



The Changes of YouTube Over Time: An Investigation into View Count, Video Length, and Likes 2013 to 2023

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Coming up with the Idea

-We decided to look at YouTube data over time to see if there were changes in video length and viewership over a decade (2013-2023).

Questions:

Did the creation of short-length video social platforms such as Vine (2013) and TikTok (2016) have an effect on average video length for videos created on YouTube?

Is the number of views or video likes correlated to the length of videos on YouTube during this timeframe?

The Why?

- Companies/organizations know what video lengths are most impactful in gaining viewership on social media platforms such as YouTube.
- Content creators track trends in video length to help them create and better monetize their videos.

Youtube API

- We used YouTube API to pull a series of random videos from each year from 2013-2023

- Faced limitations of the APIs we were able to pull

- Sample size: 1715, average of 172 videos/year

Year	
2013	141
2014	136
2015	146
2016	144
2017	150
2018	159
2019	208
2020	141
2021	204
2022	129
2023	157

Data Collection and Merging

-Merge each year CSV
into one large CSV to
pull data from

-creating DataFrame

	id	published_at	views	likes	dislikes	\
0	v1w1bvsMt8s	2013-02-04 15:00:39+00:00	200377	3867	0	
1	qMkYlIA7mgw	2013-06-05 21:35:43+00:00	27006549	302388	0	
2	Aj0ftqTGMiM	2013-10-16 23:16:26+00:00	232232	3145	0	
3	JswXLX6mfN8	2013-05-09 18:31:18+00:00	326483	31	0	
4	KfWNOons1FM	2013-10-10 08:29:45+00:00	1815	2	0	

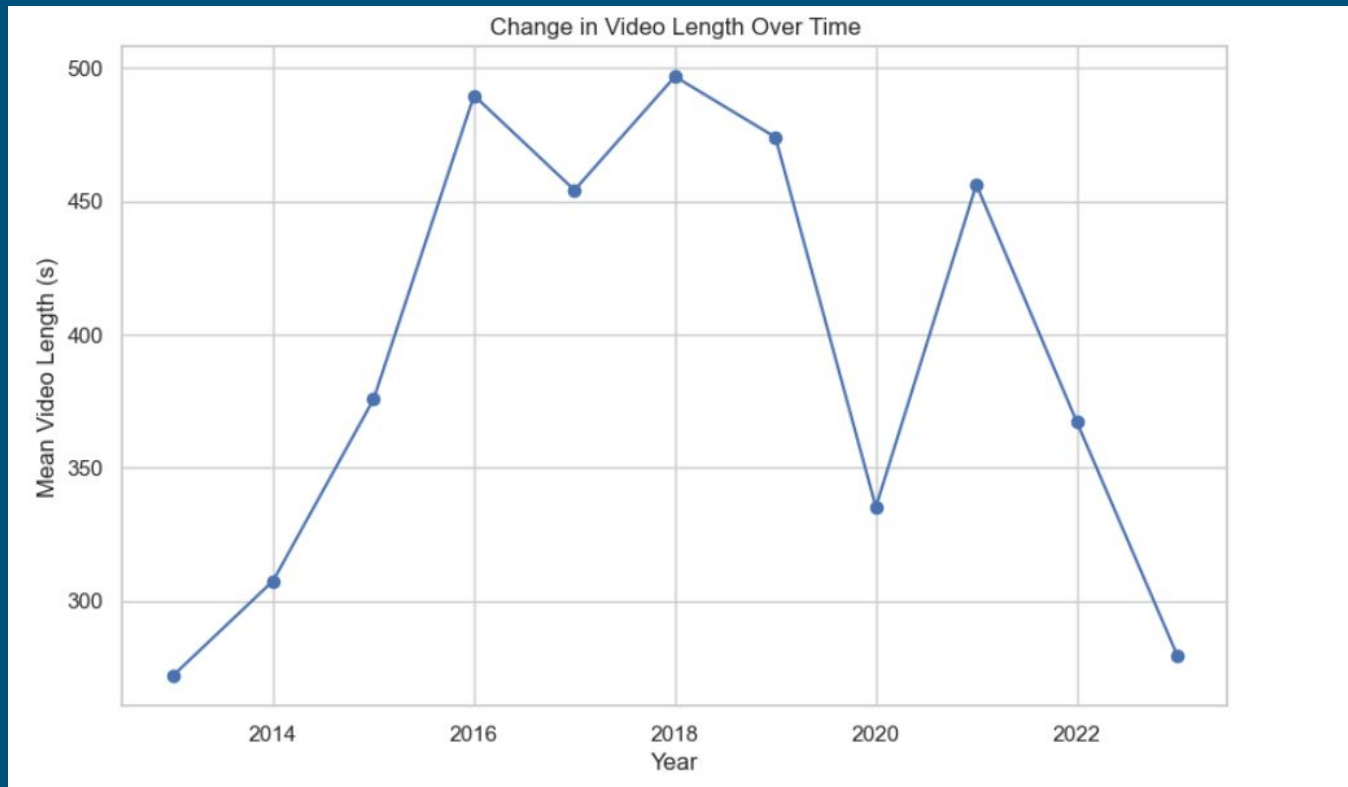
	comments	length	length_minutes	length_seconds	length_seconds_total	\
0	304	PT11M42S	11.0	42.0	702.0	
1	15248	PT4M42S	4.0	42.0	282.0	
2	619	PT36S	0.0	36.0	36.0	
3	3	PT31S	0.0	31.0	31.0	
4	0	PT4M18S	4.0	18.0	258.0	

	year
0	2013
1	2013
2	2013
3	2013
4	2013

Year vs Video Length

2013 to 2016 -Videos started getting longer, going against our initial hypothesis

2019 to 2023-Videos appear to be getting shorter, shortly after Tik Tok and Youtube Shorts started gaining popularity

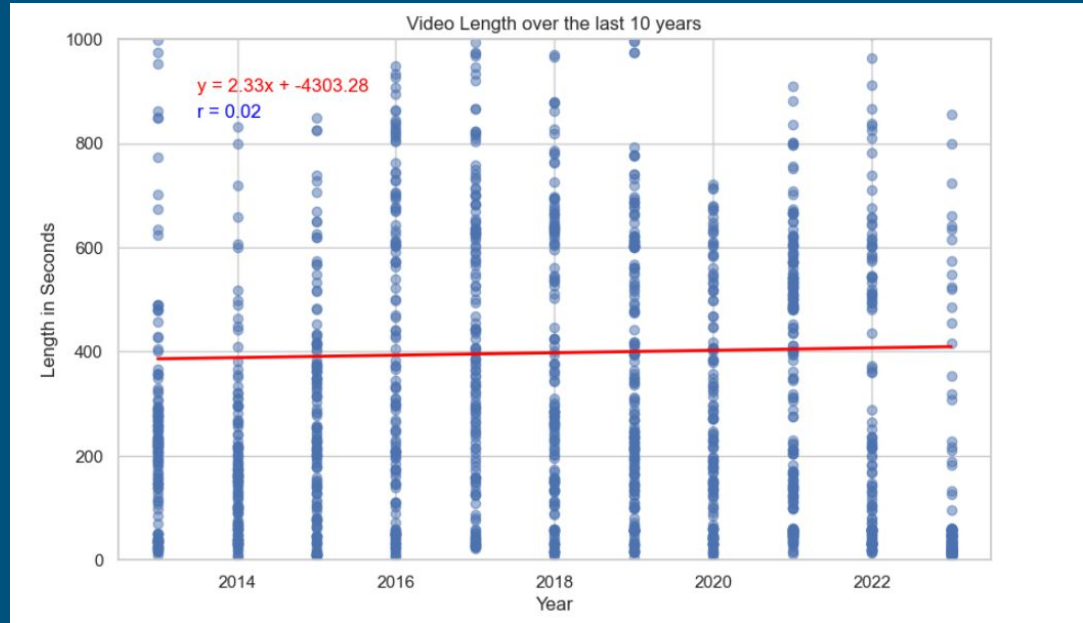


Year vs Video Length... But as a Scatter Plot

-Very scattered with major variation

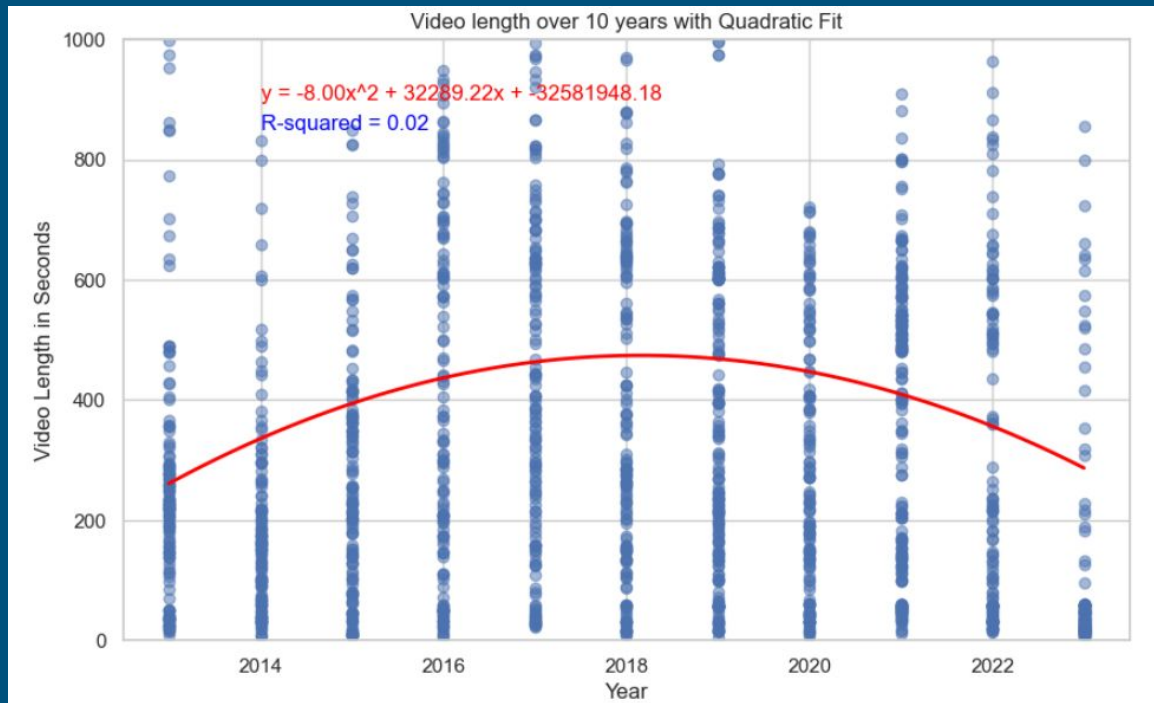
-Hesitant to accept that short video platforms had a significant impact on video length

-Small correlation coefficient...
What does that mean about our data?

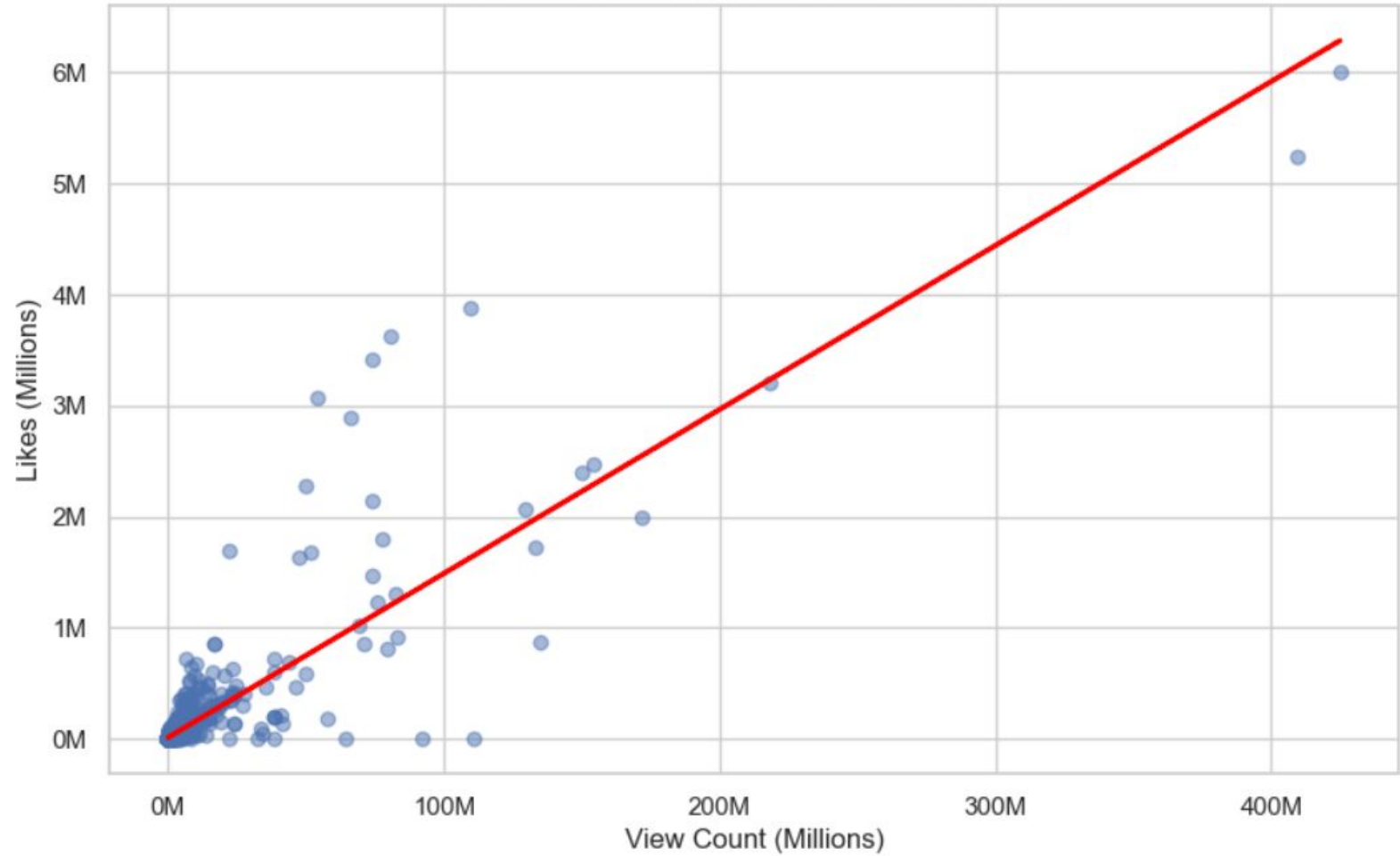


Let's try a Quadratic Fit

A quadratic fit was slightly better, but still not a good fit, we can't draw any confident conclusions based on this investigation

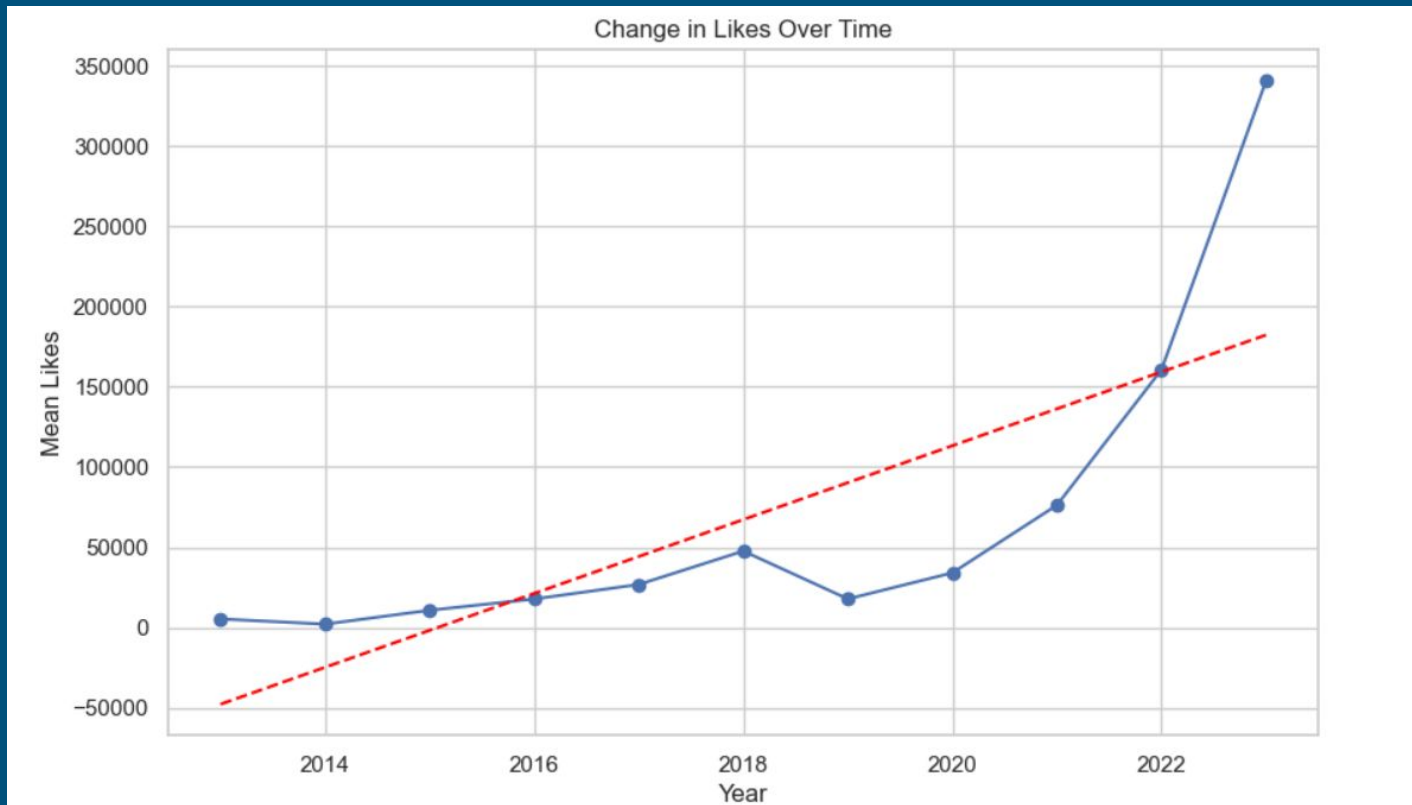


Scatter Plot with Linear Regression: Views vs Likes



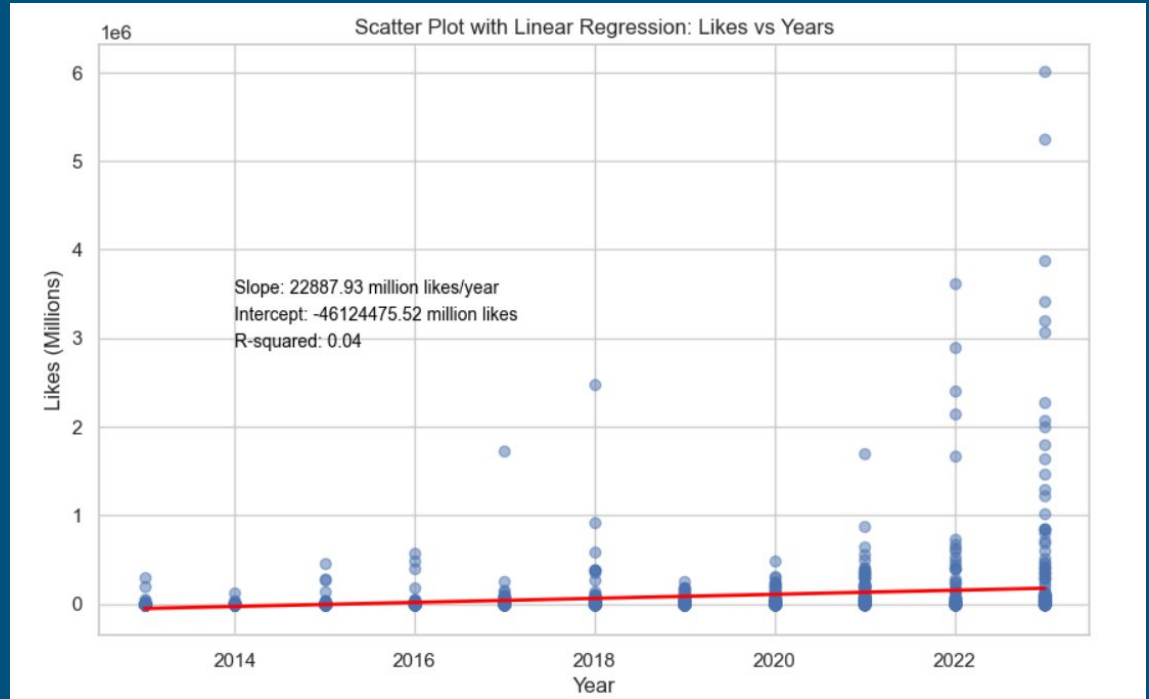
Year vs Likes

Line Graphs

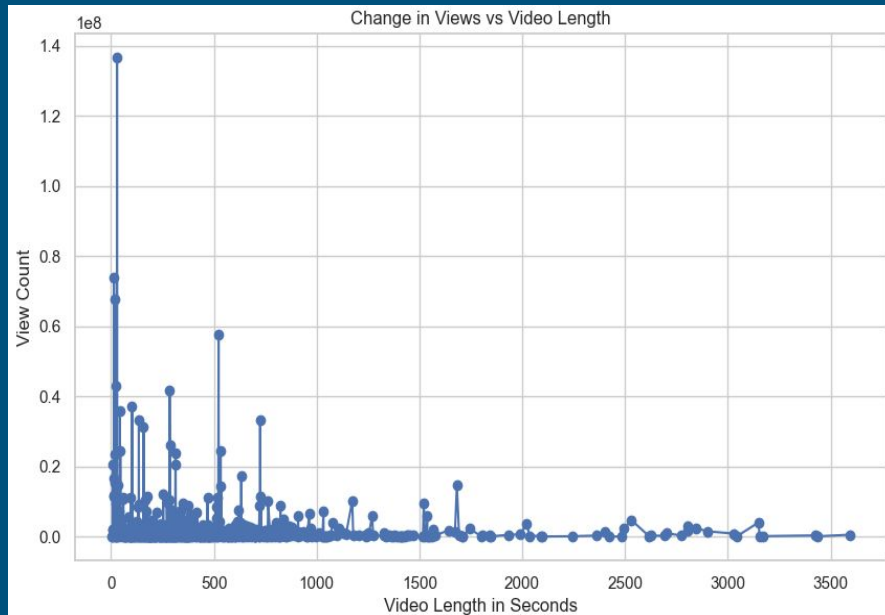
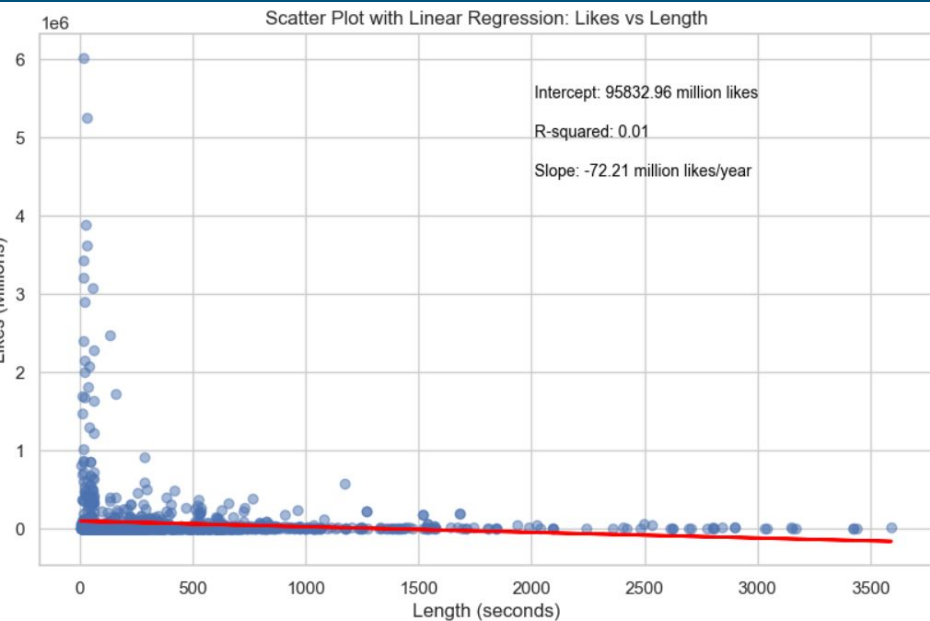


Year vs Likes

-Scatter Plots (lin and quad)



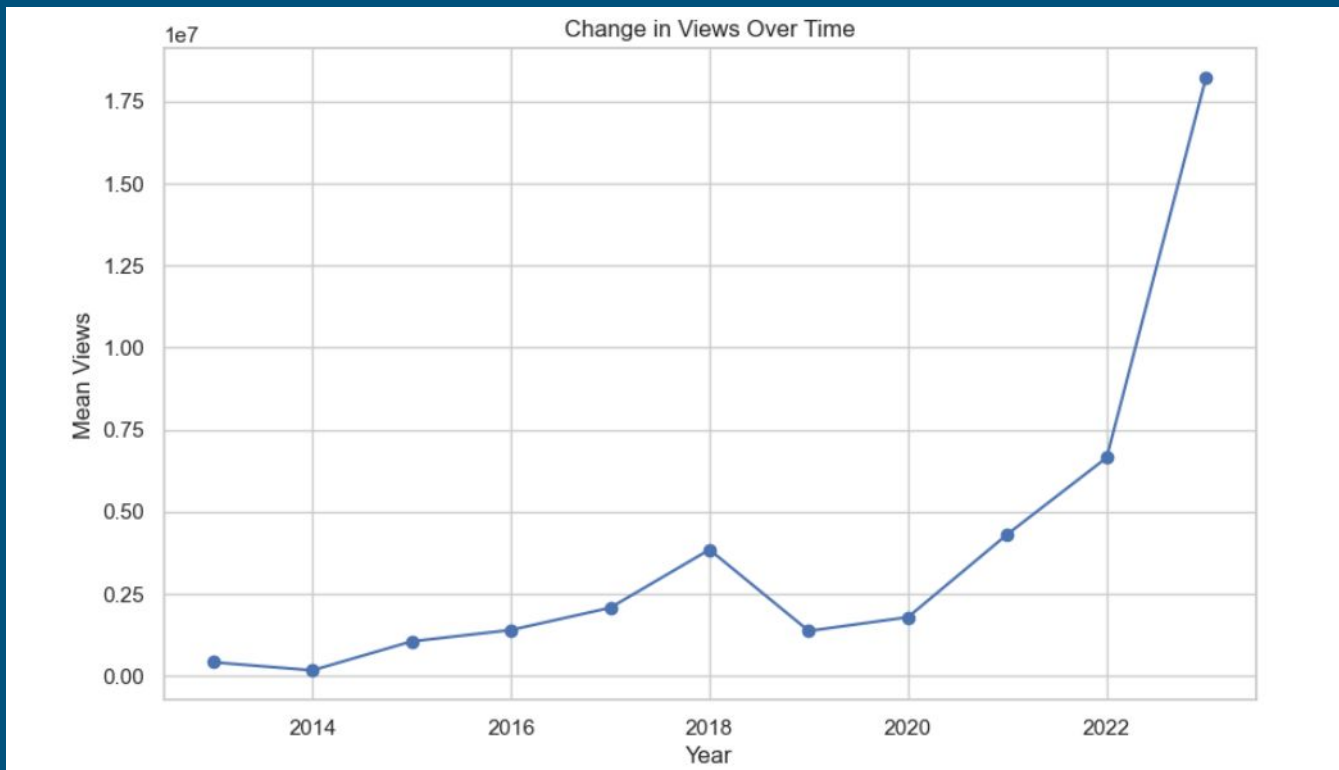
Likes vs length



Analysis & Conclusion

- We used a time series analysis to look at whether the number of views changed over time and if the number of likes changed over time in order.
- We used sentiment analysis to determine whether people prefer shorter videos or longer videos.
- ❑ In conclusion we have shown
 - ❑ Video length appeared to increase until dropping back down from 2019 onwards.
 - ❑ Low r^2 value of .01 for likes vs length
 - ❑ .04 for likes vs years
 - ❑ There was a increase in video length from 2013 to 2016 and a decrease in video length from 2019 onwards
 - ❑ Linear regression correlation coefficient was .01 and a quadratic correlation coefficient of .02 for video length over time
 - ❑ Views and likes have positive relationship
 - ❑ Views to length and likes to length do have a slightly inverse relationship.

Year vs Views... just for funzies



Going Forward

- We would like to use either a better or paid version of the api
- Compare year, video length, view etc. with the *ratio of views to likes* as to get a better gauge of user preference.
- Compare content creator popularity (Mr. Beast, pewdiepie, etc) and popularity of video tags with their average video length.
- Compare viewership and engagement with various video tags
- Did YouTube shorts cause the decrease in video length seen the year YouTube shorts was introduced?
 - Segmented analysis, qualitative analysis, further comparison with other platforms (tiktok, vine, twitch, etc)
- Look at the effects of covid to determine whether the trend breaking spike in video length in 2020 had an effect on our data.