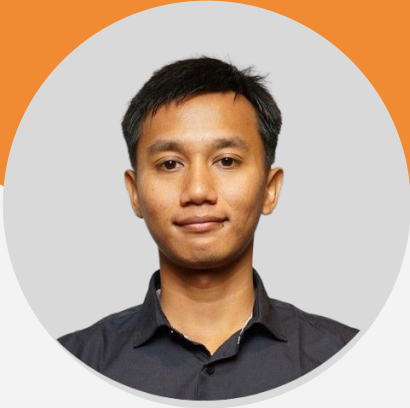


Customer Satisfaction and Sentiment Analysis

Batch 34 | Bootcamp Data Science





Arga Adyatama

Mentor

Loyalty Data Analyst

Kawan Lama Group

LinkedIn

[Arga Adyatama](#)

My writing

- [Github](#)
- [Blog post](#)

Outline

An orange square graphic positioned above the title.

Customer Satisfaction

- Why customer satisfaction matter?
- How to measure customer satisfaction?

An orange square graphic positioned above the title.

Sentiment Analysis

- What is sentiment analysis?
- How to measure a sentiment from text?
- What algorithm to use

An orange square graphic positioned above the title.

Data Visualization

- How to visualize customer satisfaction?
- How to visualize sentiment?
- Building a dashboard

Abstract geometric shapes on the left side of the slide: a large black parallelogram, a medium yellow parallelogram, and a smaller orange parallelogram, all slanted to the right.

Prepare Your Drive

Get the Materials

The whole materials can be found [here](#)

Prepare your own drive folder that at least contain the following items to get better learning experience:

- Copy of *hands_on_customer_satisfaction_sentiment_analysis.ipynb*
- Copy of *car_rental_review.csv*

A large black parallelogram is positioned on the left side of the slide. Overlapping its bottom edge are two orange parallelograms, one in a lighter shade and one in a darker shade, creating a layered effect.

Customer Satisfaction

Customer and Your Business

- Imagine you have a coffee shop
- People love it and your place get crowded by customers
- However, on the next month, traffic continue to decline
- What went wrong? Is your product taste bad? Does it take too long to serve a customer?



Why We Need Customer's Feedback

- Find out how your customers feel about your brand
- Identify pain point and friction from customer
- Measure customer loyalty
- Generate feedback about their interaction



 **Rp5.000** dari customer ini



04 Feb 2022

Komentar

"Don't call me "mbak". You are in Jkt! Say it
"non" or "kak"!"

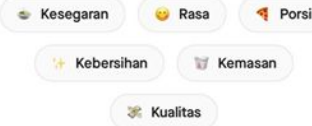
Tidak sopan

✕ Ayam Bakar Pupuy 46, Limo
Rabu, 20 Okt 2021, 18:56

Gimana makanannya?



Apa yang kamu suka dari makanannya?



Punya sepetah dua patah kata?

Sayang deh sama chef-nya!

0/4000

 Sembunyiin nama dari ulasan

Kirim

Dengan mengirim, kamu menyetujui Syarat & Ketentuan dan
Kebijakan Privasi.

CSAT – Customer Satisfaction

Measure **overall customer satisfaction** on specific area of business.

Overall, how satisfied are you with the service we provide?

Overall, how satisfied are you with our product?

Overall, how satisfied are you with our customer service?

Not Satisfied

Satisfied

Not Satisfied

Satisfied



Sum of satisfaction score

Overall CSAT =
$$\frac{\text{Sum of satisfaction score}}{\text{\# of responded customer}}$$

Sum of satisfaction score

Overall CSAT (%) =
$$\frac{\text{Sum of satisfaction score}}{\text{\# of responded customer x max rating}}$$

$$\text{Overall CSAT} = \frac{\text{Sum of satisfaction score}}{\text{\# of responded customer}}$$

$$\text{Overall CSAT} = \frac{450}{100} = 4.5$$

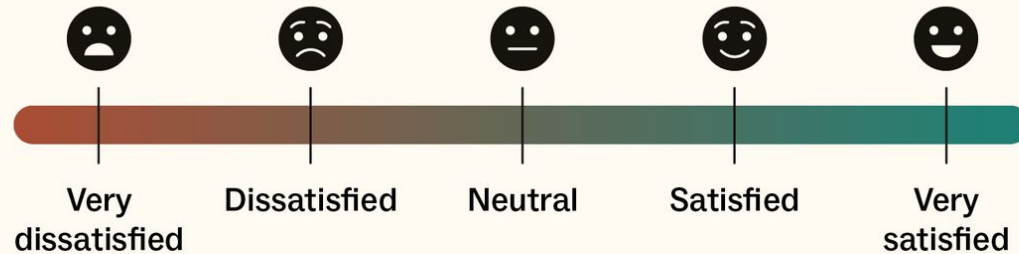
$$\text{Overall CSAT (\%)} = \frac{450}{100 \times 5} = \frac{4.5}{5} = 90\%$$

Skala 1-5

The Likert scale: Understanding customer satisfaction

Ask the customer a question like:

How do you feel about the service you received today?



On a 5-point scale, a score of **4+ is good.**

CSAT – Customer Satisfaction



Customer satisfaction often has **primary question** and **attribute question**

Example of primary question

*How satisfied are you with your **overall experience** using our ride-hailing service?*

Example of attribute question

*How satisfied are you with the **availability of driver**?*

*How would you rate the **driver's navigation skills** and route selection?*

*How satisfied are you with the **fairness of the fare for your ride**?*



"Don't call me "mbak". You are in Jkt! Say it "non" or "kak"!"

✕ Ayam Bakar Pupuy 46, Limo
Rabu, 20 Okt 2021, 18:56

★★★★★

 Kesegaran

Porsi

✦ **Kebersihan**

 Kemasan

 Kualitas

Sayang deh sama chef-nya!

0/4000

 Sembunyiin nama dari ulasan

Kirim

Dengan mengirim, kamu menyetujui [Syarat & Ketentuan](#) dan [Kebijakan Privasi](#).

CES – Customer Effort Score

The **perceived customer effort** on specific touch point → using our product, register as member, etc.

How easy it is for you to use our product?

How easy was it to navigate our app to find what you were looking for?

Difficult

Easy



$$\text{CES} = \frac{\text{Sum of effort score}}{\text{\# of responded customer} \times \text{max rating}}$$

NPS – Net Promoter Score

Measure the **likelihood for a customer to recommend** our product/service to other people, indicate their overall loyalty toward our product/service.

On a scale of 0 – 10, how likely are you to recommend our service to your friend and colleague?



$$\text{NPS Score} = \frac{\# \text{ of Promoter} - \# \text{ of Detractor}}{\# \text{ of responded customer}}$$

NPS Score and Treatment

$$\text{NPS} = 30 - 20 = 10\%$$

Promoter
30%

Focus on how to retain the promoter

Passive
50%

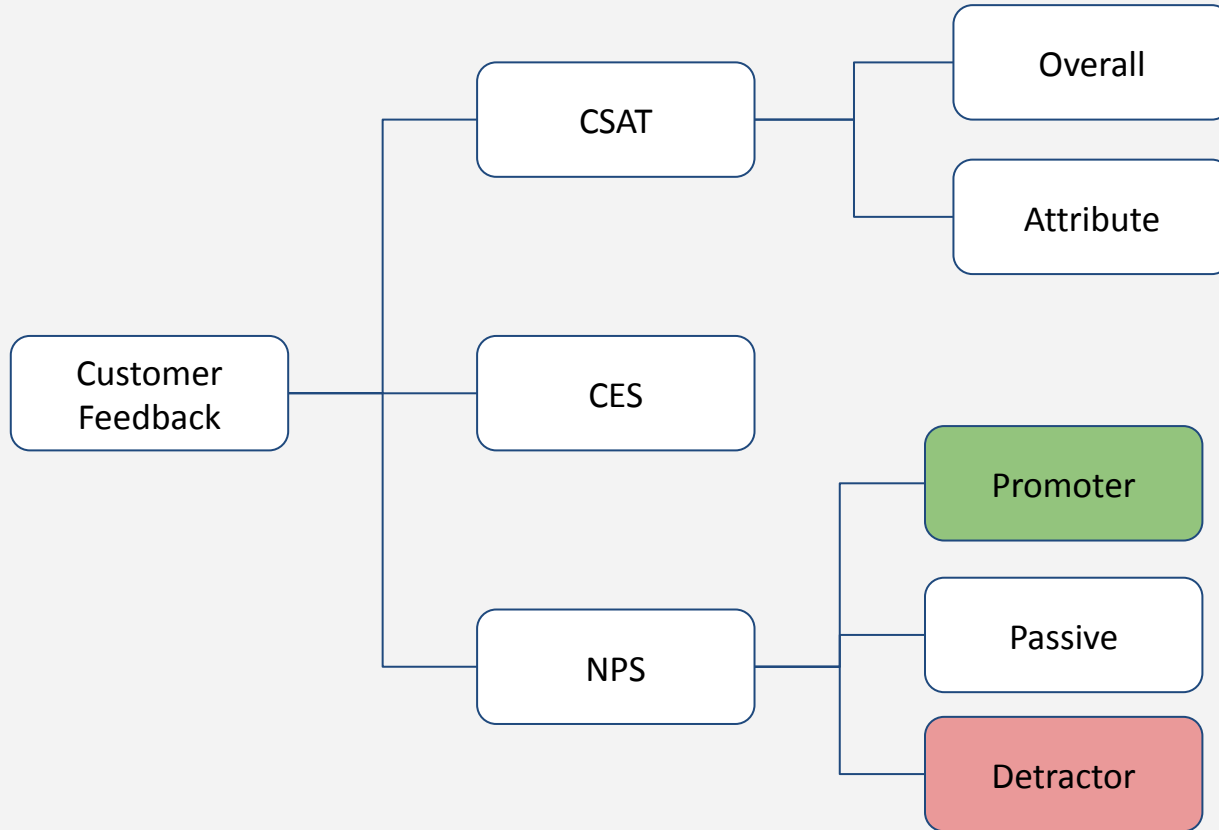
Follow up
What makes them don't become a promoter

Detractor
20%

Follow up
What makes them have a bad perception on us



Metrics of Customer Feedback



Customer Satisfaction Metrics



CSAT

- Measures a customer's immediate satisfaction with a product, service, or interaction
- Best to use right after interaction with customer
- helps pinpoint areas needing quick fixes or immediate attention
- Satisfied customer may not want to recommend



CES

- Measure how easy it is for customer to engage with our product
- Lower effort required by customer ideally should lead to higher satisfaction
- Allow us to fix problem that cause friction on customer's journey



NPS

- Measure the loyalty of a customer, by asking how likely they will recommend us
- Provides a broader view of customer sentiment over a longer period of time
- Best to use periodically, e.g. quarterly, etc.
- Doesn't tell us what's important for customer

Design a Survey

- Determine the objective, do we want to measure customer satisfaction, customer effort, or NPS?
- Determine the scale: use emoticon, yes/no, 5-scale likert, 7-scale likert, etc.
- Use clear and concise questions
- Determine when the survey is carried out: after interaction? Periodically?
- Ask relevant questions: how often you use our product in a week, which of the following words would you use to describe our products, etc.
- Keep the survey short
- Consider giving rewards to survey

Response Rate

How many of our customers that has responded to our survey.

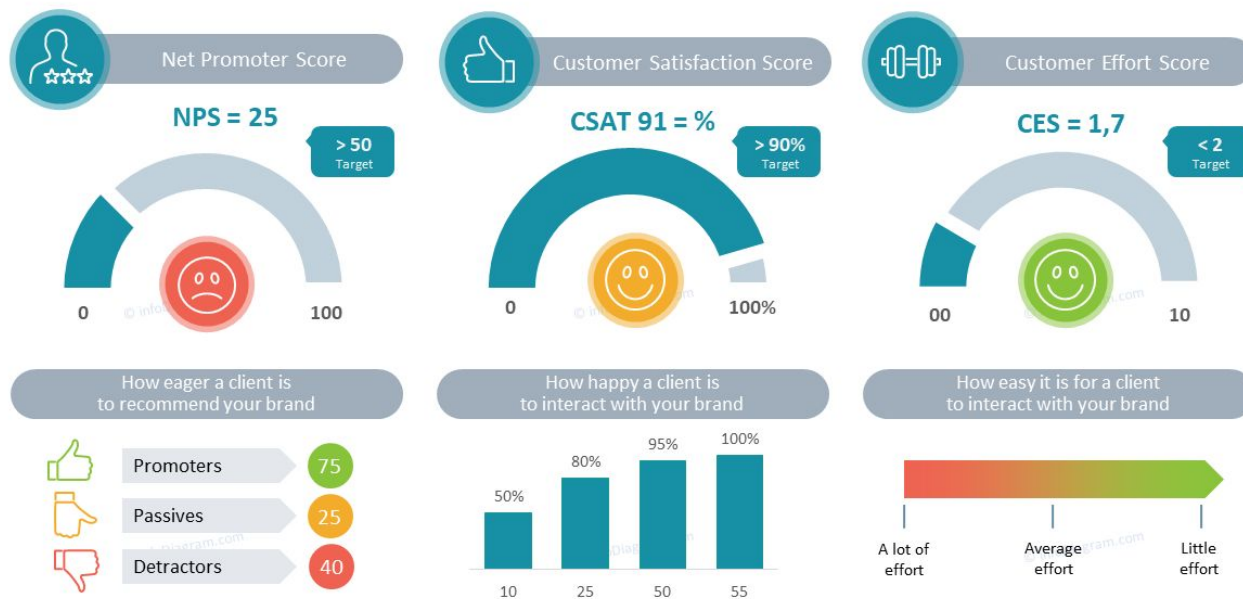
Can be used to evaluate our survey design, does our survey is confusing or too long.

$$\text{Response Rate} = \frac{\text{\# of response}}{\text{\# of survey sent}}$$

Visualizing Metrics

Customer Satisfaction Dashboard Example

CX Categories, NPS Recommendation, Satisfaction, Effort, 3 Column Layout, 3 KPI Score Gauge Charts



Visualizing Metrics

Car Rental Customer Satisfaction Report

Survey Date

7/1/2019

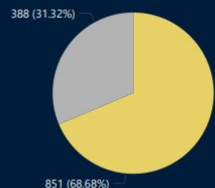
7/21/2019

Purpose

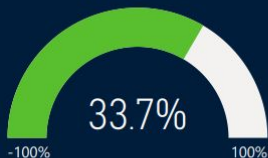
All

Survey Response

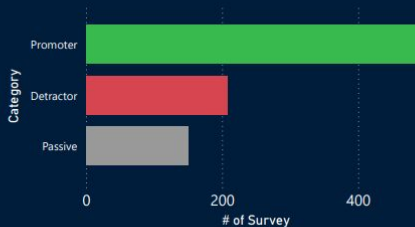
Response ● Responded ● Not Responded



NPS Score

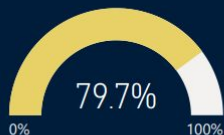


NPS Category



Customer Satisfaction

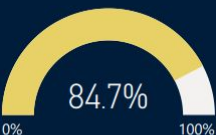
CSAT



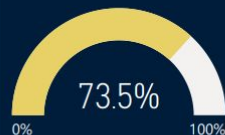
Mechanical Condition



Vehicle Cleanliness



Vehicle Choice



[Full Report](#)

On the left side of the slide, there are three overlapping geometric shapes: a large black parallelogram at the top, a medium-sized light orange parallelogram in the middle, and a smaller dark orange parallelogram at the bottom, all slanted to the right.

Sentiment Analysis

People love to talk about their experience



Sara Adams
5 Days ago



Well, this was simply amazing. Service: you have some great people there. And I Mean above the expectations that one has when coming to a 3 star restaurant.



Sandra Cook
3 Days ago



Highly recommend everyone to check out Linkdin especially if you're searching for employment.



Rose Reyes
6 Days ago



I have been using Linkedin for a couple years now, we all do at my workplace. It's great tool for many reasons. Social networking job opportunities.



Francine McCoy
1 Days ago



This site is helpful with networking and visibility. I am getting resume reviews weekly. Overall, Linkedin is one of amazing and legitimate job search.



Amanda Adams
5 Days ago



I have an account and have been a member for about five years. It is simple to find places that are looking for experienced professionals and where to submit a resume.



Sentiment Analysis

Sentiment Analysis inspects the given text and identifies the prevailing emotional opinion within the text, especially to determine a writer's attitude as positive, negative, or neutral.

– [Google Cloud NLP Page](#)



Positive



Negative



Neutral



DISGUST



FEAR



JOY



ANGER



SADNESS

Sentiment of Review



Negative



Michael H.

2 reviews



Verified customer

I ordered a product from their website, and it took over a month for it to arrive. When I contacted customer service for assistance tracking my order, they were very rude and not helpful. Once I finally received my order, some items were missing, and I received the wrong sizes. Won't be ordering from here again.



Positive



Miranda W.

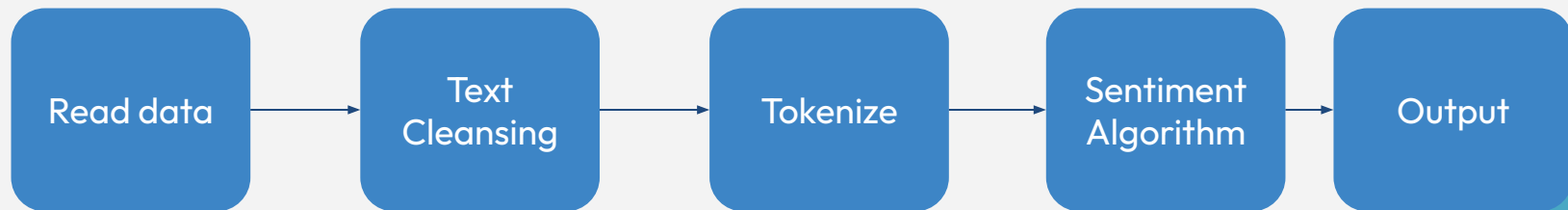
3 reviews



Verified customer

I recently needed some help setting up my online account, and the support I received was thorough and efficient. It only took one interaction to answer all my questions, and they provided me with additional help articles to reference in the future! I'll definitely recommend their services.

Sentiment Analysis Flow



Text Cleansing

Prepare the text data before predicting the sentiment. Clean and proper text data will provide more accurate sentiment.

Typical text cleansing process:

- Trim double whitespace
- Clean URL (https:/, www, etc.)
- Clean username for digital data (@elonmusk)

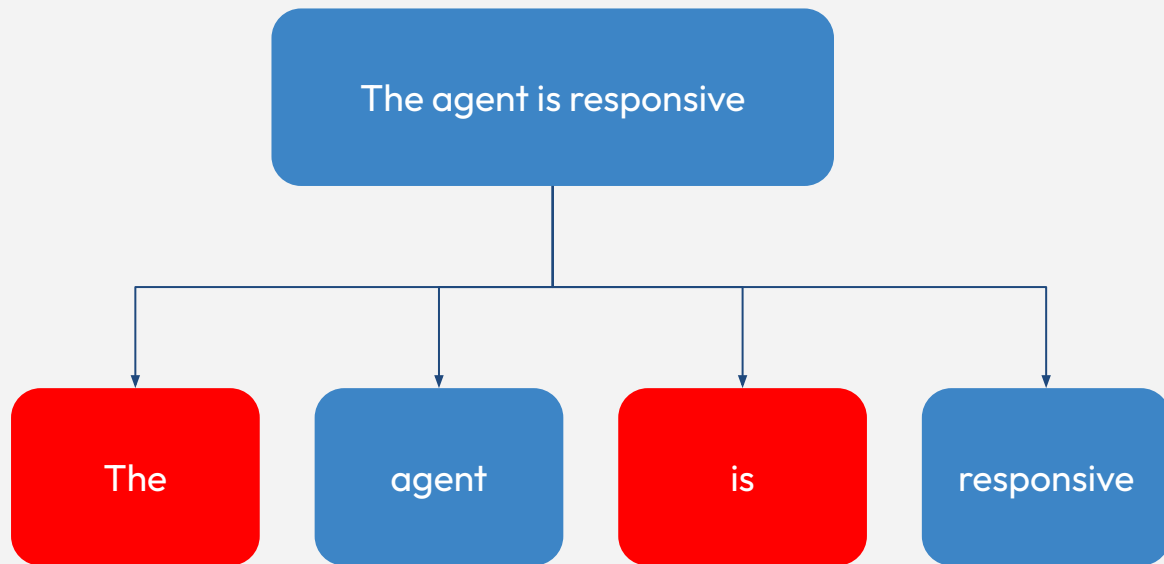
Other text cleansing process:

- Lowercase all text
- Lemmatize (cars → car)
- Word contractions (don't → do not)
- Remove stop words (you, would, should, will, am)
- Remove punctuation



Tokenization

Split a text (sentences or paragraphs) into a group of tokens, typically a word.

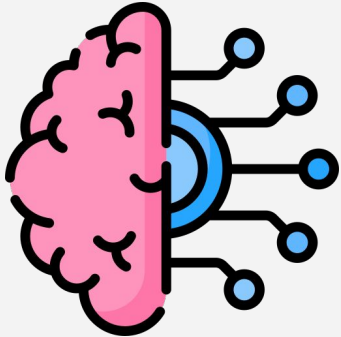


Sentiment Algorithm



Lexicon-based algorithm

Require a dictionary or list of words, each has their own sentiment score. Some algorithm also incorporate a rule-based scoring.



Machine learning algorithm

Use machine learning model to find patterns inside the text. Require less text cleansing and able to find deeper context of a sentence.

VADER

- Lexicon-based algorithm
- Every word has their own polarity score
- Require little to no text cleansing
- Apply rule to shift or boost the sentiment score
 - This item is great: 0.62
 - This item is not great: -0.52
 - This item is very great: 0.65

Check the [github](#) page

Check the [paper](#)

[Textblob](#)

Word	Polarity Score
great	3.1
greater	1.5
greatest	3.2
rude	-2.0

Score	Sentiment
≥ 0.05	positive
$-0.05 - 0.05$	neutral
≤ -0.05	negative

Deep Learning Models

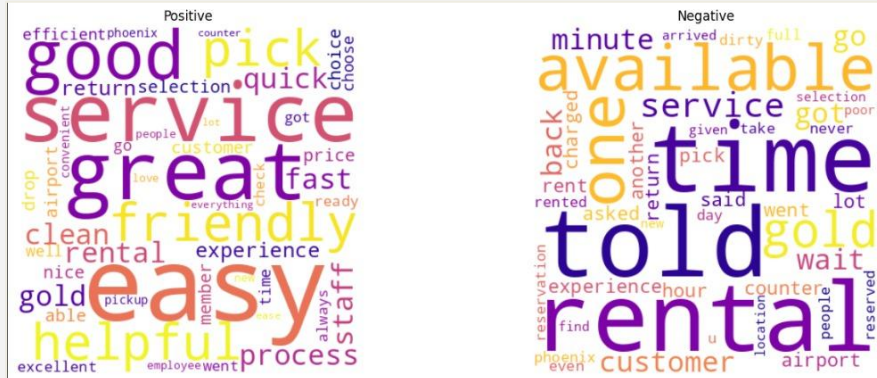
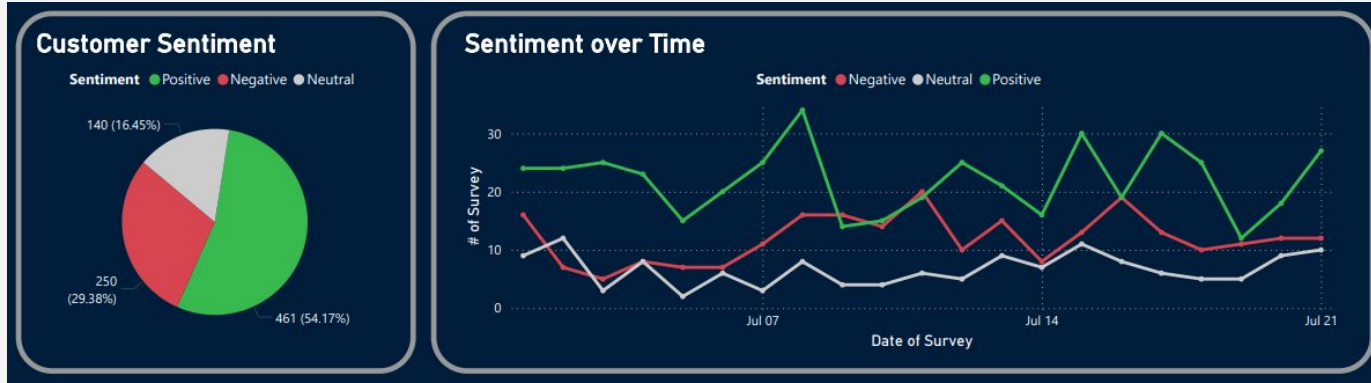
- Machine learning model trained on large corpus of text: blogs, tweets, news articles, etc.
- Able to learn context better compared to rule-based algorithm
- Require more time to compute
- Can be directly used or trained again with new data
- Can be used for different purpose: sentiment analysis, emotion detection, text summarization, etc.

Example: Twitter-roBERTa

Trained on 58 millions tweets

Check the [hugging face](#) page

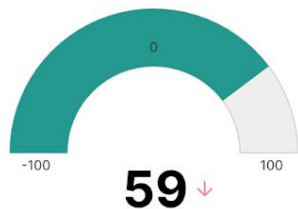
Visualizing Sentiment



Visualizing Sentiment

Sentiment score

Know if people are talking positively or negatively about a topic to gauge how it's seen by the public.

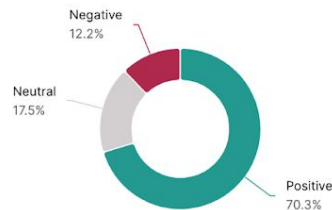


Net sentiment

This is **-10** points compared to the previous period.

Analyzed 11,278 mentions

- 7,931 with positive sentiment
- 1,970 with neutral sentiment
- 1,377 with negative sentiment



Mostly positive

The majority of conversations about this topic have positive sentiment.

Visualizing Sentiment

Sentiment trend

Track changes in sentiment over time and spot the most significant fluctuations in public opinion.

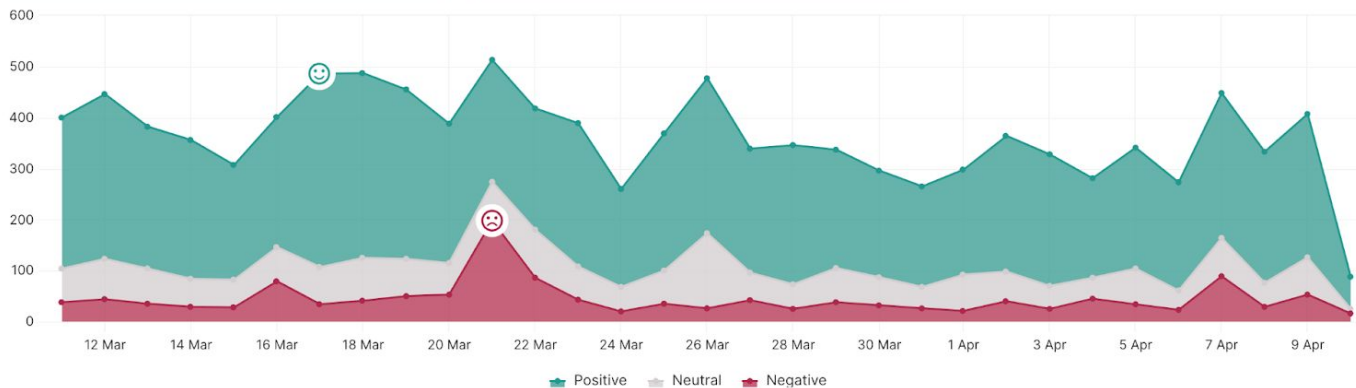
Mar 17, 2024
most positive mentions

379

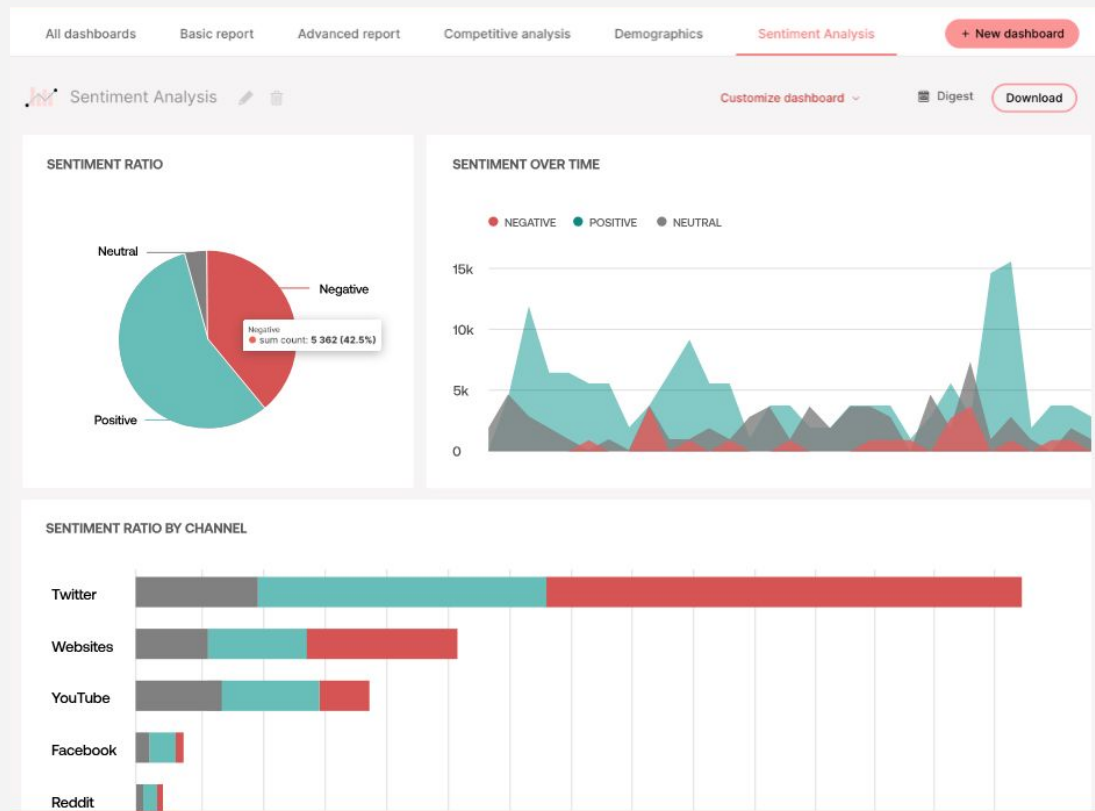


Mar 21, 2024
most negative mentions

198



Visualizing Sentiment



A large, stylized graphic on the left side of the slide. It consists of a blue outline of a person's head and shoulders. Inside the head is a yellow circle with an orange ring and a yellow center. Inside the torso is a large yellow circle with an orange ring and a yellow center.

Terima Kasih