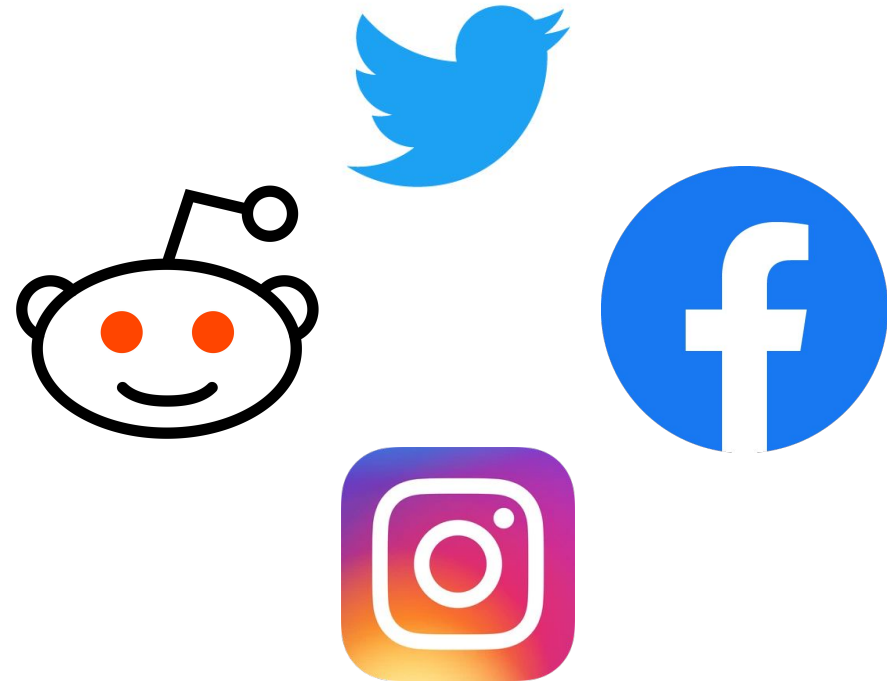




# Hilton Hotel Review Classifier

Ahilan Srivishnumohan

# Look Further



- In the modern day, public discussion and critiquing of products and services occurs beyond dedicated mediums, and now also takes place in the realm of social media, too.
- Understand the general public's perception of our hotel.
- Use sentiment analysis.

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# Tripadvisor

The image shows a screenshot of a Tripadvisor review for London Gatwick Airport. The review is titled "Awful..." and has a score of 1 out of 5 stars. The review text is as follows:

Review Score: 1 out of 5 stars (1 green star, 4 empty stars)

Review Summary: "Its hard to find words that can describe this experience without being too dismissive so i'll keep it short."

Pros:

- Check experience was fine.... The checkin clerk was funny and helpful, and had a lovely manner with the guests. Very efficient.
- Location... Very well set for access to Gatwick airport, with a short walk to the terminal for your flights.

Cons:

- Food... the hotel not only was packed full and the restaurants were full, but the food itself was incredibly poor and expensive. We did the buffet... on the evening.... barely anything was truly good tasting.....

AVOID

- Comfort... Hiltons of late seem to be less and less comfortable, the rooms stark... and without any character. Not the cleanest of rooms either.
- its a big hotel.... everywhere is a lengthy walk and its just all a bit 'run down'

Poor food, not the best night sleep, expensive for what it is, tired and in need of significant change.

AVOID!"

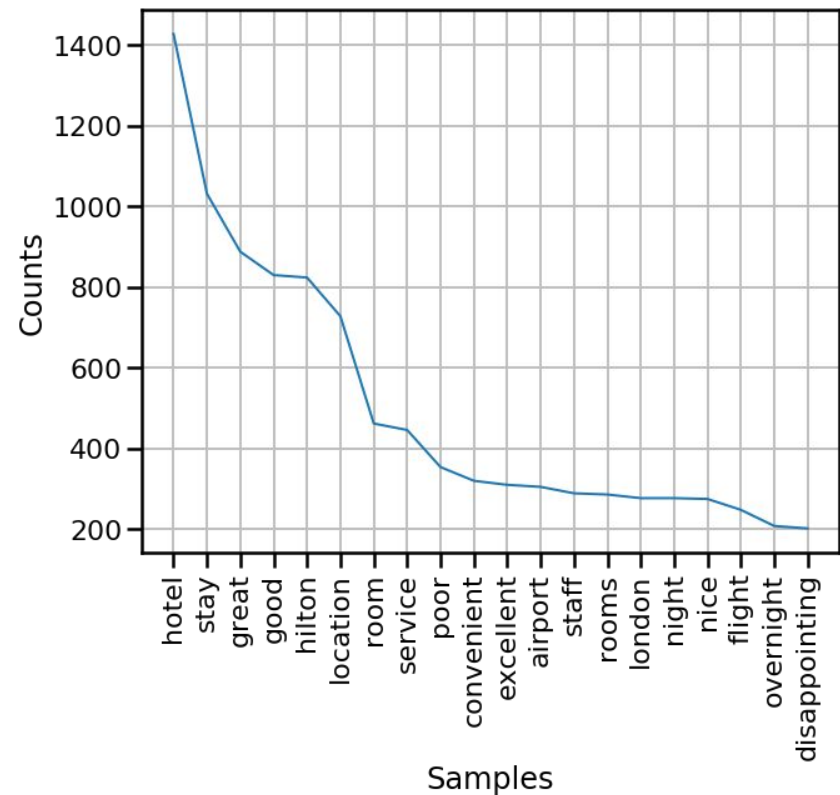
Annotations:

- An arrow points from "Review Score" to the star rating.
- An arrow points from "Review Summary" to the title "Awful...".
- An arrow points from "Review" to the "AVOID!" text.

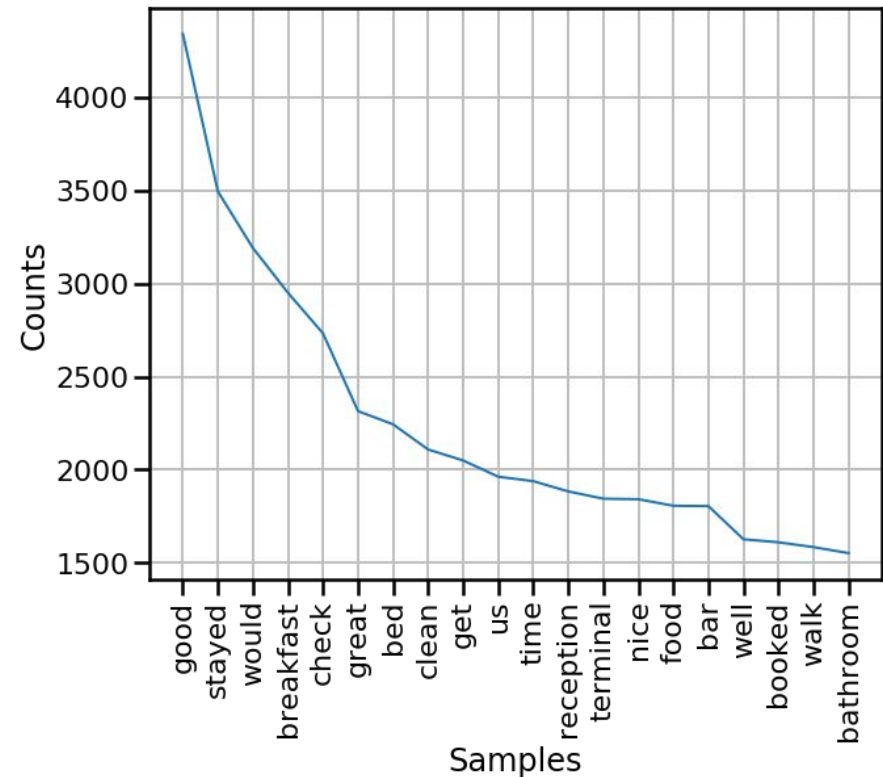
- London Gatwick Airport
- London Metropole
- London Euston
- London Croydon,
- London - West End

**9405 reviews**

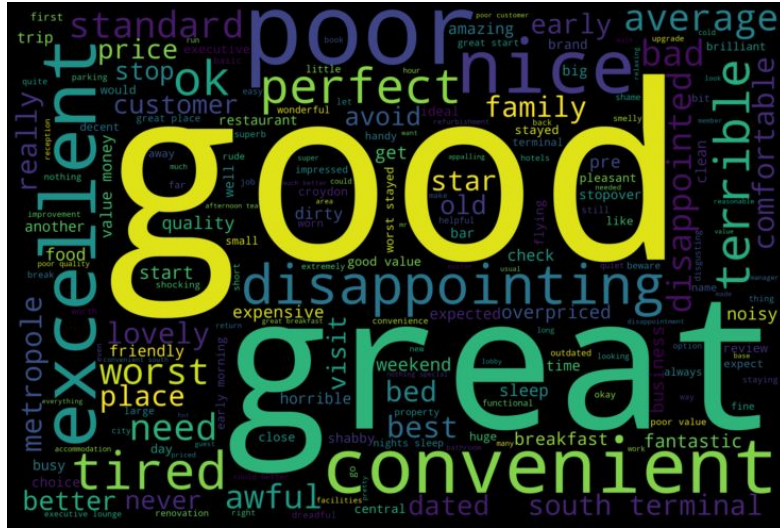
Review Summary Word Frequency



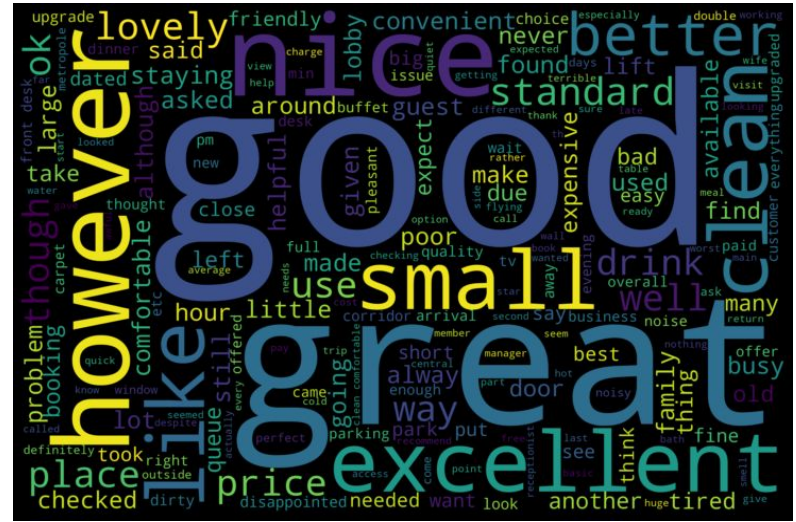
Review Word Frequency



# Review Summary Word Cloud



# Review Word Cloud



# Preprocessing

## ORIGINAL REVIEW SUMMARY:

So disappointing

## ORIGINAL REVIEW:

Spent four nights here for a work event so in essence I didn't pay, work did. Nonetheless I felt if I was short changed. Don't expect a "Hilton" quality or service. This hotel is on a corner of a busy street which is hell if you're in an adjacent room. 1st room in the east wing fourth floor was awful. Very tired, cheap mattress, and facing the main road. It was a noisy and uncomfortable night. I asked to change rooms and was told I would need to pack and bring my belongings to reception. They could have moved this for me!! Second room was a newer styled room but the cost saving was still apparent. Cheap mattress, cracked sink, holes in the wall and no hair dryer. This is not a high quality Hilton. Lesser prestigious hotels are providing better service with a higher quality.

## STEMMED REVIEW SUMMARY:

So disappoint

## STEMMED REVIEW:

spent four night here for a work event so in essence I didn't pay, work did. nonetheless I felt if I was short changed. don't expect a "hilton" quality or service. this hotel is on a corner of a busy street which is hell if you're in an adjacent room. 1st room in the east wing fourth floor was awful. very tired, cheap mattress, and face the main road. it was a noisy and uncomfortable night. I ask to change room and was told I would need to pack and bring my belongings to reception. they could have moved this for me!! second room was a newer style room but the cost saving was still apparent. cheap mattress, crack sink, hole in the wall and no hair dryer. this is not a high quality hilton. lesser prestigious hotel are providing better service with a higher quality.

## LEMMA REVIEW SUMMARY:

So disappoint

## LEMMA REVIEW:

Spent four nights here for a work event so in essence I didn't pay, work did. Nonetheless I felt if I was short changed. Don't expect a "Hilton" quality or service. This hotel is on a corner of a busy street which is hell if you're in an adjacent room. 1st room in the east wing fourth floor was awful. Very tired, cheap mattress, and face the main road. It was a noisy and uncomfortable night. I asked to change room and was told I would need to pack and bring my belongings to reception. They could have moved this for me!! Second room was a newer style room but the cost saving was still apparent. Cheap mattress, cracked sink, hole in the wall and no hair dryer. This is not a high quality Hilton. Lesser prestigious hotels are providing good service with a high quality.

139 words and phrases

(115 from reviews and 24 from review summaries)

# Optimizing for Accuracy

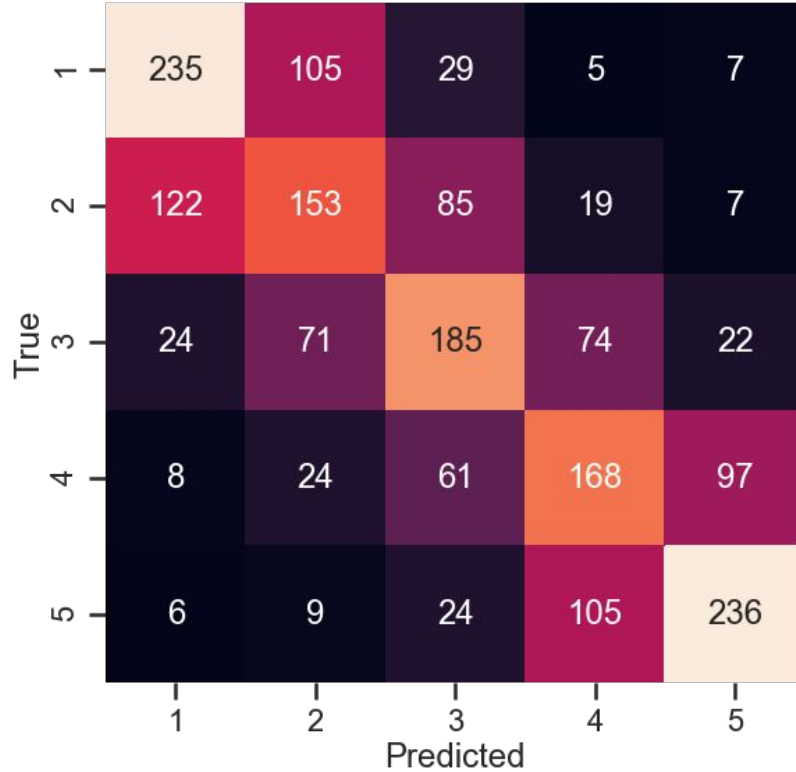
Model Name	Train Accuracy	Validation Accuracy	Accuracy Difference
Decision Tree	0.432926	0.353535	0.079390
Random Forest	0.647351	0.457735	0.189615
Logistic Regression	0.562112	0.509304	0.052809
SVM	0.559986	0.511430	0.048556
Naïve Bayes	0.372142	0.387028	-0.014886
KNN	0.507000	0.501329	0.005671
AdaBoost	0.513734	0.503987	0.009747
XGBoost	0.853624	0.484848	0.368775
Voting	0.557859	0.515683	0.042176
Stacking	0.554670	0.519405	0.035265

We want:

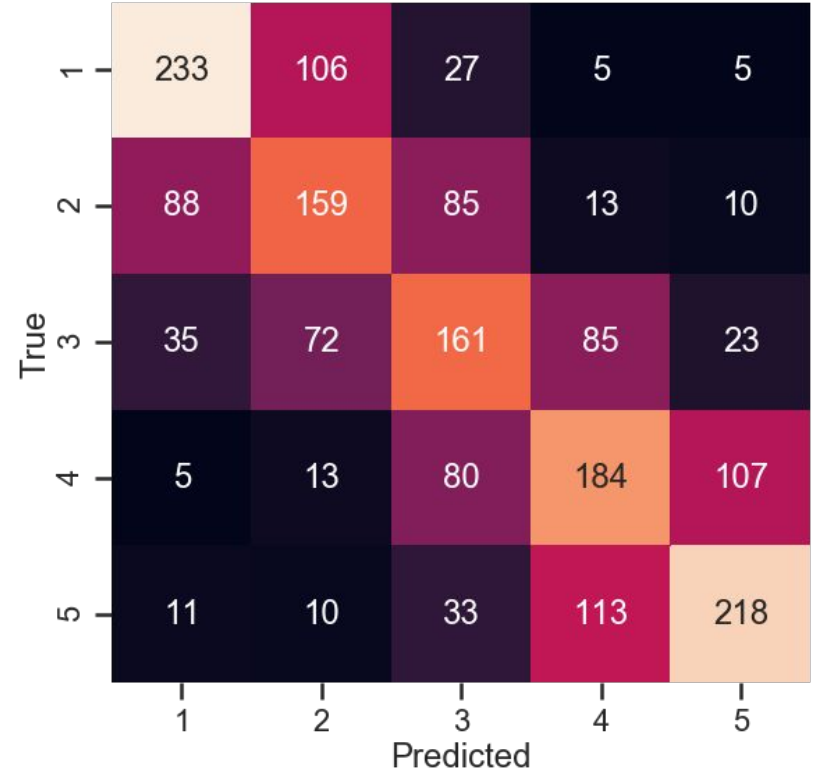
- Reusability = Low Accuracy Difference
- Consistency = High Validation Accuracy
- Performance = High Training Accuracy



## Validation Confusion Matrix



## Test Confusion Matrix





# Deployability?

- most errors were near misses (e.g. 5 predicted as 4)
- extreme scores (1 and 5) were relatively accurate
- comparable to human prediction
- reusable and consistent



```
graph LR; A[Input Layer] --> B[Embedding Layer]; B --> C[Global Average 1D Pooling Layer]; C --> D[Dense Hidden Layer]; D --> E[Dense Output Layer];
```

**Input Layer**

**Embedding  
Layer**

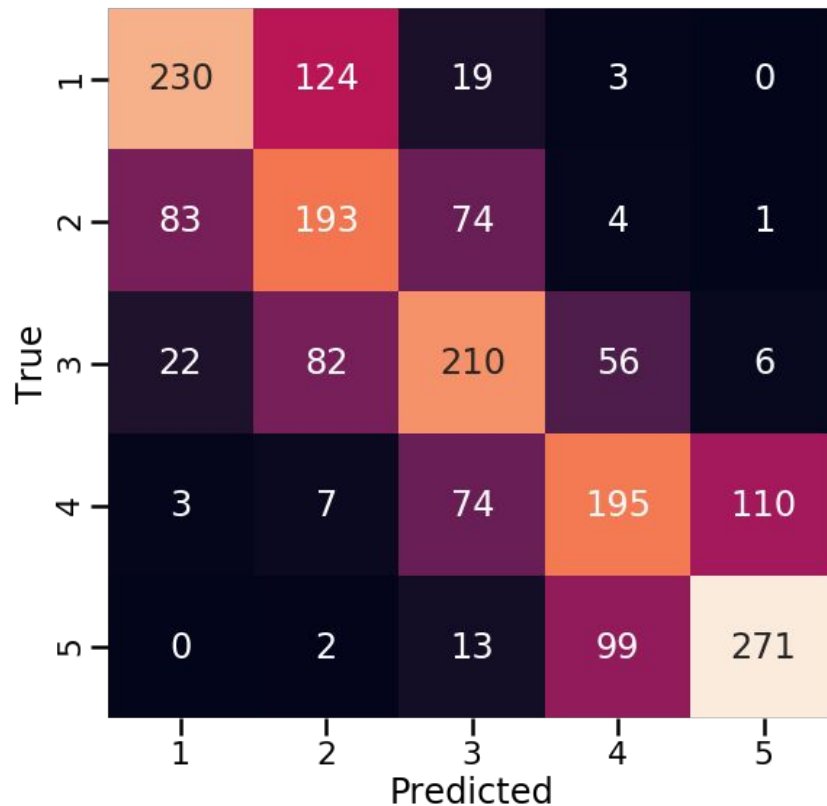
**Global  
Average 1D  
Pooling  
Layer**

**Dense  
Hidden  
Layer**

**Dense  
Output Layer**

# Better Test Accuracy?

**0.5077**  **0.5710**



# Hotel Review Classifier Application

Enter Your Review Summary Here

Check what they are charging to your card!

Enter Your Review Here

phone. Then said it would be refunded within 3 days. Why do they need to charge my card at all when my company had already paid? Now over a week later and still waiting for my money to be refunded. Totally unacceptable! Please GIVE ME MY MONEY BACK NOW with interest! This is just a money making scam at the customer's expense.

Predict

1

# Future Improvements and Additions

- Create a webscraper spider for twitter, reddit, etc for further model assessment
- Collect more data to create a stronger model
- Try deeper neural networks and potentially RNNs