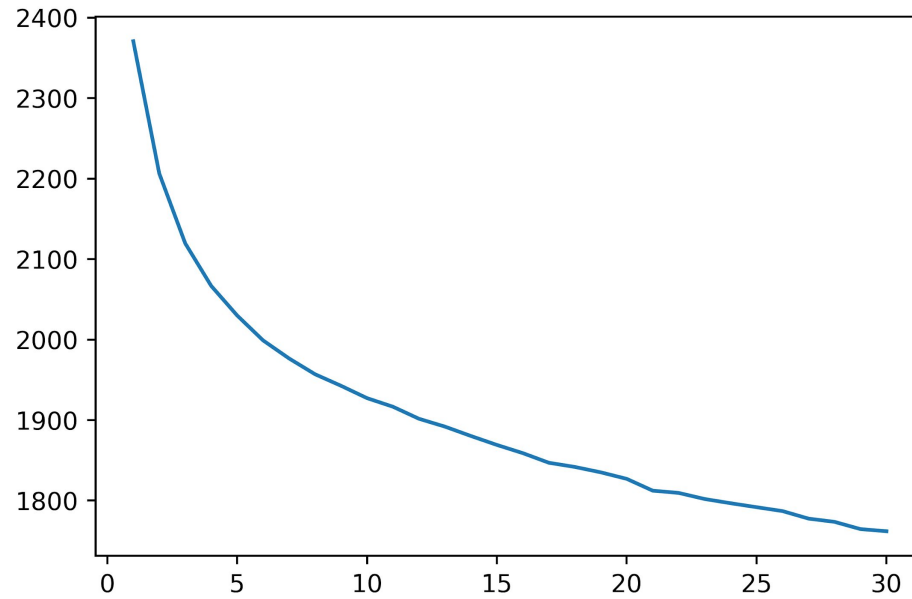
Predict_proba [0.3278798, 0.6721202]

go on your skin it on so smooth
smooth
on the with that
soft and
my skin
smooth and
goes on
makes my the skin
into the really

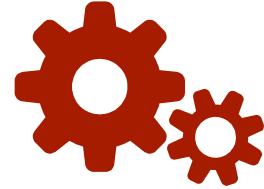
keep leaves feeling even really the
product just get for look
acne so much so soft
makeup very to it dry
face feel
it make eye soft and feel of
also little feel so
looked
oily face this with
felt as moisturizer



K-Means inertia



Method



Preprocessing

Sentence
tokenize
Word tokenize
Sentiment
analysis

Sentence to vectors

Word2vec
TF-IDF weight
Weighted
average vector
for each
sentence

Clustering

K Means (25)
Latent topics

Model

Aggregate topics
for each review
Combine non-text
features
Naive Bayes
Gradient boosting