

```
!pip install turicreate
```

```
from google.colab import drive
drive.mount('/content/gdrive')
```

```
Mounted at /content/gdrive
```

▼ Analyze Product Sentiment

```
import turicreate
```

▼ Read product review data

```
products = turicreate.SFrame('/content/gdrive/My Drive/Turicreate/Week 3/amazon_baby.sframe')
```

▼ Explore data

```
products
```

name	review	rating
Planetwise Flannel Wipes	These flannel wipes are OK, but in my opinion ...	3.0
Planetwise Wipe Pouch	it came early and was not disappointed. i love ...	5.0
Annas Dream Full Quilt with 2 Shams ...	Very soft and comfortable and warmer than it ...	5.0
Stop Pacifier Sucking without tears with ...	This is a product well worth the purchase. I ...	5.0
Stop Pacifier Sucking without tears with ...	All of my kids have cried non-stop when I tried to ...	5.0
Stop Pacifier Sucking without tears with ...	When the Binky Fairy came to our house, we didn't ...	5.0
A Tale of Baby's Days with Peter Rabbit ...	Lovely book, it's bound tightly so you may no ...	4.0
Baby Tracker® - Daily Childcare Journal, ...	Perfect for new parents. We were able to keep ...	5.0
Baby Tracker® - Daily Childcare Journal, ...	A friend of mine pinned this product on Pinte ...	5.0
Baby Tracker® - Daily Childcare Journal, ...	This has been an easy way for my nanny to record ...	4.0

```
[183531 rows x 3 columns]
```

Note: Only the head of the SFrame is printed.

You can use `print_rows(num_rows=m, num_columns=n)` to print more rows and columns.

```
products.groupby('name').operations({'count':turicreate.aggregate COUNT()}) .sort('count' ascending=F
```

```
products.groupby('name', operations = ['count']).filter(lambda x: x['count'] > 400).sort('count', ascending = False)
```

name	count
Vulli Sophie the Giraffe Teether ...	785
Simple Wishes Hands-Free Breastpump Bra, Pink, ...	562
Infant Optics DXR-5 2.4 GHz Digital Video Baby ...	561
Baby Einstein Take Along Tunes ...	547
Cloud b Twilight Constellation Night ...	520
Fisher-Price Booster Seat, Blue/Green/Gray ...	489
Fisher-Price Rainforest Jumperoo ...	450
Graco Nautilus 3-in-1 Car Seat, Matrix ...	419
Leachco Snoogle Total Body Pillow ...	388
Regalo Easy Step Walk Thru Gate, White ...	374

[32419 rows x 2 columns]

Note: Only the head of the SFrame is printed.

You can use `print_rows(num_rows=m, num_columns=n)` to print more rows and columns.

▼ Examine the reivews for the most-reviewed product

```
giraffe_reviews = products[products['name']=='Vulli Sophie the Giraffe Teether']
```

```
giraffe_reviews
```

name	review	rating
Vulli Sophie the Giraffe Teether ...	He likes chewing on all the parts especially the ...	5.0

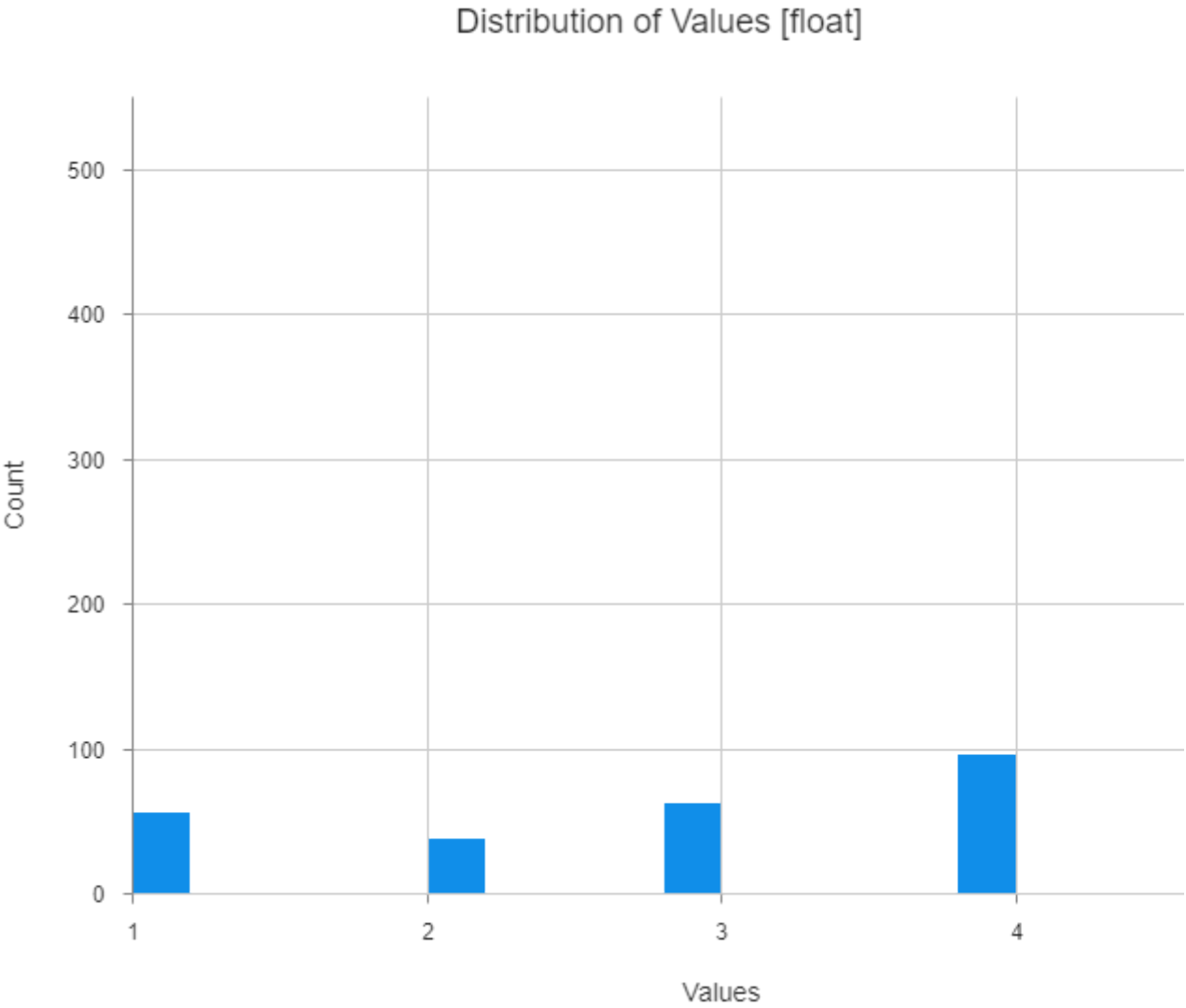
```
len(giraffe_reviews)
```

```
785
```

```
| vulli Sophie the Giraffe | All the moms in my moms | 5.0 |
```

```
giraffe_reviews['rating'].show()
```

Materializing SArray



▼ Building a sentiment classifier

▼ Build word count vectors

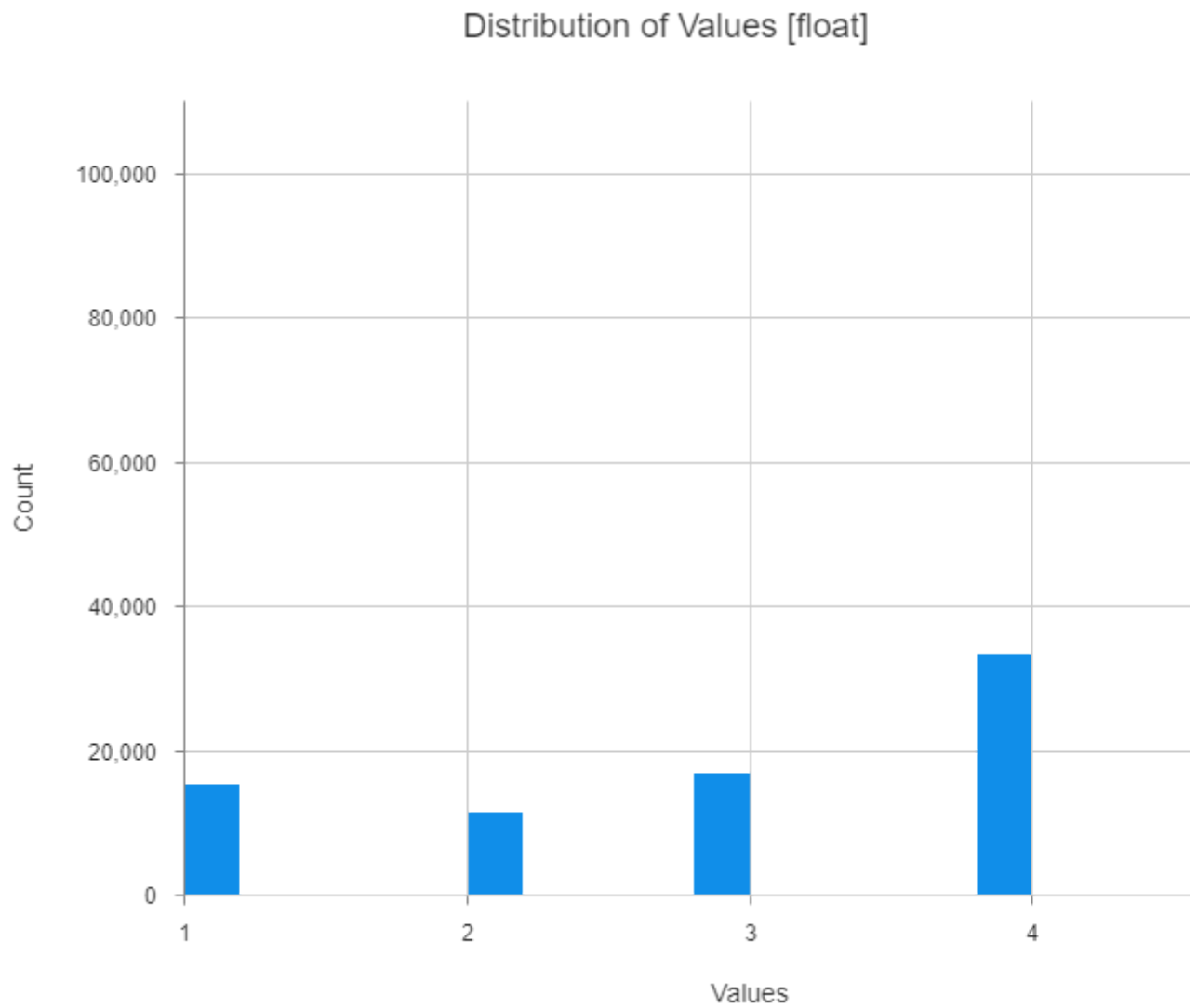
```
products['word_count'] = turicreate.text_analytics.count_words(products['review'])
```

products

name	review	rating	word_count
Planetwise Flannel Wipes	These flannel wipes are OK, but in my opinion ...	3.0	{'handles': 1.0, 'stripping': 1.0, ...
Planetwise Wipe Pouch	it came early and was not disappointed. i love ...	5.0	{'recommend': 1.0, 'highly': 1.0, ...
Annas Dream Full Quilt with 2 Shams ...	Very soft and comfortable and warmer than it ...	5.0	{'quilt': 1.0, 'of': 1.0, 'the': 1.0, 'than': 1.0, ...
Stop Pacifier Sucking without tears with ...	This is a product well worth the purchase. I ...	5.0	{'tool': 1.0, 'clever': 1.0, 'approach': 2.0, ...
Stop Pacifier Sucking without tears with ...	All of my kids have cried non-stop when I tried to ...	5.0	{'rock': 1.0, 'many': 1.0, 'headaches': 1.0, ...
Stop Pacifier Sucking without tears with ...	When the Binky Fairy came to our house, we didn't ...	5.0	{'thumb': 1.0, 'or': 1.0, 'break': 1.0, 'trying': ...
A Tale of Baby's Days with Peter Rabbit ...	Lovely book, it's bound tightly so you may no ...	4.0	{'for': 1.0, 'barnes': 1.0, 'at': 1.0, 'is': ...
Baby Tracker®; - Daily	Perfect for new parents. We were able to keep ...	5.0	{'right': 1.0, 'because': 1.0, 'questions': 1.0, ...
Childcare Journal, ...	A friend of mine pinned this product on Pinte ...	5.0	{'like': 1.0, 'and': 1.0, 'changes': 1.0, 'the': ...
Baby Tracker®; - Daily	This has been an easy way for my nanny to record	4.0	{'in': 1.0, 'pages': 1.0, 'out': 1.0, 'run': 1.0, ...

▼ Define what is positive and negative sentiment

```
products['rating'].show()
```



```
#ignore all 3* reviews
```

```
products = products[products['rating']!= 3]
```

```
#positive sentiment = 4-star or 5-star reviews
```

```
products['sentiment'] = products['rating'] >= 4
```

```
products
```

name	review	rating	word_count	sentiment
Planetwise Wipe Pouch	it came early and was not disappointed. i love ...	5.0	{'recommend': 1.0, 'highly': 1.0, ...}	1
Annas Dream Full Quilt with 2 Shams ...	Very soft and comfortable and warmer than it ...	5.0	{'quilt': 1.0, 'of': 1.0, 'the': 1.0, 'than': 1.0, ...}	1
Stop Pacifier Sucking without tears with	This is a product well worth the purchase. I ...	5.0	{'tool': 1.0, 'clever': 1.0, 'approach': 1.0, ...}	1

products['sentiment'].show()

▼ Train our sentiment classifier

```
train_data, test_data = products.random_split(.8, seed=0)
```

```
sentiment_model = turicreate.logistic_classifier.create(train_data, target='sentiment', features=['w
```

Logistic regression:

```
-----
Number of examples      : 133448
Number of classes       : 2
Number of feature columns : 1
Number of unpacked features : 57356
Number of coefficients    : 57357
Starting L-BFGS
-----
```

Iteration	Passes	Step size	Elapsed Time	Training Accuracy	Validation Accuracy
0	4	0.250000	2.342444	0.841421	0.840019
1	9	3.250000	4.257543	0.931359	0.911362
2	11	2.669978	5.190486	0.938650	0.916466
3	12	2.669978	5.789763	0.927417	0.901814
4	14	1.326072	6.721158	0.945200	0.918088
9	20	1.326072	10.066217	0.977654	0.917698

▼ Apply the sentiment classifier to better understand the Giraffe reviews

```
products['predicted_sentiment'] = sentiment_model.predict(products, output_type = 'probability')
```

```
products
```

name	review	rating	word_count	sentiment
Planetwise Wipe Pouch	it came early and was not disappointed. i love ...	5.0	{'recommend': 1.0, 'highly': 1.0, ...	1
Annas Dream Full Quilt with 2 Shams ...	Very soft and comfortable and warmer than it ...	5.0	{'quilt': 1.0, 'of': 1.0, 'the': 1.0, 'than': 1.0, ...	1
Stop Pacifier Sucking without tears with ...	This is a product well worth the purchase. I ...	5.0	{'tool': 1.0, 'clever': 1.0, 'approach': 2.0, ...	1
Stop Pacifier Sucking without tears with ...	All of my kids have cried non-stop when I tried to ...	5.0	{'rock': 1.0, 'many': 1.0, 'headaches': 1.0, ...	1
Stop Pacifier Sucking without tears with ...	When the Binky Fairy came to our house, we didn't ...	5.0	{'thumb': 1.0, 'or': 1.0, 'break': 1.0, 'trying': ...	1
A Tale of Baby's Days with Peter Rabbit ...	Lovely book, it's bound tightly so you may	4.0	{'for': 1.0, 'barnes': 1.0, 'at': 1.0, 'is':	1

giraffe_reviews = products[products['name']== 'Vulli Sophie the Giraffe Teether']

giraffe_reviews	giraffe_reviews	giraffe_reviews	giraffe_reviews	giraffe_reviews
-----------------	-----------------	-----------------	-----------------	-----------------

name	review	rating	word_count	sentiment
Vulli Sophie the Giraffe Teether ...	He likes chewing on all the parts especially the ...	5.0	{'purchase': 1.0, 'teething': 1.0, ...}	1
Vulli Sophie the Giraffe Teether ...	My son loves this toy and fits great in the	5.0	{'a': 1.0, 'is': 1.0, 'when': 1.0, 'him': 1.0, ...}	1

▼ Sort the Giraffe reviews according to predicted sentiment

```
giraffe_reviews = giraffe_reviews.sort('predicted_sentiment', ascending=False)
```

```
giraffe_reviews
```

name	review	rating	word_count	sentiment
Vulli Sophie the Giraffe Teether ...	Sophie, oh Sophie, your time has come. My ...	5.0	{'11': 1.0, 'prisrob': 1.0, '12': 1.0, 'who': ...}	1
Vulli Sophie the Giraffe Teether ...	I'll be honest...I bought this toy because all the ...	4.0	{'around': 1.0, 'explore': 1.0, 'they': ...}	1
Vulli Sophie the Giraffe Teether ...	As a mother of 16month old twins; I bought ...	5.0	{'will': 1.0, '15months': 1.0, 'would': 2.0, ...}	1
Vulli Sophie the Giraffe Teether ...	We got this little giraffe as a gift from a ...	5.0	{'out': 1.0, 'would': 1.0, 've': 1.0, 'enou ...}	1
Vulli Sophie the Giraffe Teether ...	As every mom knows, you always want to give your ...	5.0	{'whether': 1.0, 'neutral': 1.0, 'gend ...}	1
Vulli Sophie the Giraffe Teether ...	My Mom-in-Law bought Sophie for my son whe ...	5.0	{'penny': 1.0, 'little': 1.0, 'perfect': 1.0, ...}	1
Vulli Sophie the Giraffe Teether ...	My 4 month old son is teething, and I've tried ...	4.0	{'worth': 1.0, 'works': 1.0, 'teething': 1.0, ...}	1
Vulli Sophie the Giraffe Teether ...	Let me just start off by addressing the choking ...	5.0	{'question': 1.0, 'must': 1.0, 'overall': 1.0, ...}	1
Vulli Sophie the Giraffe Teether ...	I'm not sure why Sophie is such a hit with the ...	4.0	{'makers': 1.0, 'or': 1.0, 'take': 1.0, 'can': ...}	1

```
giraffe_reviews.tail()
```

name	review	rating	word_count	sentiment
Vulli Sophie the Giraffe Teether ...	My 7 1/2 month old grandbaby was sittng up ...	1.0	{'sopie': 1.0, 'with': 1.0, 'be': 1.0, 'shou ...	0
Vulli Sophie the Giraffe Teether ...	I was so looking forward to getting this for my ...	1.0	{'amazon': 1.0, 'back': 1.0, 'by': 1.0, 'more': ...	0
Vulli Sophie the Giraffe Teether ...	Received the product and smells like cheap rub ...	1.0	{'was': 1.0, 'as': 1.0, 'still': 1.0, 'but': ...	0
Vulli Sophie the Giraffe Teether ...	I got one of these as a showe gift that my baby ...	1.0	{'typical': 1.0, 'paint': 1.0, 'came': 1.0, 'mi ...	0
Vulli Sophie the Giraffe Teether ...	When we first got it I thought did my ...	2.0	{'mom': 1.0, 'teethers': 1.0, 'btw': 1.0, 'oth ...	0
Vulli Sophie the Giraffe Teether ...	When I received this the paint was peeling off in ...	1.0	{'risk': 1.0, 'but': 1.0, 'help': 1.0, 'terrible': ...	0
Vulli Sophie the Giraffe Teether ...	"Sophie the Giraffe" has tested positive for ...	1.0	{'ingest': 1.0, 'they': 1.0, 'naturally': 1.0, ...	0
Vulli Sophie the Giraffe Teether ...	My son (now 2.5) LOVED his Sophie, and I bought ...	1.0	{'exaggerated': 1.0, 'are': 1.0, 'a': 3.0, ...	0
Vulli Sophie the Giraffe	I wanted to love this product and was	1.0	{'risk': 1.0, 'ready': 1.0, 'bummed':	0

▼ Show the most positive reviews

```
giraffe_reviews[0]['review']
```

'Sophie, oh Sophie, your time has come. My granddaughter, Violet is 5 months old and starting to teeth. What joy little Sophie brings to Violet. Sophie is made of a very pliable rubber that is sturdy but not tough. It is quite easy for Violet to twist Sophie into unheard of positions to get Sophie into her mouth. The little nose and hooves fit perfectly into small mouths, and the drooling has purpose. The paint on Sophie is food quality. Sophie was born in 1961 in France. The maker had wondered why there was nothing available for babies and made Sophie from the finest rubber, phthalate-free on St Sophie's Day, thus the name was born. Since that time millions of Sophie's populate the world. She is soft and for babies little hands easy to grasp. Violet especially loves the bumpy head and horns of Sophie. Sophie has a long neck that easy to grasp and twist. She has lovely sizeable on

```
giraffe_reviews[1]['review']
```

'I'll be honest...I bought this toy because all the hip parents seem to have one too and I wanted to be a part of the "hip parent" crowd. The price-tag was somewhat of a deterrent but I prevailed and purchased this teether for my daughter. At first, Lily didn't know what to make of Sophie and showed little interest in the polka-dotted creature. I continued to introduce Lily to Sophie and kept the toy in the carrier so that it was on-hand during transitions. Eventually, Lily discovered what a wonderful experience it was to gnaw on the hooves and

▼ Most negative reviews

```
giraffe_reviews[-1]['review']
```

'This children's toy is nostalgic and very cute. However, there is a distinct rubber smell and a very odd taste, yes I tried it, that my baby did not enjoy. Also, if it is soiled it is extremely difficult to clean as the rubber is a kind of porous material and does not clean well. The final thing is the squeaking device inside which stopped working after the first couple of days. I returned this item feeling I had overpaid for a toy that was defective and did not meet my expectations. Please do not be swayed by the cute packaging and hype surrounding it as I was. One more thing, I was given a full refund from Amazon without any problem.'

```
giraffe_reviews[-2]['review']
```

➞ 'I wanted to love this product and was excited to buy it when I became pregnant but am now hesitant to let my baby use it after reading about the recall in Europe. Apparently, as I understand it, their toxin standards of measurement are lower than ours so they have not been recalled here (apparently we are OK with low levels of nitrates in the toys our children put in their mouths, but Europeans are not...hmmm)...Be that as it may, toxins registering even CLOSE to a dangerous level made me nervous about using. After digging around online I did discover that the company claims to have changed the product after a certain date and lists manufacturing codes so you can check yours (those listed were made after a certain date and are said to be safer). Sadly mine was not made after the "improved" date but I could not return it because there was no formal recall in our country. I considered returning it and

