



Machine Learning Regression Assignment

POLIMI Graduate School of Management

Predicting Popularity of eCommerce Reviews

Objective:

Predict number of shares on product comments with the end goal of managing potential negative feedback.





Variables of interest based on: Context

From our understanding of the variables:

- The number of **days elapsed** from publication might impact the number of shares.
- Including **images** and **videos** may attract more attention from viewers.
- The relatable **topics** might push people to draw parallels with their lives.
- **Subjective** and **sentiment-driven titles** might enhance empathy among readers.

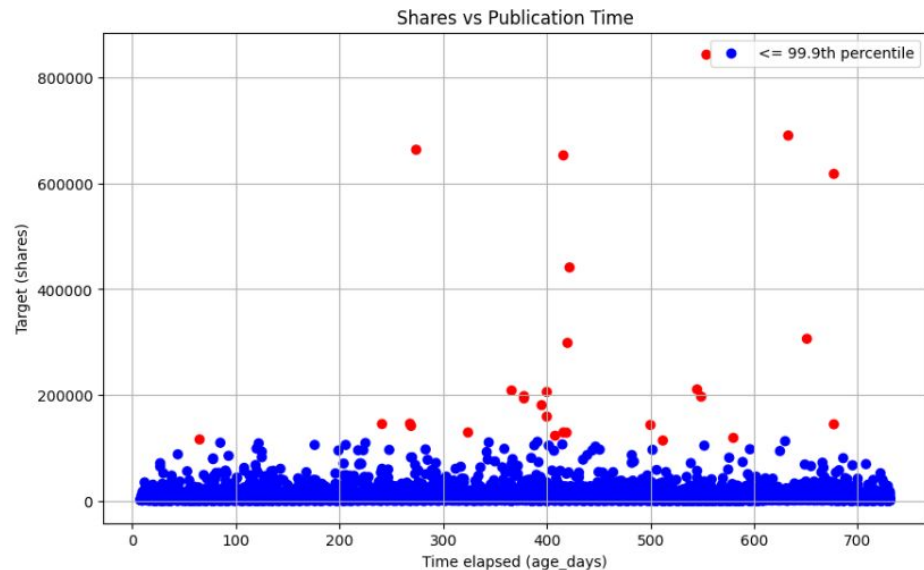
#	Variable	Description
1	age_days	Days between the article publication and dataset acquisition
9	num_imgs	Number of images
10	num_videos	Number of videos
13	product_category	Category of the product: business, cleaning, ..., other
25	day	Publication day: mon.. sun
26	topic_quality	Percentage of the content speaking about quality
27	topic_shipping	Percentage of the content speaking about shipping
28	topic_packaging	Percentage of the content speaking about packaging
29	topic_description	Percentage of the content speaking about the description
30	topic_others	Percentage of the content speaking about other topics
31	global_subjectivity	Content text subjectivity (0-Objective 1-Subjective)
32	global_sentiment_polarity	Text sentiment polarity (-1-Negative 1-Positive)
43	title_subjectivity	Title subjectivity
44	title_sentiment_polarity	Title polarity

Deep dive into days elapsed

Typically, there is a correlation between the **days since publishing** and the **number of shares**.

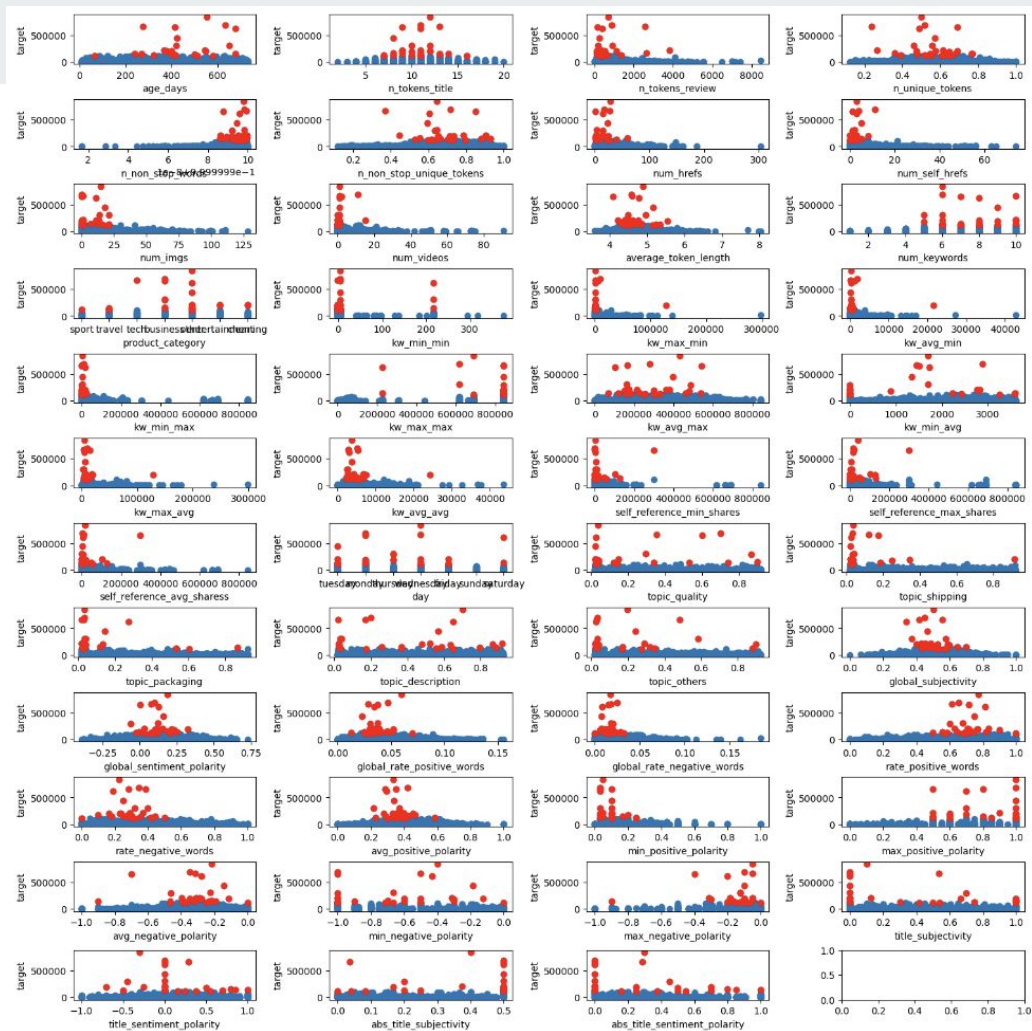
In this case, that correlation is not present.

Therefore, we will focus on the **outliers** in the data, which might be **viral comments**, and investigating the underlying reasons for this phenomenon.

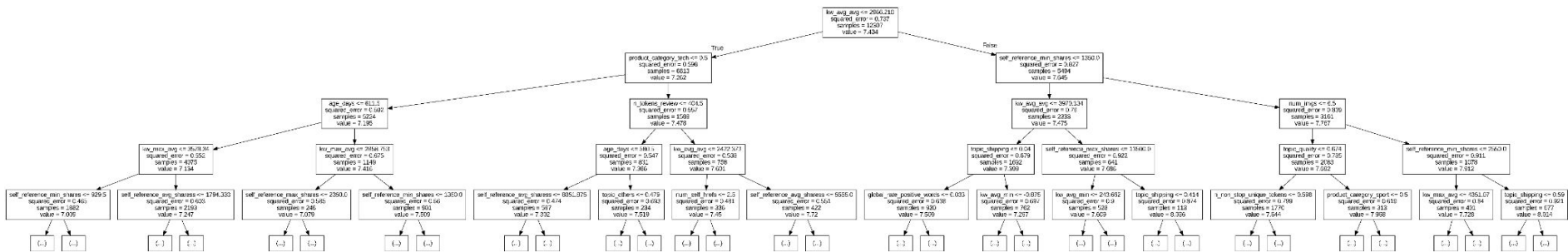


How to craft a viral comment?

From all the numerical variables, there's no obvious pattern for viral comments, as they are highly connected with the content of the comments.



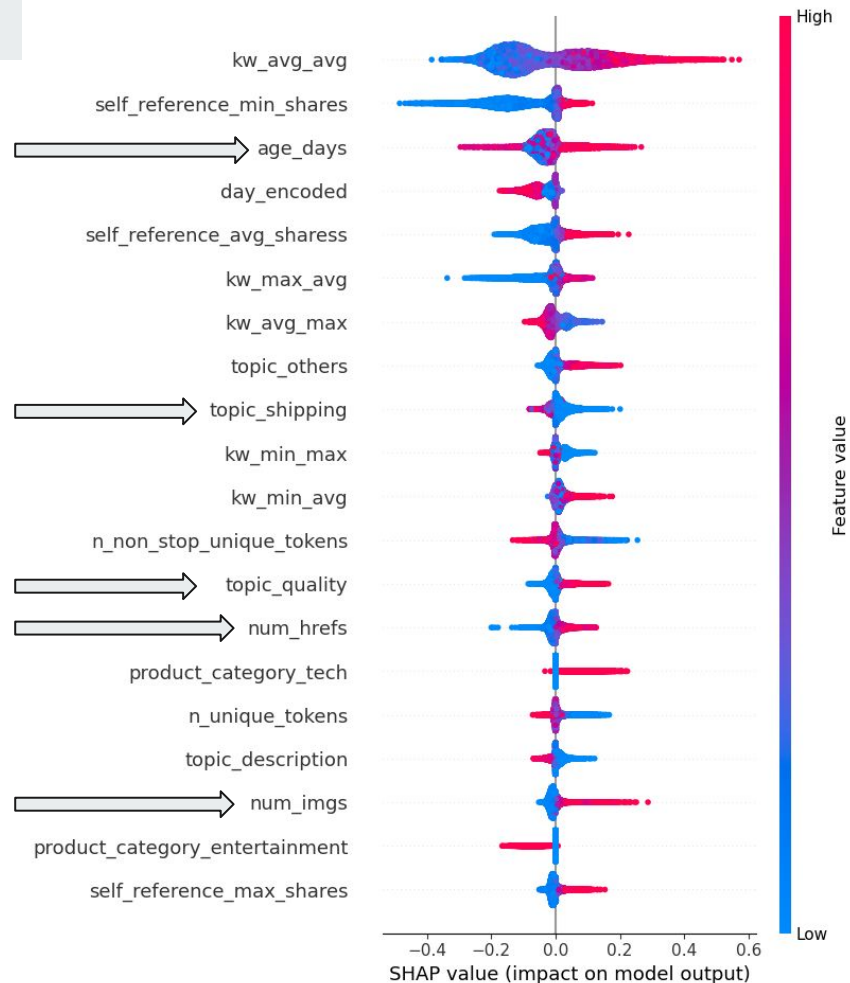
RANDOM FOREST MODEL | *gs_99_2*



What makes comments *popular*?

Some variables impact shares more than others.

- Days after publication
- Percentage of the content about shipping
- Percentage of the content about quality
- Number of links
- Number of images





Project Limitations

- Excluding two categorical columns, all the variables are **numerical variables**.
- The **data lacks detailed context knowledge** regarding the variables, which may impact the depth of the analysis.
- It's unclear whether the **data has undergone pre-processing** that could affect the model.



Can we know for sure how many shares a comment will gain?

Predictive model gs_99_2

While the model provides some predictions of how many shares a comment will receive, there is space for improvement.

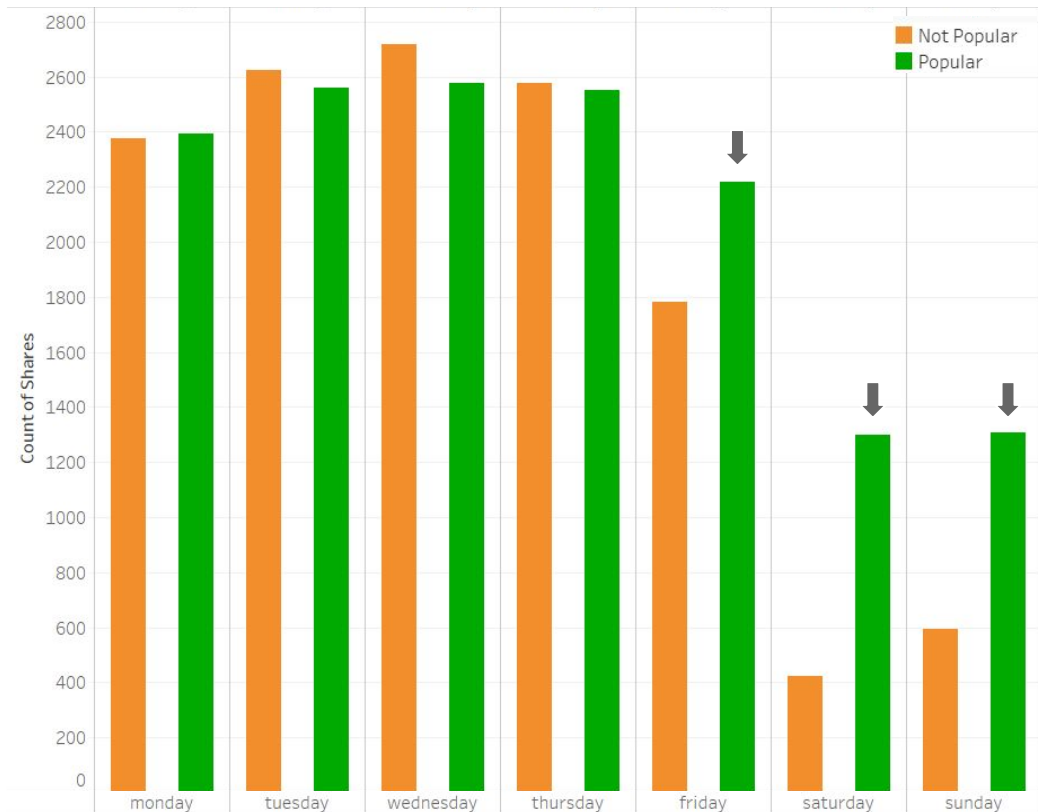
Areas to further investigate:

- data imbalance
- user behaviour

“Popularity”
what is it?

+1400 shares

This is the median of the shares gained by comments in the past 2 years



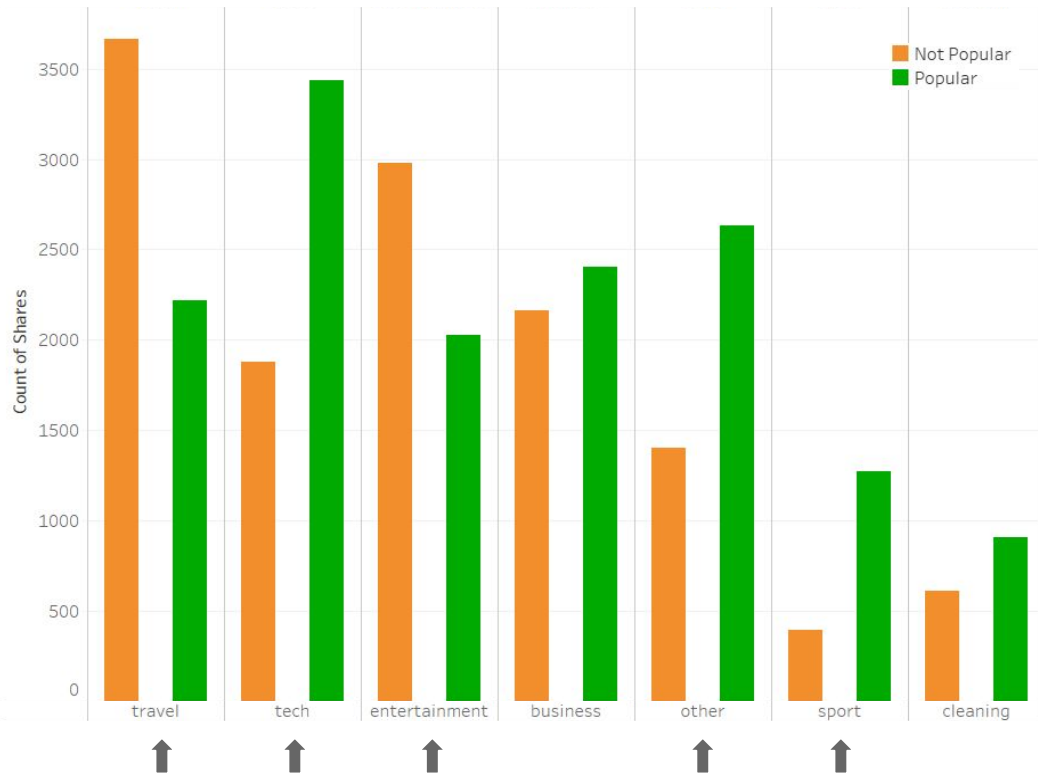
Popular comments VS Day of the Week

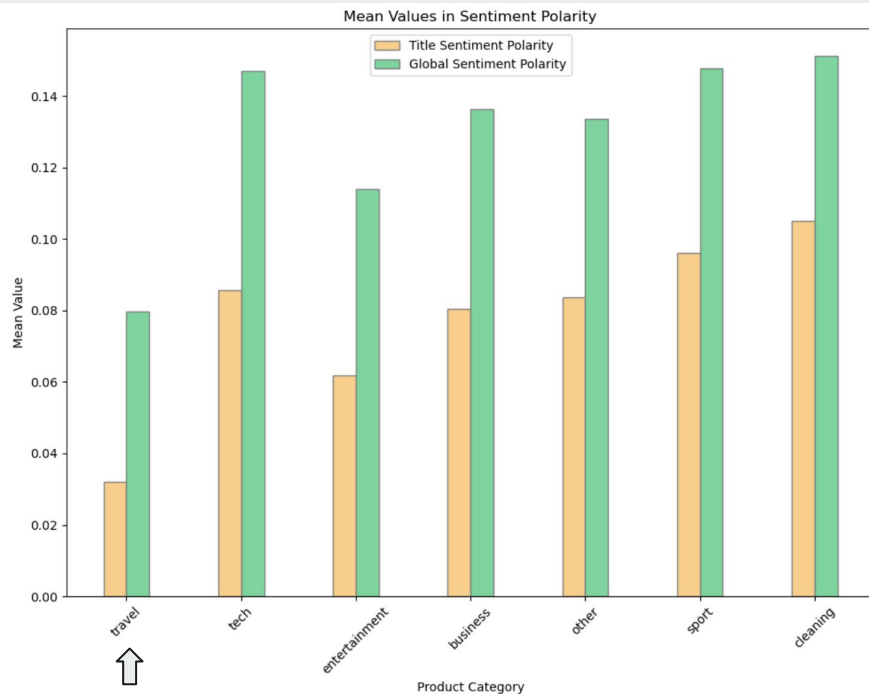
- Users are less active on the weekend
- Comments posted on the weekend are more likely to gain popularity
- Most comments are posted week days

Popular comments VS Product categories

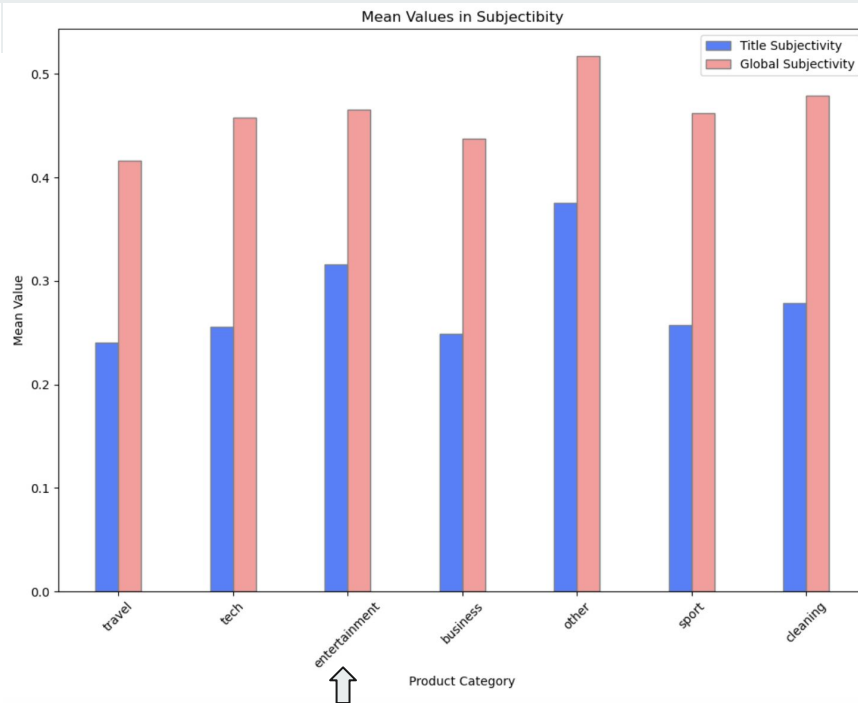
- **Travel** and **entertainment** comments are less likely to become popular
- **Tech**, **sport** and **other** comments are likely to become popular
- Category representation is uneven

Note: this is based on the assumption that all these services started to be offered at the same time.





- **Travel** comments have lower avg. sentiment polarity, which means that they have more **negative words**



- **Entertainment** comments have higher possibility to have **subjective titles**

The **subjectivity and sentiment polarity** in each category are similar.

As we mentioned before, viral comments are highly influenced by the content of the comments.

SO...

do we need to know the **exact
numbers of shares** a comment
will gain?

Not really.

Objective: [...] managing potential negative feedback.

To do this, it is enough to create a model able to predict if a comment will become infamous or not instead of the exact numbers of shares.



Thank you!