

P407 -Sentiment Analysis

TEAM 3

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OBJECTIVE

Perform sentiment analysis on the review dataset and deploy an app for the same



Streamlit

WEEK 1-EDA

Shape:(325, 3)

Columns:headline,reviewBody,ratingValue

Data types:

headline object
reviewBody object
ratingValue float64

Missing values:

headline 0
reviewBody 0
ratingValue 6

```
df.head()
```

	headline	reviewBody	ratingValue
0	Super light and efficient laptop	Super light and efficient laptop. Crisp & cle...	5.0
1	NEW laptop is great	so far I am loving the new look and the feel o...	5.0
2	Lightweight powerhouse.	Great build quality \ excellent screen \ very ...	5.0
3	Great Laptop for Work	Excellent laptop for work. Processor was able ...	5.0
4	Practical Solid Laptop	So far so good, I like it has an HDMI, USB-C &...	5.0

EDA

Summary statistics for headline
lengths:

count	325.000000
mean	27.747692
std	23.087415
min	2.000000
25%	13.000000
50%	22.000000
75%	33.000000
max	214.000000

Summary statistics for reviewBody
lengths:

count	325.000000
mean	193.615385
std	285.915343
min	23.000000
25%	54.000000
50%	104.000000
75%	214.000000
max	2354.000000

No of duplicates:19

```
def clean_text(text):  
    text = text.lower()  
    text = text.translate(str.maketrans('', '', string.punctuation))  
    text = text.replace('\d+', '')  
    stop_words = set(stopwords.words('english'))  
    text = ' '.join([word for word in text.split() if word.isalpha() and word not in stop_words])  
    return text
```

EDA

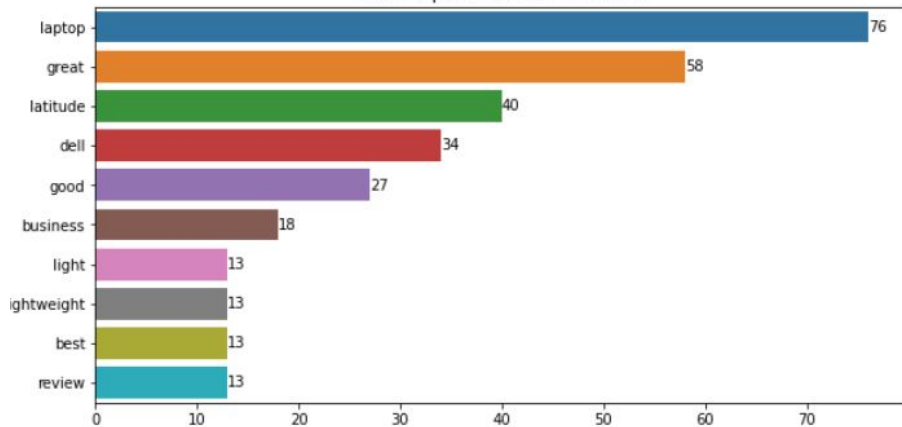
```
df.head()
```

	headline	reviewBody	ratingValue	headline_length	reviewBody_length	cleaned_reviewBody	cleaned_headline
0	Super light and efficient laptop	Super light and efficient laptop. Crisp & cle...	5.0	32	118	super light efficient laptop crisp clean scree...	super light efficient laptop
1	NEW laptop is great	so far I am loving the new look and the feel o...	5.0	19	62	far loving new look feel new laptop	new laptop great
2	Lightweight powerhouse.	Great build quality \ excellent screen \ very ...	5.0	23	232	great build quality excellent screen good port...	lightweight powerhouse
3	Great Laptop for Work	Excellent laptop for work. Processor was able ...	5.0	21	98	excellent laptop work processor able handle wo...	great laptop work
4	Practical Solid Laptop	So far so good, I like it has an HDMI, USB-C &...	5.0	22	258	far good like hdmi usbpc ports instead usbpc por...	practical solid laptop

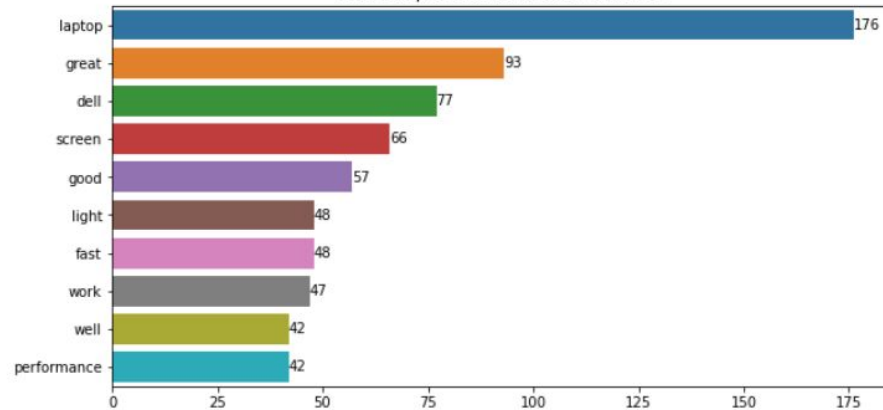
EDA

Most Frequent Words

Most Frequent Words in Headlines



Most Frequent Words in Review Bodies

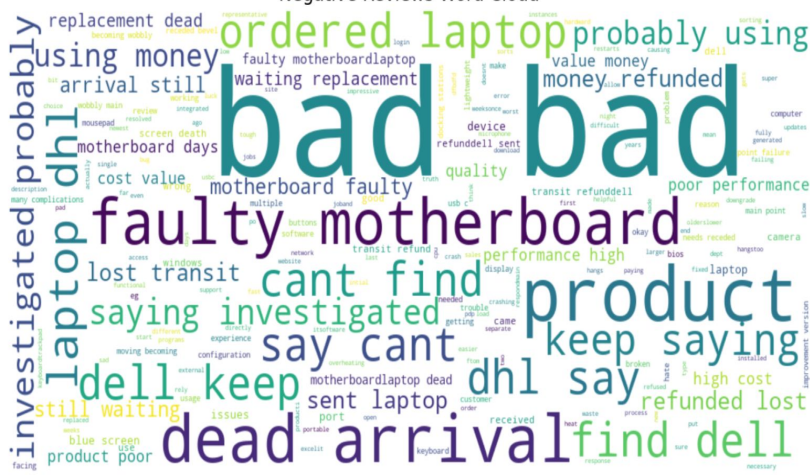


EDA

Positive Reviews Word Cloud

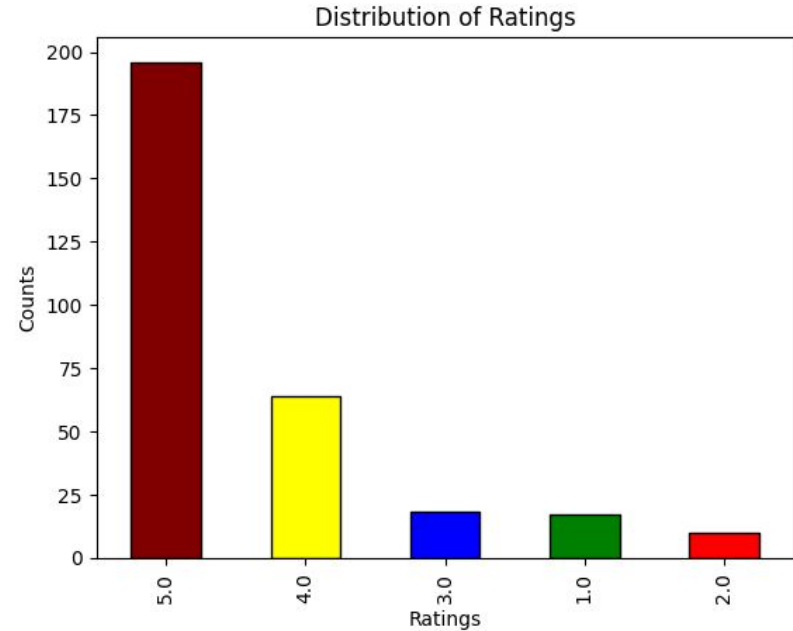


Negative Reviews Word Cloud

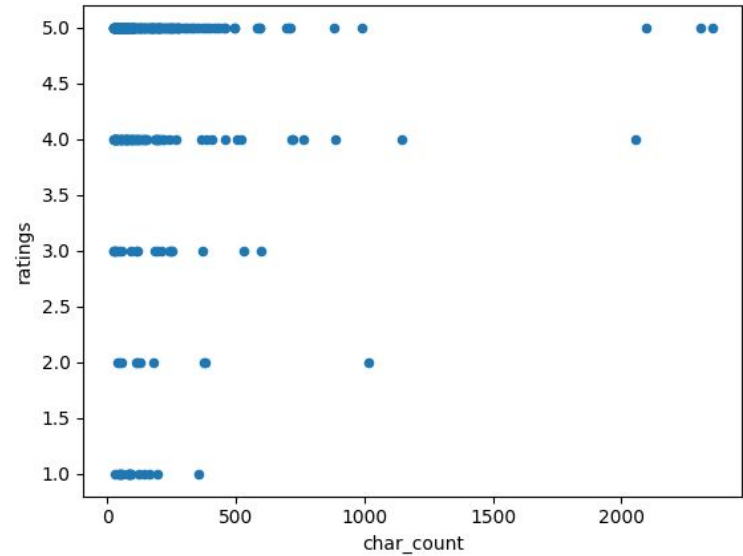
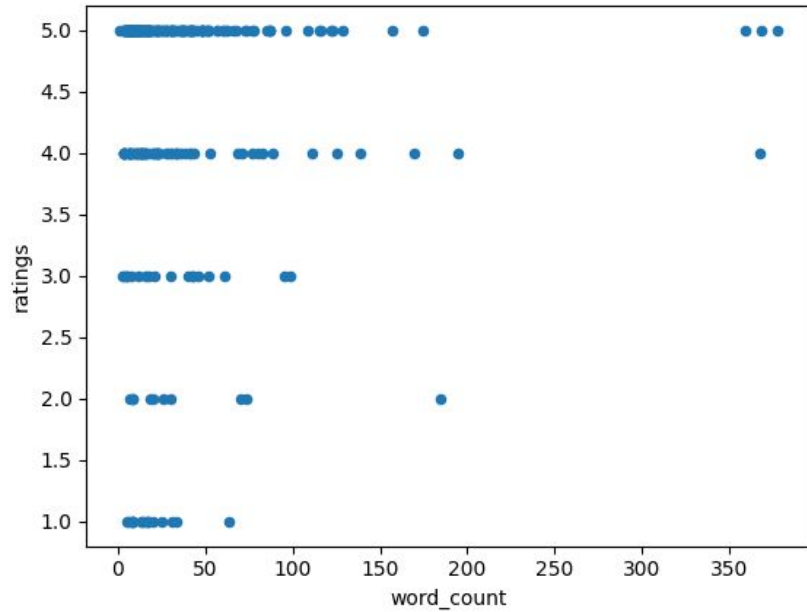


EDA

- From the above distribution plot we can see that people rated 5 for most of the reviews , followed by the rating of 4.
- A good no of reviews are on the positive side

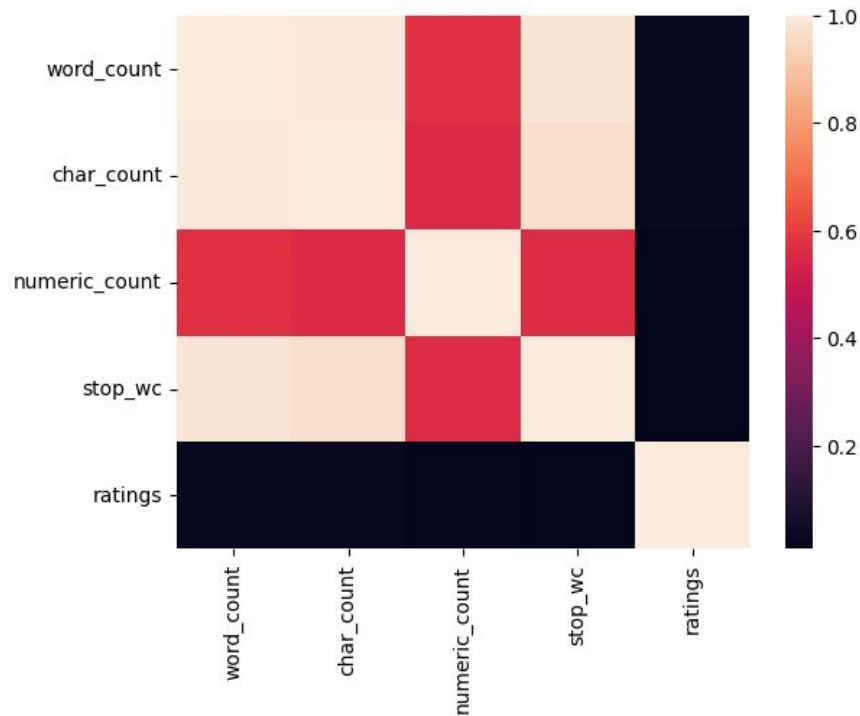


EDA



EDA

- From the above heatmap we can conclude that there is no significant correlation between the word count or review length and the ratings by the customers. The number of stop words increases as the word or char counts of the review increases



EDA

Review Analysis

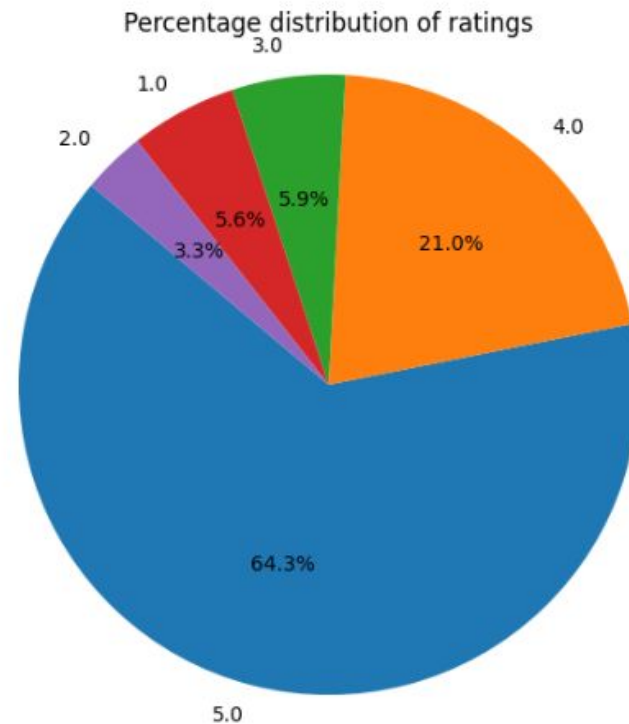
Cost/Price:10

Physical features:207

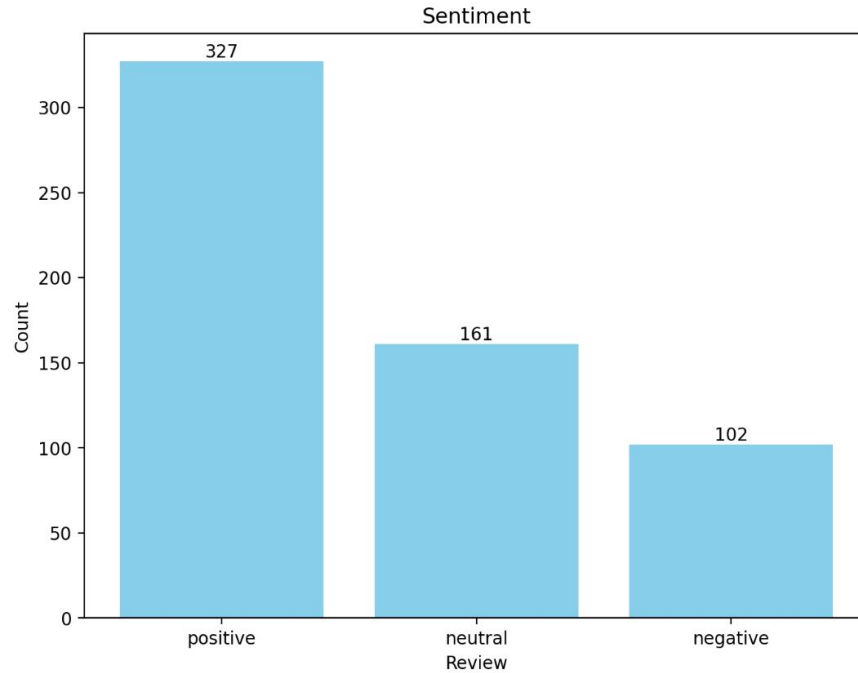
Performance:236

Note

Using regular expression



EDA



Based on Polarity score

Model

```
# LSTM model
model3 = Sequential()
model3.add(Embedding(input_dim=1779, output_dim=50, input_length=100))
model3.add(SpatialDropout1D(0.2))
model3.add(LSTM(100, dropout=0.2, recurrent_dropout=0.2, kernel_regularizer=l2(0.02)))
model3.add(Dense(3, activation='softmax', kernel_regularizer=l2(0.02)))
```

	precision	recall	f1-score	support
negative	1.00	1.00	1.00	51
neutral	0.96	1.00	0.98	52
positive	1.00	0.96	0.98	50
accuracy			0.99	153
macro avg	0.99	0.99	0.99	153
weighted avg	0.99	0.99	0.99	153

Deployment

Raw data

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

product_db

Tables

reviews

Columns

Indexes

Foreign Keys

Triggers

transformed_reviews

Views

Stored Procedures

Functions

sys

Query 1 transformed_reviews reviews reviews transformed_reviews reviews x

1 • SELECT * FROM product_db.reviews;

Result Grid

headline	review_body	rating
Super light and efficient laptop	Super light and efficient laptop. Crisp & clean s...	5
NEW laptop is great	so far I am loving the new look and the feel of t...	5
Lightweight powerhouse.	Great build quality \ excellent screen \ very goo...	5
Great Laptop for Work	Excellent laptop for work. Processor was able t...	5
Practical Solid Laptop	So far so good, I like it has an HDMI, USB-C & A...	5
Good Choice	Very light weight and like the touch of the keyb...	5
Like the laptop	Really like the laptop, it is light and fast.	5
A great, portable laptop.	An excellent all-around package. A great size, n...	5
Feels like QUALITY! fast!	Feels like quality! The construction is phenomen...	5
The Best Laptop!	Upgraded from Latitude 5440 which was 5 year...	5
Amazing laptop!	This laptop is amazing. It's lightweight, powerfu...	5
Performance and Quality	the Dell Latitude 7440 XCTO is a strong contend...	5
Latitude 7440 Laptop or 2-in-1	Excellent quality as expected.	5
Nice and light yet powerful	This has everything you need to run your busin...	5
Really impressed with perform...	High performance, light weight and built for pro...	5
Great Business Laptop that ju...	It's a sleek laptop with a beautiful dark gray-silv...	5
Latitude 7440 Laptop	Love this unit, very lightweight and functional	5
Performance and Overall Quality	The Dell Latitude 7440 is a high-performing lap...	5
New 7440	Lightweight and portable with good battery exp...	5
Latitude 7440 GTX is Awesome!	Very pleasant and smooth to work with this mac...	5
Great!	Great performance and excellent display!	5

reviews 1 x

Administration Schemas

Information

Table: reviews

Columns:

headline text

review_body text

rating int

Transformed data

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

product_db

Tables

reviews

transformed_reviews

Views

Stored Procedures

Functions

sys

Query 1 transformed_reviews reviews reviews reviews transformed_reviews x

1 • SELECT * FROM product_db.transformed_reviews;

Result Grid

headline	review_body	rating	cleaned_headline	cleaned_reviewBody	Combined_reviews
Super light and efficient laptop	Super light and efficient laptop. Crisp & clean s...	5	super light efficient laptop	super light efficient laptop crisp clean screen ea...	super light efficient laptop i
NEW laptop is great	so far I am loving the new look and the feel of t...	5	new laptop great	far loving new look feel new laptop	far loving new look feel new
Lightweight powerhouse.	Great build quality \ excellent screen \ very goo...	5	lightweight powerhouse	great build quality excellent screen good port o...	great build quality excellent
Great Laptop for Work	Excellent laptop for work. Processor was able t...	5	great laptop work	excellent laptop work processor able handle wo...	excellent laptop work proc
Practical Solid Laptop	So far so good, I like it has an HDMI, USB-C & A...	5	practical solid laptop	far good like hdm usb ports instead usb ports...	far good like hdm usb port
Good Choice	Very light weight and like the touch of the keyb...	5	good choice	light weight like touch keyboard	light weight like touch keybo
Like the laptop	Really like the laptop, it is light and fast.	5	like laptop	really like laptop light fast	really like laptop light fast
A great, portable laptop.	An excellent all-around package. A great size, n...	5	great portable laptop	excellent allaround package great size nice desi...	excellent allaround package
Feels like QUALITY! fast!	Feels like quality! The construction is phenomen...	5	feels like quality fast	feels like quality construction phenomenal alumi...	feels like quality construct
The Best Laptop!	Upgraded from Latitude 5440 which was 5 year...	5	best laptop	upgraded latitude years old loved light weight s...	upgraded latitude years olc
Amazing laptop!	This laptop is amazing. It's lightweight, powerfu...	5	amazing laptop	laptop amazing lightweight powerful easy carry ...	laptop amazing lightweight
Performance and Quality	the Dell Latitude 7440 XCTO is a strong contend...	5	performance quality	dell latitude xcto strong contender business lap...	dell latitude xcto strong cor
Latitude 7440 Laptop or 2-in-1	Excellent quality as expected.	5	latitude laptop	excellent quality expected	excellent quality expected l
Nice and light yet powerful	This has everything you need to run your busin...	5	nice light yet powerful	everything need run business pc nice video qual...	everything need run busine
Really impressed with perform...	High performance, light weight and built for pro...	5	really impressed perform...	high performance light weight built productivity	high performance light weig
Great Business Laptop that ju...	It's a sleek laptop with a beautiful dark gray-silv...	5	great business laptop del...	sleek laptop beautiful dark gray/silver finish runs...	sleek laptop beautiful dark
Latitude 7440 Laptop	Love this unit, very lightweight and functional	5	latitude laptop	love unit lightweight functional	love unit lightweight func
Performance and Overall Quality	The Dell Latitude 7440 is a high-performing lap...	5	performance overall quality	dell latitude highperforming laptop fast boot tim...	dell latitude highperforming
New 7440	Lightweight and portable with good battery exp...	5	new	lightweight portable good battery experience ma...	lightweight portable good b
Latitude 7440 GTX is Awesome!	Very pleasant and smooth to work with this mac...	5	latitude btx awesome	pleasant smooth work machine really value money	pleasant smooth work mad

transformed_reviews 1 x

Administration Schemas

Information

Table: transformed_reviews

Columns:

headline text

review_body text

rating int

cleaned_headline text

cleaned_reviewBody text

Combined_reviews text

Deployment

×

Navigation

Select a page:

Product reviews ▾

Product reviews

■

Headline

Review Body

Rating

1 ▾

Predict Sentiment

Deploy ⋮

Dashboard

Select a page:

Dashboard

Total number of reviews: 590

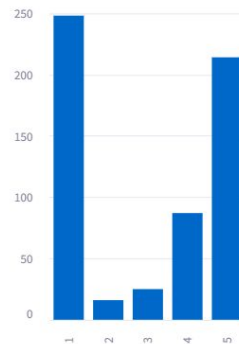
Positive Review Word Cloud



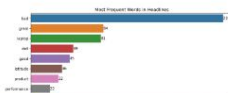
Negative Review Word Cloud



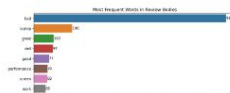
Rating



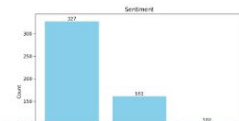
Most Frequent Words in Headlines



Most Frequent Words in Review Bodies



Sentiment



Challenges

- Imbalance data
- Less amount of data
- Data storage and connection

Thank you.