



Introduction

What is the YouTube Trending page?

The YouTube Trending page is a place users flock to, to quickly see what is popular and current on YouTube. So naturally any video that makes the page with grow far quicker than if it hadn't.

The YouTube Trending page is a competitive battleground where videos to fight their way to the number one position and stay there as long as they can. Although there very much is cloud of competition that rains over the page, there is nothing creators can do but produce the best video they can and hope. YouTube's Trending page became infamous through its seemingly random ways of choosing which videos are pushed onto it. Sometimes a creator's video will get far more views than videos that are currently on the trending page and in a shorter time, but it wouldn't be on trending. And it goes the other way, some videos are pushed to trending are sitting stagnant on 40k views. As YouTube developed through the years, many creators made it their goal to reach the trending page, often to no avail. But is there a reason most of the content creators on YouTube hardly see their video pop up there?

Definition

Rules, and unspoken rules

With YouTube being at the size it is, it must pander to the companies who pay for advertisements; this is their business model. No adverts, no money. Because of this, YouTube has strict measures for videos that can stay on the platform. If a video is to break any of the following rules it will be removed: sensitive content, violent or dangerous content, regulated goods and misinformation. It's clear to see why those rules are in place [1]. But what about the unspoken rules of the trending page, well, they're more a wish list that they hope they can create [2]. This list is what YouTube aims the Trending page to be like.

- Appealing to a wide range of viewers
- Are not misleading, clickbaity or sensational
- Capture the breadth of what's happening on YouTube and in the world
- Showcase a diversity of creators
- Ideally, are surprising or novel

So is it an algorithm or a person that picks what goes on the Trending page? Well, its both, but only in some places. Take the United States of America. All videos that the algorithm picks to push to the trending page have a final human filter before they are pushed to the page [2].

What makes a video trend?

Understanding what makes a video trend is useful to know before we dive into the analysis [2].

- View count
- How quickly the video is generating views
- Where views are coming from, including outside of YouTube
- The age of the video
- How the video performs compared to other recent uploads from the same channel

These key performance indicators (KPI) are most likely for a machine learning model, no human could take all these KPI's and spit out accurate suggestions. Most likely they use a clustering model. All the data of all the videos uploaded is accessible to YouTube, so what they most likely did was take some of the top videos across many categories and trained a clustering model to segment videos into different sections. Now when a new video is released, if it meets some pre metrics like a given number of views in 15 minutes, then it will be fed into the model and put into a cluster. If it is placed into a trending cluster, then it will be pushed to the Trending page.

The dataset

The dataset (of Kaggle) contains 38,916 rows and 16 columns and span a year from 2017 - 2018. If a video were to reach the trending page, it would get a single row in the dataset. If the video were to remain on the trending page for the following day, it will gain its next row, and so on until it leaves the trending page.

Analysis

Like to dislike ratio

First, I took the numeric data and looked their correlation. Likes and views have a strong positive correlation. Although it is difficult to see, there is often a sharp rise in likes for a small rise in views, and as the video gains views the likes tend to slow down and almost plateau compared to their sharp rise. In figure 2 these lines that trail off are single videos. Toward the end of the videos time on the trending page the likes and views decelerate and cluster tightly and then the line stops, this is when the video is dropped from the page.

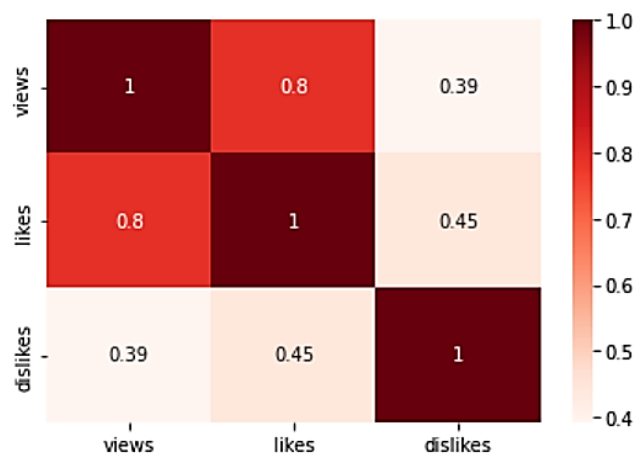


Figure 1 correlation matrix for views, likes and dislikes

Looking at the same graph but with dislikes

(figure 3), we can see that for most videos the dislikes are stagnant as the video gains in views. This is because most videos are liked by most people, hence they are the type of video to get pushed to the trending page. But you can see two paths that trail high up the y axis, this shows they gained a huge number of dislikes in a short time. These two videos are Logan Paul's apology video (So Sorry.) for going to the

“suicide forest” in Japan and filming a victim of suicide by means of hanging. The second sharp increase in dislikes is for the YouTube Rewind made for 2017 (YouTube Rewind: The Shape of 2017 | #YouTubeRewind).

When Logan Paul released the suicide forest video it exploded with hate. From that moment he was shot into the mainstream media and almost universally hated. The video was swiftly removed, as Logan Paul and his team watched the hate flood in, as well as the fact that it violated one of YouTube’s most basic rules, sensitive content. So it is clear to see why the apology video that followed would get such a vast amount of hate. No matter what he said or did, the damage was done.

YouTube rewind is an annual high production video that YouTube fund, record and publish, that showcases trends, popular songs, top videos and the top content creators of that year in a short film. With trends, songs, videos and people all being subjective, every YouTube rewind will normally gain a lower-than-average like to dislike ratio. But one part of the video that most agreed was in poor taste happened at the middle of the video. There was an eclipse of a YouTube play logo, to represent the eclipse that happened in

2017, and at the same time audio snippets of tragedies where many died played for roughly 10 seconds and then some YouTubers are shown holding hands and suddenly more positive audio clips start playing. Many took great offence to this, for not only themselves, but the people directly impacted from the events. It’s not that mentioning such events was in poor taste, but the way it was carried out. If a greater section of the video had been dedicated in a more delicate way, then maybe it could have fitted as a heartfelt moment where people watching can remember those who passed. Then again YouTube rewind had a reputation for being uplifting and fun, and most watching know the major negative events that happened that year and don’t wish to be reminded, at least not in a YouTube rewind where 30 seconds later Logan and Jake Paul are playing with slime. Although the video did receive a high number of dislikes it did have a positive like to dislike ratio of 1.89, unlike Logan Paul’s apology which had a like to dislike ratio of 0.8. It’s clear to see why these videos shot up in dislikes.

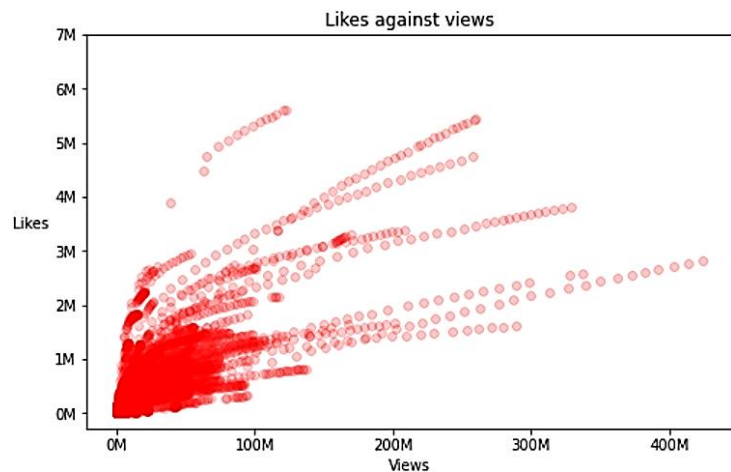


Figure 2 scatter plot of likes against views

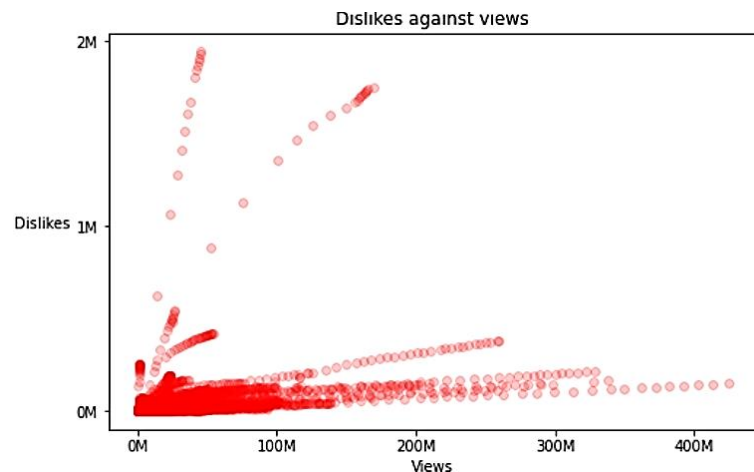


Figure 3 scatter plot of dislikes against views

Time to trend and time spent trending

An interesting concept is how long it takes for a video to trend. We know that views, how quickly a video gains views, where the views are coming from, and the age and the channel all come together to decide whether the video should trend [2].

From figure 4 you can see that most videos trend only 1 day after upload, some even the same day, this is due to the trending page being updated every 15 minutes. The data seen follows a log distribution. It is hard to know whether this exponential decay is due to human behaviour or the algorithm, or both. Although it is easy to draw a clear separation between human and computer, it becomes harder knowing the model is learning from human behaviour.

For figure 4 the data had outliers removed as occasionally there was a video from years ago that happened to trend and the graph would have a data point at 3000 days. What we can take away from this graph is that 70% of videos trend within the first 3 days.

Although learning how long it takes for a video to trend is interesting, the time a video spends on the trending page can a better insight into how the trending page works. The most frequent time a video spends on the trending page is a single day. This may show that most videos pushed to the trending page are not actually videos people want to see, as if they were, people would watch them, and the video would

continue to trend. Although algorithms can predict things well, they cannot predict with 100% certainty for what humans would want to watch, but they can make a good guess. But they don't have to be 100% because if there was statistically a video a given human would want to watch the absolute most, it might not be found, the algorithm just has to push videos that people would watch even if they didn't know they did. One video may become huge and an almost identical video, to a computer, may not. But most of the time the algorithm seems to do a good job as most videos that make it onto the trending page stay for longer than a day. An interesting drop in videos occurs at exactly 2 weeks. This feels like a trend may have been discovered by the algorithm where videos drop off in views after 2 weeks, so the algorithm just drops certain videos off, or videos do just drop off in some of the metrics at around that time.

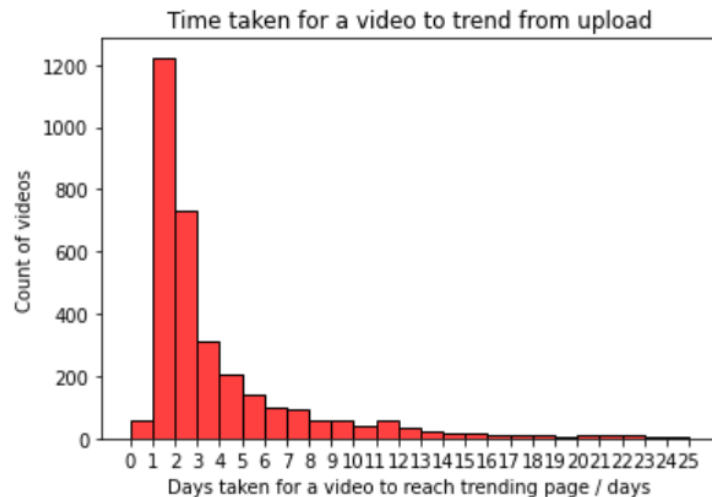


Figure 4 time taken in days for a video to reach the Trending page

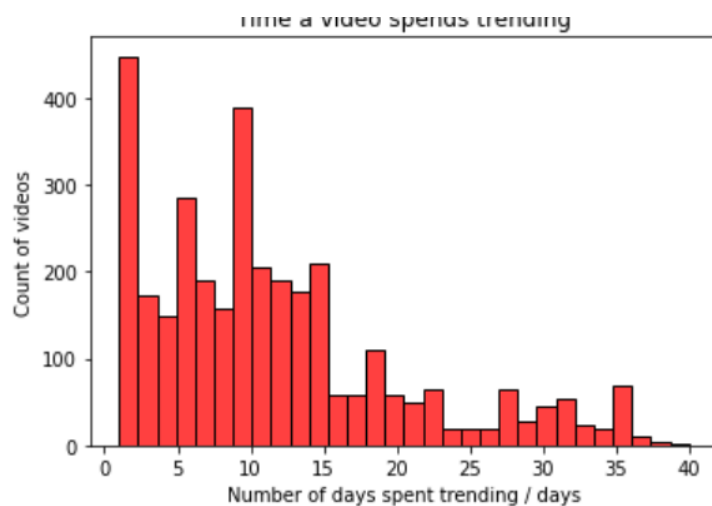


Figure 5 time in days a video spends on the trending page

The top 5 videos that spent the longest on the trending page are.

Video Title	Days spent on the Trending page
Maroon 5 – Wait	40
Jurassic World: Fallen Kingdom – Official Trailer #2 [HD]	38
Anne-Marie – 2002 [Official Video]	38
Justin Timberlake’s FULL Pepsi Super Bowl LII Halftime Show! NFL Highlights	38
Whethan, Dua Lipa – High (Audio)	37

Comments

On YouTube, the channel that uploaded a given video has the option to remove comments. Some channels have comments removed by default, not necessarily because they often receive hate, but it may be company policy for YouTube or the channel. News channels can often be seen with comments disabled. As well as news channels, a new rule was implemented that any video that has children in, will have the comments automatically disabled by YouTube, this was due to inappropriate comments being left by mature immature users. Sometimes when a video is receiving a large amount of hate in the form of comments they will be disabled by the channel. This would imply that videos with disabled comments would have a lower like to dislike ratio.

As you can see from the graph videos with comments enabled have, on average, 2 times the like to dislike ratio than videos with comments disabled. This is

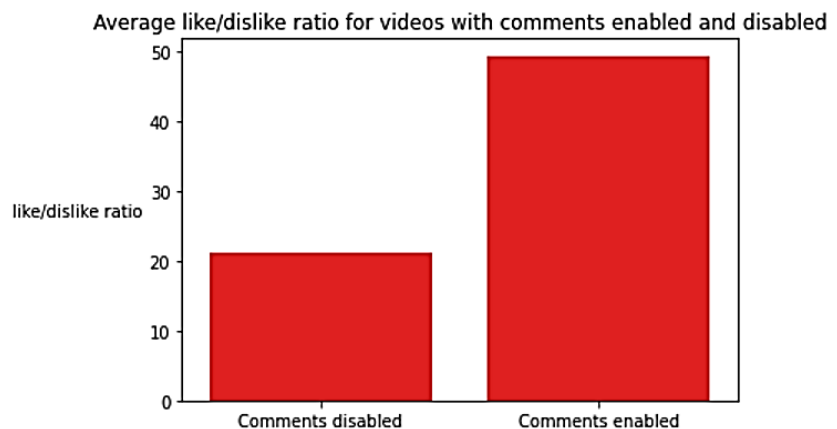


Figure 6 average like to dislike ratio for videos with their comments enabled and disabled

probably due to the fact news channels on YouTube attract people who generally hold strong beliefs and often disagree or agree strongly with what the media is putting out. Another reason is that if a video is receiving enough hate that the channel feels comments should be disabled, or expect to, the comments are disabled before the video is uploaded. Then the only place a user can voice their opinion is the dislike button, hence these videos will have a lower like to dislike ratio.

Category

There are 15 categories that YouTube videos can be put into.

Music	Science & Technology	Gaming	News & Politics
Non-profits & Activism	Education	Travel & Events	Comedy
Pets & Animals	Entertainment	People & Blogs	Sports
Film & Animation	Autos & Vehicles	How-to & Style	

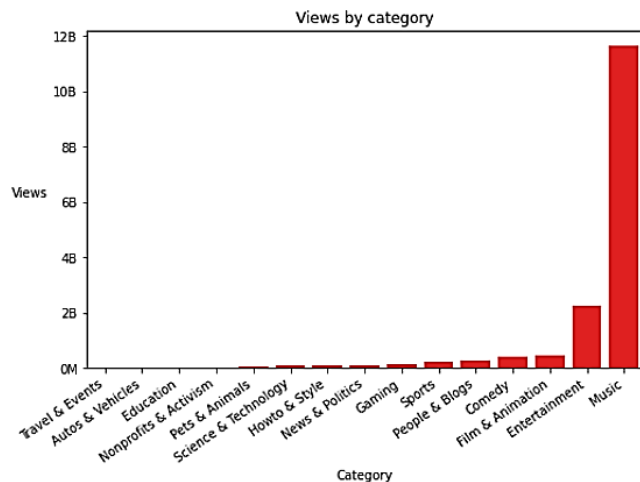


Figure 9 view count total by category on the Trending page

to like the video. As well as that, people may feel like they are contributing to whatever cause is being shown just by liking the video, which in a way they are, as the video will be more likely to stay on the trending page and more people will see it. This type of video must be done with not only good intentions but good execution. If the creator of the video is deemed in anyway trying to benefit themselves from the video by using charity or activism, the viewers will notice, and the video will be plagued with dislikes. Much like Logan Paul's last video in his career ending/making unintentional dark trilogy on suicide. This last video was all about suicide awareness, donations and a journey for himself and views to go on to learn more about suicide. But the video was still plagued by dislikes. The video got a like to dislike ratio of 4, which is still positive. It was clear that many views had forgiven him and believed his sincerity and his regret for what he did, but many didn't. The video had to be made otherwise no one would ever forgive him. This video is tagged under Non-profits and activism. But another reason for the higher like to dislike ratio was that, as I mentioned, the suicide forest video shot him into the mainstream, this brought a lot of new people to his channel and when he uploaded his apology, they were all there and ready to dislike. But this

Looking at these categories and how views, likes, dislikes and time spent on the trending page vary. Music and Entertainment hold 54% of the total videos to trend from 2017 to 2018. But when we look at where the views are held, music dominates by holding 67% of the total viewership. When it comes to the average likes a video receives, Non-profits & Activism bests music by over 10,000 average likes. This may be due to the fact Non-profits & Activism tagged videos are generally selfless acts and donations being made, this type of content can make people feel very sad or very happy, but both emotions will make people want

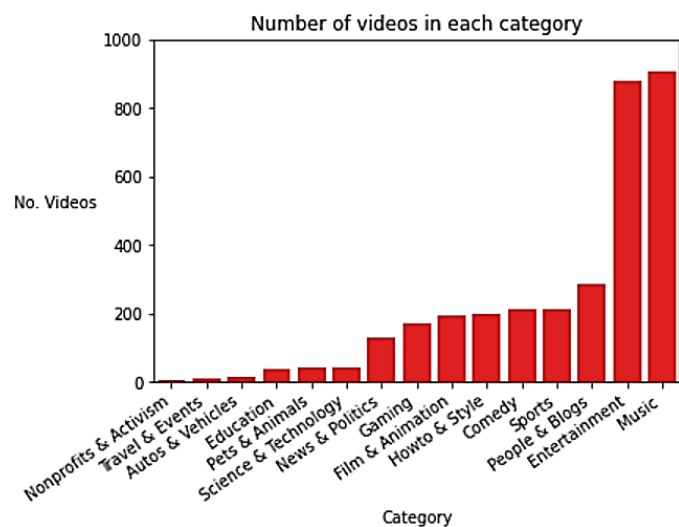


Figure 7 total number of videos in each category on the Trending page

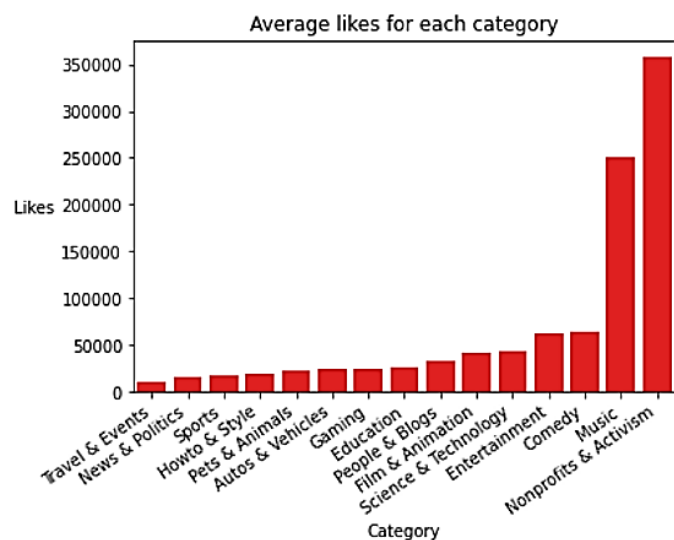


Figure 8 average likes for each category on the Trending page

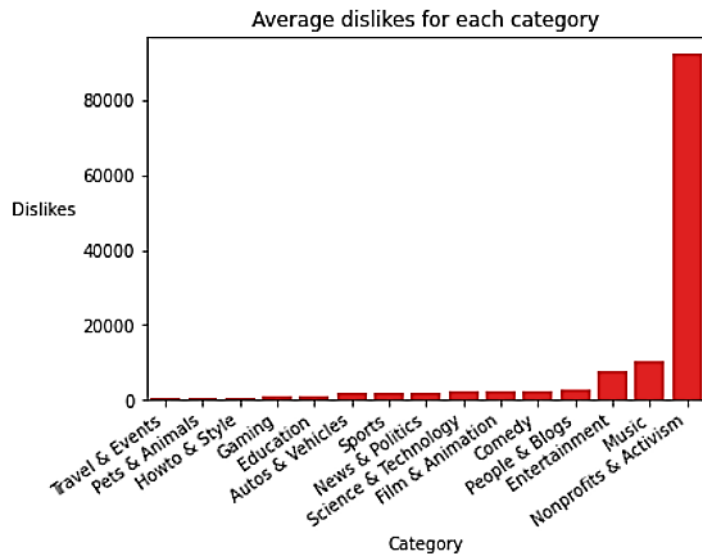


Figure 10 average dislikes for each category on the Trending page

ratio for each category. At the high end we have Pets & Animals with a like to dislike ratio of 41, which makes sense, people love animals. Non-profit & Activism has the lowest like to dislike ratio, which is easy to understand based on what I have gone into previously.

The average time videos in categories spend on the trending page. Music and Non-profits & Activism sit at the top with both having around 15 days on average spent on the trending page. This is because for a music video to reach the trending page it will most likely be already established artists or viral songs which will float on the trending page for a while.

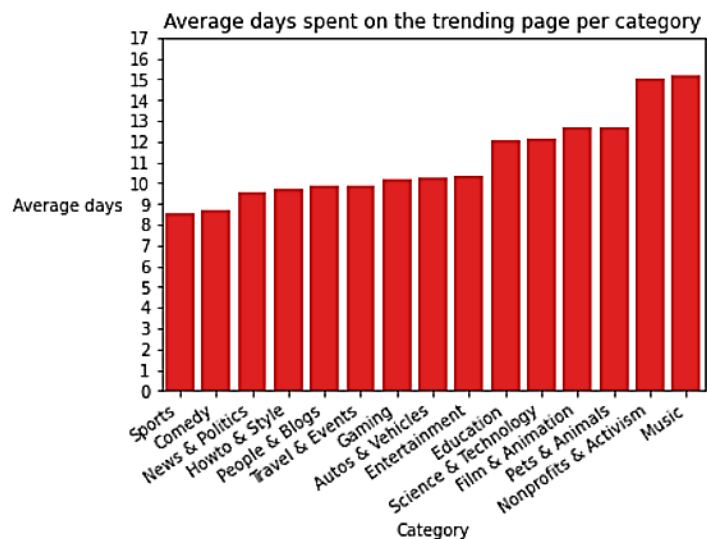


Figure 11 average time videos in a given category will spend on the Trending page

Conclusion

Infamous yet still used by millions. The YouTube Trending page is a diverse ever-changing cluster of videos that tries its best to represent what YouTube is at all times. And all the users seem to watch is music, well, proportionally. Although music, entertainment and pets & animals are beloved and drowning in likes, it's not all so glorious for other categories. Non-profit & activism is a category that's had a red cross on its door since YouTube became about the creators. Abusing charity for popularity is about as transparent as glass

and as polarising as sunglasses, do it and your fans will turn, and you'll attract hate from all corners of the platform.

On the other hand you could sit neutral as a gaming or travel & events channel where you attract little controversy and are loved by the fans.

References

[1] - <https://support.google.com/youtube/answer/9288567?hl=en-GB>

[2] - <https://support.google.com/youtube/answer/7239739?hl=en-GB>

Kaggle - <https://www.kaggle.com/datasets/datasnaek/youtube-new?select=GBvideos.csv>