```
!pip install gensim
```

```
Collecting gensim
  Downloading gensim-4.3.3-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (8.1 kB)
Collecting numpy<2.0,>=1.18.5 (from gensim)
  Downloading numpy-1.26.4-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (61 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 61.0/61.0 kB 3.3 MB/s eta 0:00:00
Collecting scipy<1.14.0,>=1.7.0 (from gensim)
  Downloading scipy-1.13.1-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (60 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 60.6/60.6 kB 4.2 MB/s eta 0:00:00
Requirement already satisfied: smart-open>=1.8.1 in /usr/local/lib/python3.11/dist-packages (from gensim) (7.3.0.post1)
Requirement already satisfied: wrapt in /usr/local/lib/python3.11/dist-packages (from smart-open>=1.8.1->gensim) (1.17.2)
Downloading gensim-4.3.3-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (26.7 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 26.7/26.7 MB 37.3 MB/s eta 0:00:00
Downloading numpy-1.26.4-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (18.3 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 18.3/18.3 MB 59.0 MB/s eta 0:00:00
Downloading scipy-1.13.1-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (38.6 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 38.6/38.6 MB 17.2 MB/s eta 0:00:00
Installing collected packages: numpy, scipy, gensim
  Attempting uninstall: numpy
    Found existing installation: numpy 2.0.2
    Uninstalling numpy-2.0.2:
      Successfully uninstalled numpy-2.0.2
  Attempting uninstall: scipy
    Found existing installation: scipy 1.16.0
    Uninstalling scipy-1.16.0:
      Successfully uninstalled scipy-1.16.0
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the source o
opencv-python 4.12.0.88 requires numpy<2.3.0,>=2; python_version >= "3.9", but you have numpy 1.26.4 which is incompatible.
opencv-python-headless 4.12.0.88 requires numpy<2.3.0,>=2; python_version >= "3.9", but you have numpy 1.26.4 which is incompatible.
opencv-contrib-python 4.12.0.88 requires numpy<2.3.0,>=2; python_version >= "3.9", but you have numpy 1.26.4 which is incompatible.
tsfresh 0.21.0 requires scipy>=1.14.0; python_version >= "3.10", but you have scipy 1.13.1 which is incompatible.
thinc 8.3.6 requires numpy<3.0.0,>=2.0.0, but you have numpy 1.26.4 which is incompatible.
Successfully installed gensim-4.3.3 numpy-1.26.4 scipy-1.13.1
```

```
# 1. Setup
import pandas as pd
import nltk
from nltk.corpus import stopwords
from textblob import TextBlob
from gensim import corpora, models
import matplotlib.pyplot as plt
import seaborn as sns

nltk.download('punkt_tab')
nltk.download('stopwords')
```

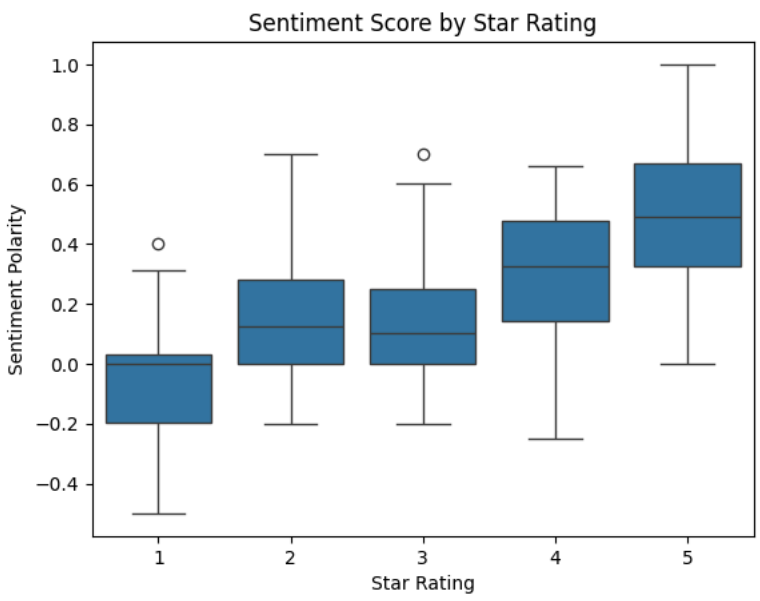
```
[nltk_data] Downloading package punkt_tab to /root/nltk_data...
[nltk_data]   Unzipping tokenizers/punkt_tab.zip.
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
True
```

```
# 2. Load Data
reviews = pd.read_csv("/content/B097SFBSB4 - Acejoz 200Pcs Assorted Color Charms for Jewelry Ma 2025-07-18.csv")
reviews = reviews[['Body', 'Rating']].dropna()
reviews = reviews.rename(columns={'Body': 'reviewText', 'Rating': 'overall'})


# 3. Sentiment Analysis
reviews['sentiment'] = reviews['reviewText'].apply(lambda x: TextBlob(str(x)).sentiment.polarity)


reviews_sorted = reviews.sort_values(by='sentiment', ascending=True)
reviews_sorted[['reviewText', 'sentiment','overall']]
```

	reviewText	sentiment	overall
94	Holes are so small for the bracelet Disappointed	-0.500000	1
25	Beware it comes with a pentagram! Not happy wi...	-0.500000	1
79	Was disappointed as about half of the color ch...	-0.458333	1
54	I have only used these charms for about 3 days...	-0.408333	1
26	I made friendship bracelets with my friends an...	-0.400000	1
...	...	...	...
71	They are beautiful!! Great quality, perfect fo...	0.933333	5
184	Awesome! Made the birthday party. The kids lov...	0.937500	5
46	soo cute 10/10!!!!	1.000000	5
188	Perfect for my granddaughter	1.000000	5
226	Came with a great selection of charms that I u...	1.000000	5

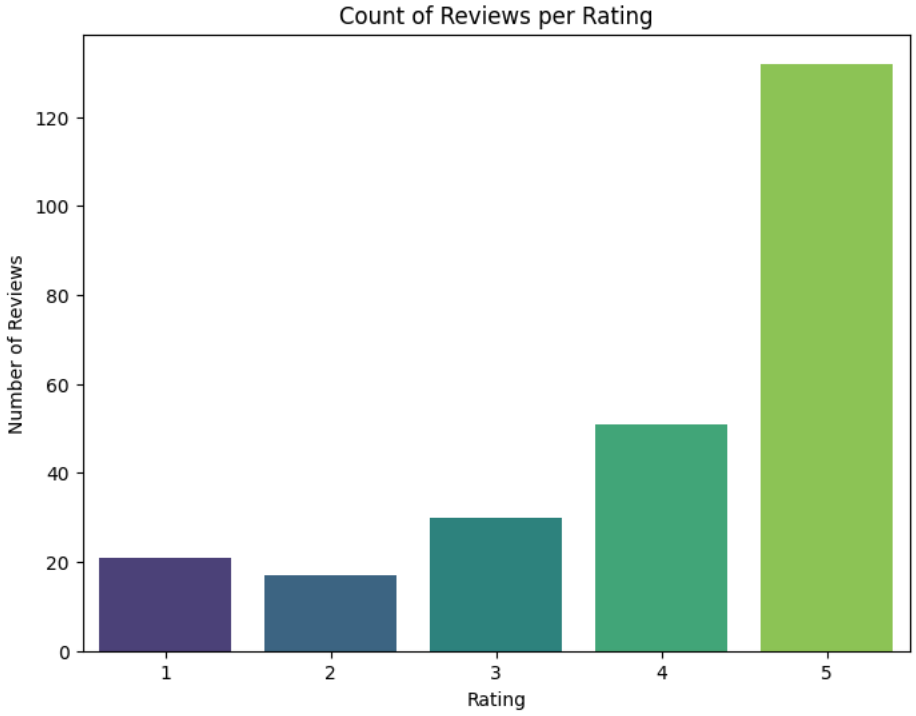
251 rows × 3 columns

```
# 4. Visualization
sns.boxplot(data=reviews, x='overall', y='sentiment')
plt.title('Sentiment Score by Star Rating')
plt.xlabel('Star Rating')
plt.ylabel('Sentiment Polarity')
plt.show()
```




```
plt.figure(figsize=(8, 6))
sns.countplot(data=reviews, x='overall', palette='viridis')
plt.title('Count of Reviews per Rating')
plt.xlabel('Rating')
plt.ylabel('Number of Reviews')
plt.show()
```

```
/tmp/ipython-input-1032568786.py:2: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=

  sns.countplot(data=reviews, x='overall', palette='viridis')
```




```
# 5. Topic Modeling
from nltk.tokenize import word_tokenize
stop_words = set(stopwords.words('english'))

def preprocess(text):
    tokens = word_tokenize(str(text).lower())
    return [w for w in tokens if w.isalpha() and w not in stop_words and len(w) > 2]

reviews['tokens'] = reviews['reviewText'].apply(preprocess)


reviews
```

	reviewText	overall	sentiment	tokens
0	Love this assortment. Usually when i order I'l...	5	0.466667	[love, assortment, usually, order, get, good, ...
1	They don't feel cheep	5	0.000000	[feel, cheep]
2	I was excited to receive this 200-piece charm ...	5	0.305853	[excited, receive, charm, lot, overall, happy,...
3	So cute, used it to make some lip balm charms....	5	0.500000	[cute, used, make, lip, balm, charms, gives, b...
4	Very disappointed that half the colored charms...	3	0.174750	[disappointed, half, colored, charms, christma...
...	...	...	...	...
246	There is a great assortment of beads. They mak...	5	0.750000	[great, assortment, beads, make, good, earring...
247	These charms were perfect for jewelry making! ...	5	0.687500	[charms, perfect, jewelry, making, worked, wel...
248	I liked they are good weight , nice colors and...	5	0.675000	[liked, good, weight, nice, colors, great, sel...
249	I am so happy with my purchase! Above and beyo...	5	0.252778	[happy, purchase, beyond, expectations, charms...
250	I bought these for a craft night to make charm...	5	0.500000	[bought, craft, night, make, charm, bracelets,...

251 rows × 4 columns

```
dictionary = corpora.Dictionary(reviews['tokens'])
corpus = [dictionary.doc2bow(text) for text in reviews['tokens']]
lda_model = models.LdaModel(corpus, num_topics=3, id2word=dictionary, passes=20)
lda_model.show_topics()
```

```
[(0,
  '0.059*"charms" + 0.020*"cute" + 0.013*"good" + 0.013*"get" + 0.011*"make" + 0.011*"quality" + 0.011*"variety" + 0.011*"christmas" +
0.010*"lot" + 0.008*"bracelets"'),
 (1,
  '0.035*"cute" + 0.028*"charms" + 0.018*"good" + 0.015*"perfect" + 0.014*"super" + 0.013*"great" + 0.011*"bought" + 0.011*"loved" +
0.010*"love" + 0.010*"tarnish"'),
 (2,
```

```
  '0.043*"charms" + 0.022*"great" + 0.018*"variety" + 0.015*"love" + 0.014*"quality" + 0.011*"good" + 0.011*"making" + 0.011*"nice" +
0.010*"cute" + 0.010*"used"')]
```

```
dictionary = corpora.Dictionary(reviews['tokens'])
corpus = [dictionary.doc2bow(text) for text in reviews['tokens']]
lda_model = models.LdaModel(corpus, num_topics=2, id2word=dictionary, passes=20)
lda_model.print_topics()
```

```
[(0,
  '0.014*"cute" + 0.013*"charms" + 0.010*"super" + 0.010*"one" + 0.009*"quality" + 0.009*"like" + 0.008*"product" + 0.008*"much" +
0.008*"great" + 0.008*"made"'),
 (1,
  '0.061*"charms" + 0.023*"cute" + 0.020*"good" + 0.017*"variety" + 0.017*"great" + 0.012*"bracelets" + 0.011*"love" + 0.010*"quality" +
0.010*"making" + 0.009*"make"')]
```

Filter for <=3 ratings

```
negative_reviews = reviews[reviews['overall'] <= 3]
negative_reviews['tokens'] = negative_reviews['reviewText'].apply(preprocess)
```

```
/tmp/ipython-input-2551902449.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  negative_reviews['tokens'] = negative_reviews['reviewText'].apply(preprocess)
```

```
dictionary = corpora.Dictionary(negative_reviews['tokens'])
corpus = [dictionary.doc2bow(text) for text in negative_reviews['tokens']]
lda_model = models.LdaModel(corpus, num_topics=3, id2word=dictionary, passes=20)
lda_model.print_topics()
```

```
[(0,
  '0.033*"charms" + 0.013*"product" + 0.011*"received" + 0.011*"one" + 0.011*"like" + 0.011*"made" + 0.009*"half" + 0.009*"muy" +
0.009*"quality" + 0.008*"feel"'),
 (1,
  '0.031*"charms" + 0.020*"get" + 0.018*"cute" + 0.015*"ones" + 0.015*"really" + 0.012*"quality" + 0.012*"lot" + 0.012*"use" +
0.012*"match" + 0.012*"tarnished"'),
 (2,
  '0.079*"charms" + 0.026*"cute" + 0.026*"christmas" + 0.015*"ones" + 0.013*"disappointed" + 0.013*"picture" + 0.011*"good" +
0.011*"super" + 0.011*"pack" + 0.010*"get"')]
```

Adding common phrases

```
from gensim.models import Phrases
bigram = Phrases(reviews['tokens'], min_count=3, threshold=5)
bigram_mod = Phrases(bigram[reviews['tokens']])
reviews['tokens'] = [bigram[doc] for doc in reviews['tokens']]
```

```
reviews
```

	reviewText	overall	sentiment	tokens
0	Love this assortment. Usually when i order I'l...	5	0.466667	[love, assortment, usually, order, get, good, ...
1	They don't feel cheep	5	0.000000	[feel, cheep]
2	I was excited to receive this 200-piece charm ...	5	0.305853	[excited, receive, charm, lot, overall, happy,...
3	So cute, used it to make some lip balm charms....	5	0.500000	[cute, used, make, lip, balm, charms, gives, b...
4	Very disappointed that half the colored charms...	3	0.174750	[disappointed, half, colored_charms, christmas...
...	...	...	...	...
246	There is a great assortment of beads. They mak...	5	0.750000	[great, assortment, beads, make, good, earring...
247	These charms were perfect for jewelry making! ...	5	0.687500	[charms, perfect, jewelry_making, worked, well...
248	I liked they are good weight , nice colors and...	5	0.675000	[liked, good, weight, nice, colors, great_sele...
249	I am so happy with my purchase! Above and beyo...	5	0.252778	[happy_purchase, beyond, expectations, charms,...
250	I bought these for a craft night to make charm...	5	0.500000	[bought, craft_night, make_charm, bracelets, g...

251 rows × 4 columns

```
dictionary = corpora.Dictionary(reviews['tokens'])
corpus = [dictionary.doc2bow(text) for text in reviews['tokens']]
```

```
lda_model = models.LdaModel(corpus, num_topics=3, id2word=dictionary, passes=20)
lda_model.print_topics()
```

```
[(0,
  '0.044*"charms" + 0.017*"cute" + 0.014*"love" + 0.014*"get" + 0.013*"great" + 0.013*"color" + 0.011*"use" + 0.010*"nice" + 0.010*"good"
+ 0.009*"one"'),
 (1,
  '0.051*"charms" + 0.022*"cute" + 0.013*"many" + 0.013*"really" + 0.009*"lot" + 0.009*"ones" + 0.008*"great" + 0.008*"super_cute" +
0.008*"bracelets" + 0.008*"good"'),
 (2,
  '0.022*"variety" + 0.021*"charms" + 0.017*"quality" + 0.008*"price" + 0.008*"bracelets" + 0.008*"expected" + 0.007*"set" + 0.007*"fun"
+ 0.007*"different" + 0.007*"looking"')]
```

```
negative_reviews = reviews[reviews['overall'] <= 3]
negative_reviews['tokens'] = negative_reviews['reviewText'].apply(preprocess)
dictionary = corpora.Dictionary(negative_reviews['tokens'])
corpus = [dictionary.doc2bow(text) for text in negative_reviews['tokens']]
lda_model = models.LdaModel(corpus, num_topics=3, id2word=dictionary, passes=20)
lda_model.print_topics()
```

```
/tmp/ipython-input-1734944771.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  negative_reviews['tokens'] = negative_reviews['reviewText'].apply(preprocess)
[(0,
  '0.029*"charms" + 0.015*"product" + 0.012*"quality" + 0.012*"one" + 0.010*"picture" + 0.009*"like" + 0.009*"really" + 0.009*"received"
+ 0.009*"get" + 0.009*"made"'),
 (1,
  '0.021*"cute" + 0.015*"muy" + 0.014*"get" + 0.014*"super" + 0.014*"tarnished" + 0.014*"really" + 0.011*"ones" + 0.011*"use" +
0.011*"quality" + 0.011*"son"'),
 (2,
  '0.087*"charms" + 0.022*"christmas" + 0.019*"cute" + 0.014*"ones" + 0.013*"get" + 0.012*"good" + 0.011*"many" + 0.011*"disappointed" +
0.011*"buy" + 0.011*"pack"')]
```

```
from wordcloud import WordCloud

text = " ".join(reviews['reviewText'])
wordcloud = WordCloud(width=800, height=400, background_color='white').generate(text)

plt.figure(figsize=(10,5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.show()
```

Trying facebook model

```
!pip install transformers
```

```
Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.54.0)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from transformers) (3.18.0)
Requirement already satisfied: huggingface-hub<1.0,>=0.34.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.34.1)
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (1.26.4)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (25.0)
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.11/dist-packages (from transformers) (6.0.2)
Requirement already satisfied: regex!=2019.12.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (2024.11.6)
Requirement already satisfied: requests in /usr/local/lib/python3.11/dist-packages (from transformers) (2.32.3)
Requirement already satisfied: tokenizers<0.22,>=0.21 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.21.2)
```

```
Requirement already satisfied: safetensors>=0.4.3 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.5.3)
Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.11/dist-packages (from transformers) (4.67.1)
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.34.0->transforme
Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.34.0->
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.34.0->transf
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (3.4.2)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (2.5.0)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests->transformers) (2025.7.14)
```

```
from transformers import pipeline

# Load the zero-shot classification pipeline
classifier = pipeline("zero-shot-classification", model="facebook/bart-large-mnli")
```

```
/usr/local/lib/python3.11/dist-packages/huggingface_hub/utils/_auth.py:94: UserWarning:
The secret `HF_TOKEN` does not exist in your Colab secrets.
To authenticate with the Hugging Face Hub, create a token in your settings tab (https://huggingface.co/settings/tokens), set it as secret
You will be able to reuse this secret in all of your notebooks.
Please note that authentication is recommended but still optional to access public models or datasets.
  warnings.warn(
config.json:        1.15k/? [00:00<00:00, 34.8kB/s]
model.safetensors: 100%                                                 1.63G/1.63G [00:59<00:00, 27.8MB/s]
tokenizer_config.json: 100%                                               26.0/26.0 [00:00<00:00, 1.03kB/s]
vocab.json:         899k/? [00:00<00:00, 12.8MB/s]
merges.txt:         456k/? [00:00<00:00, 20.5MB/s]
tokenizer.json:         1.36M/? [00:00<00:00, 31.4MB/s]
Device set to use cpu
```

```
candidate_labels = [
    "high quality",
    "poor quality",
    "cute design",
    "great variety",
    "broken or damaged",
    "good value",
    "not worth the price",
    "colorful assortment",
    "perfect for gifts",
    "disappointed with size",
    "good for jewelry making",
    "missing items",
    "child-friendly",
    "easy to use"
]
```

```
review = "The charms are beautiful but a few arrived broken."

result = classifier(review, candidate_labels, multi_label=False)

print("Predicted label:", result['labels'][0])
print("Confidence:", result['scores'][0])
```

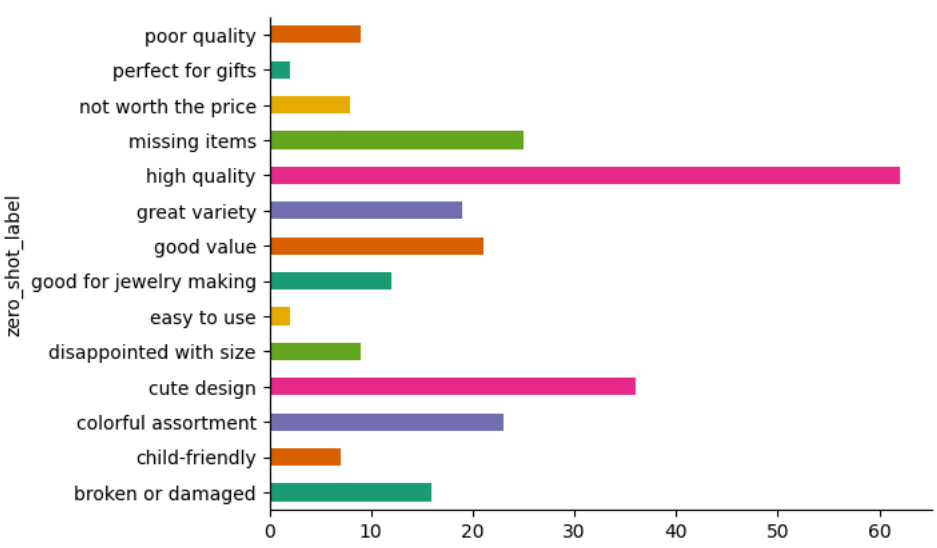
```
Predicted label: broken or damaged
Confidence: 0.3969348967075348
```

```
reviews['zero_shot_label'] = reviews['reviewText'].apply(
    lambda x: classifier(str(x), candidate_labels, multi_label=False)['labels'][0]
)
```

```
reviews
```

	reviewText	overall	sentiment	tokens	zero_shot_label
0	Love this assortment. Usually when i order I'l...	5	0.466667	[love, assortment, usually, order, get, good, ...	colorful assortment
1	They don't feel cheep	5	0.000000	[feel, cheep]	high quality
2	I was excited to receive this 200-piece charm ...	5	0.305853	[excited, receive, charm, lot, overall, happy,...	good value
3	So cute, used it to make some lip balm charms....	5	0.500000	[cute, used, make, lip, balm, charms, gives, b...	cute design

```
from matplotlib import pyplot as plt
import seaborn as sns
reviews.groupby('zero_shot_label').size().plot(kind='barh', color=sns.palettes.mpl_palette('Dark2'))
plt.gca().spines[['top', 'right',]].set_visible(False)
```



				.making, worked, well...	good for jewelry making
				ce, colors, great_sele...	high quality
				expectations, charms,...	high quality
				e_charm, bracelets, g...	high quality

```
reviews[reviews['zero_shot_label'] == 'high quality']
```

	reviewText	overall	sentiment	tokens	zero_shot_label