

# Sentiment Analysis of You Tube Video Comments

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## -----ABSTRACT-----

In Today's world, YouTube is the prominent platform to share the educational resources than ever before. Students as well as professionals enhance their learning experience with their preferred way of learning which making it easier to understand and retain the concepts in an easy way. They can also revisit the lecturers at their flexible time and pace. Nowadays global experts are stepping into YouTube with extraordinary visual demonstration to give an exclusive insight with no cost to the learners. The you tubers not only rocking in the field of education but also in the various fields such as cooking, mentoring, skill development course and etc., so everyone turning to YouTube for their growth and also for the welfare of the society. Once the channel is grown, one of the biggest challenges is to identify the pros and cons of the viewers. To maintain the channel in quality way, SNA (Social Network Analysis) is coming into the picture, where we identify the emotion behind the text or comments. This research work used RStudio tool to analyse the comments or emotions provided by the viewers in YouTube. In this eight emotions (anger, fear, anticipation, trust, surprise, sadness, joy and disgust) are identified which is very helpful to understand the impact of the video and also gives the insight to the channel creator.

Keywords – Emotion Analysis, Sentiment Analysis, SNA, Social Network Analysis, YouTube Comments.

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**I. INTRODUCTION**

The YouTube is a prominent video-sharing website where users may publish, watch, share, and comment on videos. It was founded in February 2005 by three ex-Paypal employees: Chad Hurley, Steve Chen, and Jawed Karim. When the creators struggled to find video clips online, they envisioned a centralized platform where users could simply share and discover videos.

YouTube swiftly gained popularity because of its user-friendly interface, extensive content library, and the opportunity for anybody to make and post videos. It has grown over the years to become one of the world's greatest social media sites, with material ranging from music videos, tutorials, vlogs, comedy sketches, instructional information, and more.

Users can like, share, comment on the posted videos, and engage with content creators via comments and messaging. YouTube also provides a variety of tools for content creators such as monetization opportunities, advertising revenue, channel memberships, sales opportunities and much more which is really amazing. The mission of YouTube is to give everyone a voice to show them not only the particular sector but to the world which is out boxing to our imagination.

At present, billions of users and hours of video uploaded every minute in YouTube. It has grown into a global cultural phenomenon, influencing entertainment, education, and communication. It has also played an important part in the growth of online influencers and digital marketing methods. The Figure1.a table depicts the history of youtube with various features.

2013	Google+ integration of comments sections
2014	60 fps videos, 360° videos
2015	YouTube red launches, YouTube subscription service
2016	YouTube TV launches, ability to modify video annotations removed
2017	Video editor option discontinued
2018	Introduction to premiers, Removal of annotations and Auto Share features
2019	Subscriber count visibility
2020	Removal of creator studio, optional email notifications for uploads
2021	mass privatization
2022	New UI design
2023	Crack down on ad blockers

Figure1.a History of YouTube with various features

The purpose of the research work is to identify the emotion behind the text or comments which is specified in the specific YouTube link. This research process proposed a step by step process to execute the same with snippets which will be helpful for the new research buds to execute and enhancement in future.

**II. IMPACT OF YOUTUBE IN THE SOCIETY**

YouTube had a significant impact on society in many aspects, including culture, communication, education, entertainment, and economy. some of the important places of its impact are listed below:

**2.1 Media revolution:** YouTube democratized content generation and dissemination, resulting in a media consumption revolution. Users can access a massive library of videos on almost any subject, allowing individuals and communities to share their stories, knowledge, and creativity with a worldwide audience.

**2.2 Empowerment of Channel creators:** YouTube has enabled millions of people to become content creators, including aspiring artists, filmmakers and especially educators. It has offered a forum for marginalized voices and under represented populations to share their opinions and experiences, promoting diversity and inclusion in media coverage.

**2.3 YouTube stars and influencers:** They are the significant individuals who are popular in You Tube culture, impacting trends, opinions, and consumer behavior. YouTube has helped to create new cultural phenomena and internet subcultures through viral videos, memes, beauty lessons, and gaming streams.

**2.4 Education & Learning:** YouTube is an excellent educational resource, providing tutorials, lectures,

Year	Feautres
2005	Video Html embedding,5 star rating system, top videos page, playlists, full screen view subscription, groups function, personalized profiles,10 minutes video limit
2006	Video responses, cell phone uploading, further personalized profiles, viewing history, local language version
2007	Mobile web front end with RTSP streaming,480p videos,video analytics tool
2008	Video annotations, audio swap, google videos uploading halted, launch of YouTube XL front end for television sets
2009	720p videos and support for 3D videos, Automatic speech recognition, Thumbs rating system
2010	Removal of groups feature, live streaming
2011	YouTube analytics, feature film rental, seek bar preview tooltips
2012	Merger with google video, Transition to the one channel layout

documentaries, and instructional videos on a variety of topics. It has democratized access to knowledge, making learning more accessible and enjoyable for people of all ages and circumstances. YouTube has disrupted the traditional entertainment sector by offering an alternative platform for content consumption and dissemination. Independent filmmakers, singers, and comedians can now skip traditional gatekeepers and directly reach audiences.

### III. STEPS TO CREATE A YOUTUBE CHANNEL

Creating a YouTube channel is as straightforward as creating a Gmail account. One should follow the steps provided below:

**3.1 Sign in or Create a Google Account:** create a Google account or Gmail account. once you created, sign in to that account.

**3.2 Go to YouTube and Sign In:** After you've signed in with your Google account, go to YouTube.com and sign in using the same account details information. Click on your profile picture. Your profile image can be found in the upper right corner of the YouTube site. When you click on it, a drop-down menu appears.

**3.3 Choose Your Channel:** From the dropdown menu, select studio.youtube.com. This will lead you to a page where you can establish a channel.

**3.4 Create and upload your video :** on the right side, you have create option. From the create option you can upload videos, go live, create post, new playlist and new podcast options are there. To upload a video in your channel you can choose upload videos, which is shown in the Figure 2.a creating your video in YouTube channel.

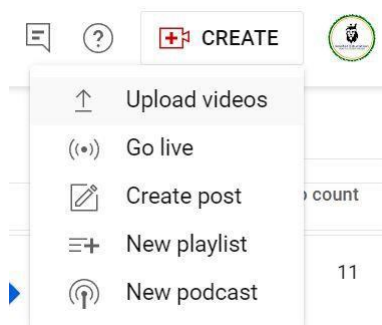


Figure 2.a creating your video in YouTube channel

**3.5 Customize your channel :** Once the channel is created you can customize it by changing the profile picture, banner, title and description of your channel. This will create an impact with an audience. so, give an appropriate details of your channel and then click publish button.

**3.6 Promote your channel:** To increase viewership, share your videos on social media, forums, and other online venues. You can also work with other YouTubers, join forums pertaining to your subject, and optimise your videos for search engines to boost visibility.

**3.7 Engage with Your Audience:** Respond to comments on your videos, solicit feedback, and communicate with your viewers to foster a community around your channel. Looking into their audience comment and modify in the way of user expectation is

one of the key process to engage your audience. This should done in consistency way to become popular in You Tube. We should upload high-quality material on a regular basis to keep your audience interested and attract new views.

### IV. SENTIMENT ANALYSIS ON YOUTUBE VIDEO COMMENTS

Analysing YouTube comments can reveal significant information about audience engagement, emotion, and feedback for your channel or individual videos. The Figure 4.a.Process flow of sentiment analysis on YouTube video comments depicted the overall flow of this research work.

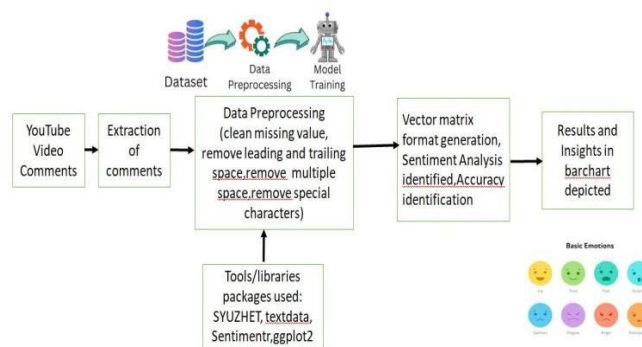


Figure 4.a Process flow of sentiment analysis on You Tube video comments

#### 4.1 YouTube video comments :

The following steps are to be executed before extracting the comments from your own specified YouTube channel, which will give you the overview of your own video comments and other information. If you wish to find the sentiment analysis for other channels you can directly go to the next step 4.2 Extraction of comments process.

**4.1.1 Visit YouTube Studio:** At first, Log in to your Gmail account and in the right corner you have to click You Tube option which will head to YouTube Studio. This is where you can manage your channel, videos, and analytics.

**4.1.2 Select a video:** Choose a video for which you wish to analyse comments. You can accomplish this by going to YouTube Studio's "Content" menu and selecting the desired video.

**4.1.3 Navigate to Comments:** On the video detail page, select the "Comments" option. You may see all of the comments left on that video here. Begin by personally reviewing the comments to gain an understanding of audience sentiment, common topics, and any particular complaints or questions. This will help you comprehend the context before digging into further in-depth analytics.

#### 4.2 Extraction of comments:

The process of extraction or downloading all the comments from the particular You Tube video is known as importing process. This importing comments can be done using the website "<https://exportcomments.com/>". In this research work the YouTube link "<https://www.youtube.com/watch?v=NxP3R55KnIE>" comments are downloaded. To download the comments copy

that link and paste it in export social media comments which is depicted in the Figure 4.2.a Exporting social media comments. Here not only YouTube video comments, this tool allows users to download comments from various social media platforms such as Face book, Instagram, Twitter, YouTube and etc which may be representative of the broader content on the platform.

Once you pasted the link, Click start export process option to down load all the comments submitted in the YouTube link, Normally to download 100 comments will be free, to download more than 100 comments will be come under the premium option. so At the initial process you can go with free option, later depends on your research process need you can choose premium option. once the downloading process completes it gives the message that export is completed, ready for download which is depicted in the Figure 4.2.b Export Completed. It provides a user-friendly interface to extract comments from posts, videos, or pages. Here Users can easily download the extracted data in Xls, CSV and other format for analysis. This is useful for collecting datasets for research, sentiment analysis, or marketing insights. The various Exporting file options are depicted in the image Figure 4.2.c Exporting file options.

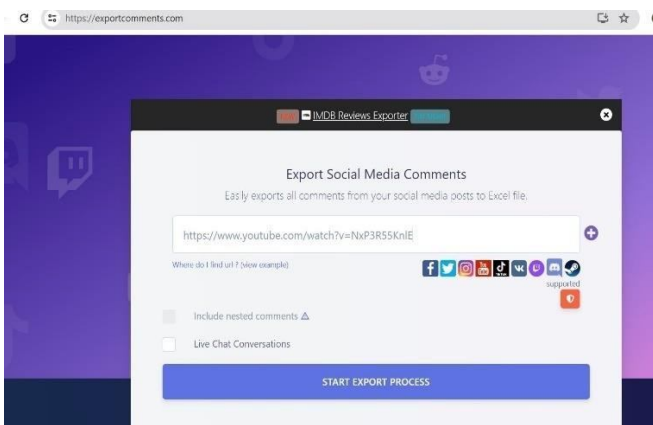


Figure 4.2.a Exporting social media comments

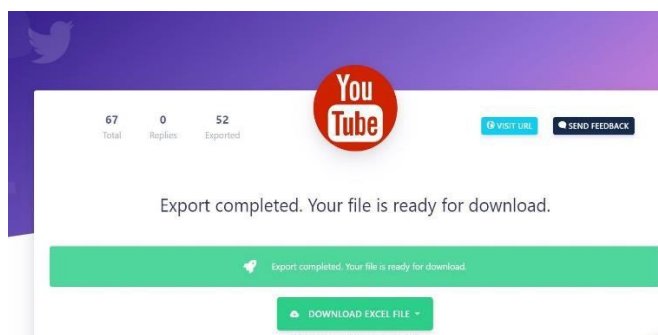


Figure 4.2.b Export completed

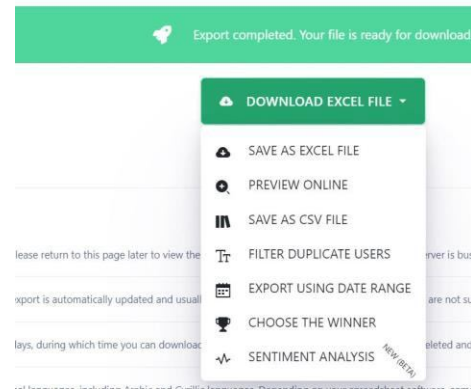


Figure 4.2.c Exporting file options

Now our exported comment file is ready for evaluation, the exported file is shown in the Figure 4.2.d Exported You Tube video comments file.

A	B	C	D	E	F	G
Name (click Date)	Likes	isHearted	isPin	Comment		
1 @zawarkr	07-06-2022 10:31	1	no	error show horaha		
2 @zawarkr	07-06-2022 10:31	0	no	jab bhi send pr click kro		
3 @soumitr	09-06-2022 17:41	1	no	How to send bulk message excel to mobile sms?		
4 @crazy4b	13-06-2022 13:12	2	no	can u tell us how this code changes instead of IE to Edge		
5 @janakira	07-07-2022 17:11	3	no	Excellent. Crystal Clear Madam Voice. Simple / Short / Clear. No Wasting of Ti		
6 @tamilbgi	21-07-2022 04:45	2	no	Not working madam		
7 @ahladan	15-08-2022 11:33	1	no	How to get the code from description box & paste - please explain		
8 @ivanlaw	25-09-2022 07:34	1	no	Excellent.mdm plz help. when can't send 500 spelling space message		
9 @crudejar	05-11-2022 15:32	0	no	Super sister ..thnku ,nice work		
10 @apagara	15-11-2022 13:02	10	no	Not working		
13 @abdulha	21-12-2022 10:02	0	no	Hi madam it will not be working properly what's app , after applying the code		
14 @clinicadi	03-02-2023 18:28	0	no	Does it work in whatsapp business?		
15 @geekaye	04-02-2023 12:48	0	no	Pl let me know get code		
16 @raymon	18-02-2023 08:45	5	no	Hi Madam, I try but is not working. I think is because you set the Marco to IE t		
17 @Mera_N	28-03-2023 17:00	2	no	Thanks for sharing coding. It is working perfectly. Now, also tell how to send n		
18 @ravitejar	03-04-2023 05:35	0	no	Hi madam I need this for my business but it's not working for me can you give		
19 @tkamal8	29-04-2023 08:45	1	no	which version of microsoft office you are using		
20 @ramesh1	18-05-2023 02:05	0	no	I tried so many times but not working totally one day waste		
21 @ramesh1	18-05-2023 02:06	0	no	First of all say any one contact number if any doubt to ask directly		
22 @harshilji	29-05-2023 08:54	0	no	Messages was not send only what's app number is opening. What's the reaso		

Figure 4.2.d Exported You Tube Video Comment file

### 4.3 Data Preprocessing :

The next is Data Preprocessing, Data preprocessing is an essential process in sentiment analysis, because it improves data quality by removing missing values, outliers, and inconsistencies, making the dataset more reliable for analysis. It improves model performance by converting raw data into a format appropriate for machine learning algorithms. Preprocessing minimizes complexity, improves accuracy, and prevents over fitting. Finally, it contributes to better and more meaningful outputs from data-driven jobs. The various preprocessing processes techniques that were taken here as follows:

- ✓ Remove rows with null values
- ✓ Remove leading and trailing spaces from a column
- ✓ Remove multiple spaces between words
- ✓ Remove special characters and so on.

To execute the above process, choose the appropriate sentiment analytics tool. There are various sentiment analysis tools such as Rstudio, VADER, TextBlob, Stanford NLP, Microsoft Azure Text Analytics, MonkeyLearn, GoogleColab with NLTK library. This tools are helpful to acquire a better understanding of sentiment behind the comment or text. These tools are automatically assess whether a comment is positive, negative, or neutral. In

this process, Rstudio tool which are the prominent sentiment analysis software taken for sentiment classification.

RStudio is a one of the most usage tool for Sentiment analysis and prediction work. It's used in data analysis to import, access, transform, explore, plot model data for machine learning to make predictions on data in a easy way when compare with other tools, especially those who are initiating their research work. Later, choose python in GoogleColab is recommended to dive in analytics. R Studio is an integrated development environment (IDE) for R. The IDE is a graphical user interface (GUI) that allows you to write quotes, view results, and view variables formed during programming. The highlighted characteristics of Rstudio is as follows:

- ✓ R Studio is accessible as both open-source and commercial software.
- ✓ R Studio is accessible in both desktop and server versions.
- ✓ R Studio is also available on other platforms, including Windows, Linux, and macOS.
- ✓ It integrate with machine learning models through packages like caret and xgboost which providing model selection and tuning compared to APIs like GoogleCloud.
- ✓ Rstudio tool provides reproducible research and interactive reporting which is not as seamless in standalone tools like TextBlog or VADER.

The working environment for Rstudio is depicted in the Figure 4.3.a Environment of Rstudio

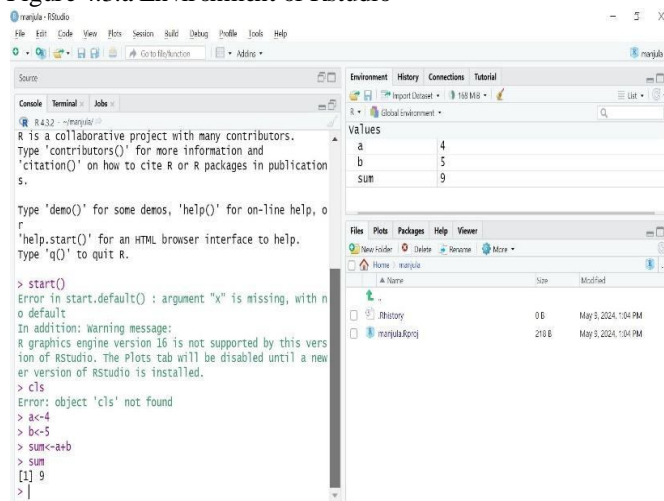


Figure 4.3.a Environment of Rstudio

The Environmental/History panel is located at the upper right. It has two tabs:

- ✓ The Environment tab displays the variables generated over the process of programming in a temporary workspace.
- ✓ The History tab displays all of the commands that have been used since the beginning of R Studio's usage.
- ✓ The right bottom panel includes tabs for files, plots, packages, help, and viewer options.
- ✓ The files tab displays all of the files and directories available in R's default workspace.

The Plots tab displays the various plots depending on your programming results or queries.

The Packages tab allows you to see what packages are already installed in R Studio and provides a user interface for installing new packages too.

The Help tab is the most significant tab since it allows you to get help from the R Documentation on the functions that are built into R.

The last is Viewer tab, which allows you to see local web content developed using R.

Now we have to import the YouTube comment file into Rstudio for sentiment analysis. In Rstudio, We will use the "syuzhet" text package to analyse the data and assign scores to the related words in the dataset. The ultimate goal is to create a sentiment analysis model that can recognise if a word is good or negative, or neutral and other emotions.

Figure 4.3.b Importing SYUZHET package, from the packages option in the right side library and reading the downloaded youtube comment file using read\_excel option. View method is used to view the file in RStudio.View(youtubecomment) indicates it reading the file"youtubecomment" and view in the top left corner. The snippet to do the same is indicated below:

```

> library(syuzhet)
> youtubecomment <- read_excel("youtubecomment.xlsx")
> View(youtubecomment)
    
```

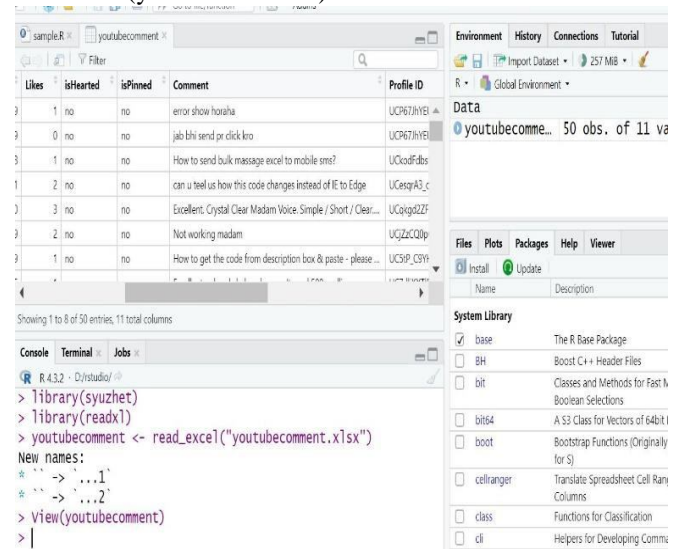


Figure 4.3.b Importing SYUZHET package

#### 4.4 Vector Matrix Format Generation

Once the preprocessing is done on the YouTube comment, the next step is vector matrix format generation based on the sentiment in each comment line. In vector matrix format generation process take the column which we required for analysis, here in YouTube comment file there are lot of fields such as sno, name, id, liked, comment and etc., for sentiment analysis we required only comment column, so extract that column alone and assign it to the variable "sna".

```

Ex:
> sna<-as.character(youtubecomment$Comment)
> View(sna)
    
```

Now, the comment field is extracted and assign it to the variable sna. This field has to enter into sentiment analysis that can be achieved using get\_nrc\_sentiment method. By default this method analysis the various emotion such as anger, anticipation, disgust, fear, joy, sadness and surprise from the each words given in the statement. Based on the emotion of the word presents it assigns value 1, if the

specified emotion not present then it is 0. Example : In the youtube comment file there are totally 50 comments, so 50 lines of matrix is created and in each statement if there is any word related to sadness then it will be marked as '1' else it marked as '0'. This matrix format is generated by using the coding `get_nrc_sentiment(sna)` which is depicted in the Figure 4.4.a Comment field in vector matrix format.

```
> get_nrc_sentiment(sna)
```

s.no	anger	anticipation	disgust	fear	joy	sad	surprise	trust	negative	positive
1	0	0	0	0	0	1	0	1	1	0
2	1	0	0	0	0	0	0	0	0	0
3	0	2	0	0	2	0	1	1	0	2
4	0	0	0	0	0	0	0	0	0	0
5	0	2	1	2	2	2	1	2	2	4
6	0	0	0	0	0	0	0	0	0	1
7	0	0	0	0	0	0	0	1	0	1
8	0	0	0	0	1	0	0	1	0	2
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	1
11	0	0	0	0	0	0	0	0	0	1
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	1	0	1	1	0	2
15	0	0	0	0	0	0	0	0	0	1
16	0	1	0	0	0	0	0	0	0	2
17	0	0	0	0	0	0	0	0	0	0
18	0	0	1	0	0	0	0	0	1	1
19	0	0	0	1	0	1	0	1	1	0
20	0	0	0	0	0	0	0	0	0	1
21	0	0	0	0	0	0	0	1	0	1
22	0	0	0	1	0	0	0	0	0	0
23	0	0	0	0	0	0	0	1	0	2
24	0	0	0	0	0	0	0	0	0	1
25	0	0	0	0	0	0	1	0	0	0
26	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	1
28	0	1	0	0	1	0	1	1	0	1
29	0	0	0	0	0	0	0	1	0	1
30	0	0	0	0	0	0	0	0	0	1
31	0	0	0	0	0	0	0	1	0	2
32	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	1
34	0	0	0	0	0	1	0	0	1	0
35	0	0	0	0	0	0	0	1	0	1
36	0	0	0	0	0	0	0	0	1	0
37	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	1	0	1
39	0	1	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	2
41	0	0	0	0	0	0	0	0	0	1
42	0	0	0	0	0	0	0	0	0	0
43	0	1	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	2	0	1	1	0	1	1	1	1
47	0	0	0	0	0	0	0	0	0	1
48	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0
50	0	1	0	0	0	0	0	0	0	2

Figure 4.4.a Comment field in vector matrix format

Once the vector matrix generated, `cbind()` function is used to join vector, matrices, or data frames by column. This function implements "column bind." It is commonly used when you have many data structures with the same amount of rows and wish to merge them into a single structure.

#### 4.5 RESULTS AND INSIGHTS

The final step is to draw the barplot for the sentiment analysis for the imported file. In RStudio, the `barplot()` function is used to generate bar plots, which are graphical representations of categorical data. Bar graphs are helpful for visualising categorical variable distributions or comparing distinct categories frequencies or proportions.

Ex:

```
> barplot(colSums(s1), col=rainbow(7), beside = TRUE, names.arg = colnames(s1), xlab=' ', ylab='count', main='Sentiment analysis of YouTube video comments', las = 2, cex.names = 0.9)
```

- `barplot(values)` creates the bar plot using the values provided. here sentiment analysis such as anger, disgust, joy and so on.
- `colSums(s1)` –It calculates the column wise sum of the matrix or data frame s1, here each column represents a sentiment category.

- `Col=rainbow(7)`- It specifies the colors of the bars using the rainbow color palette.
- `Beside=true` –it gives us the different categories are placed beside each other rather than stacked.
- `Name.arg=colnames(s1)`: Use the column name of s1, as the labels for the bars on the x axis.
- `xlab = ""` and `ylab = "count"` set the labels for the x-axis and y-axis, respectively.
- `main = 'Sentiment analysis of YouTube video comments'` sets the title of the plot.
- `Las=2` :it rotates the x axis label text to 90% of its default size.
- `Cex.names=0.9` :It adjusts the size of the x-axis label text to 90% of its default.

The sentiment analysis for the uploaded comment file is depicted in the Figure 4.4.b Sentiment analysis for youtube comment.

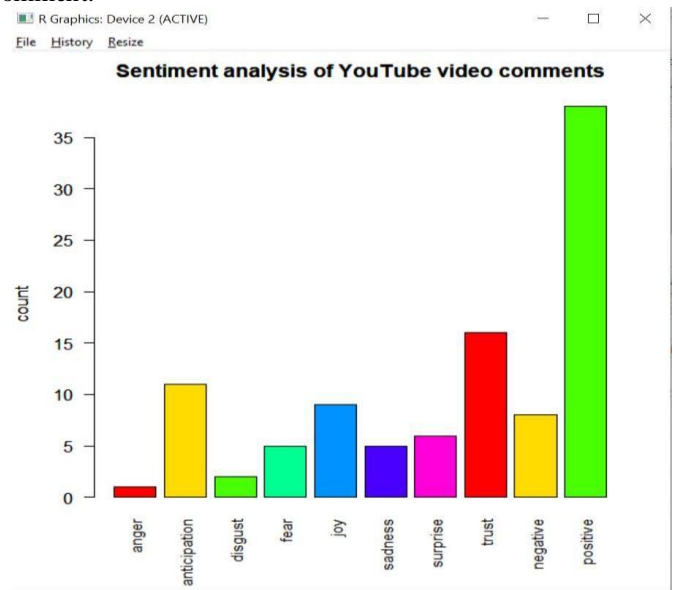


Figure 4.4.b Sentiment analysis for YouTube comment

From the resultant bar chart, we come to know the various level of emotions of the given comments in the YouTube link, based on that the channel creator can tune their videos into audience expectation. The various accuracy metrics will be incorporated in future.

#### IV. CONCLUSION

Sentiment Analysis of YouTube comments can provide useful insights into viewers' emotions, views, and attitudes towards specific video or topics. By analysing the sentiment conveyed in comments, artists, marketers, and researchers can gain a deeper understanding of audience perceptions, identify areas for development, and customise their material to better resonate with them.

As technology progresses, including sentiment analysis into content design may become increasingly important for staying relevant and creating meaningful connections with viewers in the ever-changing landscape of online media. In this work, limited dataset and model are used. However, in the future, this can be expanded to a larger audience and more model with various sentiment analysis metrics will be evaluated. If this technique is used on YouTube, the audience will be able to see the reviewer's emotions with a single glimpse. Thankyou.

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### Biographies and Photographs



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Dr.A.Jaya is a Professor in the Department of Computer Application and Director in the Department of CDOE(Centre for Distance and Online Education). she works on the techniques of Case based Reasoning and Natural Language Processing for Automatic construction of stories. She is recognized supervisor of B.S. Abdur Rahman University and currently she is guiding 8 research scholars. She published 100 research articles out of which 37 in scopus indexed International journals and presented 52 papers in both International and National conferences including three research articles in IEEE conferences, one in ACM Digital Library, and two in Springer conferences. Her research articles were recognized with Best paper awards, in IEEE International Conferences.