In [1]:
```
# libraries
import numpy as np
import pandas as pd
# !pip install altair;
import altair as alt
import datetime
# !pip install sklearn
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
from sklearn.preprocessing import add_dummy_feature

alt.data_transformers.disable_max_rows();
```

# PSTAT 100 Project Plan Report

### Sections



## Group Information

**Group members**: Harleen Kaur (Member 1), Amelia Meyer (Member 2)

**Contributions**:

1. Member 1: Inital data tidying, Initial Explorations
2. Member 2: Background, Data Description, Exploratory Plots, Planned Work

## Background: Trending Videos on Youtube (US)


According to Cloudfare, YouTube was the 8th most visited site, and the 3rd most visited social media site in 2021. See this cbs article for more rankings.. With millions of users in the US and around the world, YouTube has developed its own gravitational force, pulling people in to watch content varying from makeup tutorials to scuba-divers solving cold cases.

The most popular content on YouTube is referred to as 'trending' - a term that gained popularity due to Twitter's hashtags. Luckily for us, YouTube tracks their top trending videos which, according to Variety magazine, are measured by user interactions "(number of views, shares, comments and likes)".

The purpose of our project will be to analyze the top trending videos on YouTube in the US using a dataset of the daily record of the top trending videos. Our goals are to get a better understanding of the types of videos users are interested in. Given the influence of social media on everyday life, this can give us insight into the state of the world and general trends or interests of YouTube users in the US.

View Youtube's Trending Feed
More on how YouTube influences the topics of today

# Data Description

## Basic Information

### General Description

The dataset we will be using for our analysis is the YouTube Trending Video Dataset which documents the daily record of the top trending videos on YouTube(updated daily).

### Source

Our dataset was collected by Rishav Sharma and made available through Kaggle with for the purpose of user analysis. Rishav lists possible projects as sentiment analysis, categorization based on video comments and statistcs, machine learning to generate comments, predicting popularity of new videos, and general analysis over time.

### Collection Methods:

The data was collected using the YouTube API as provided by Google which uses web-scraping.

### Sampling Design and Scope of Inference

We'll be focusing specifically on the dataset for top trending YouTube videos in the US. The dataset includes several months of data, with up to 200 listed trending videos per day. The sample population is all YouTube videos in the US. The sample frame is the top trending YouTube videos in the US. Our scope of inference will include videos that are available to users in the US.

## Data Semantics and Structure

### Units and Observations

The observational units are the trending videos. One unit is one video that appeared on the top trending YouTube videos list in the US.

### Variable descriptions

| Name | Variable description | Type | Units of measurement |
|---|---|---|---|
| title | video title | object or string | ... |
| date_published | date video was published | object or string | ... |
| channel_name | name of channel video was published on | object or string | ... |
| category | category video falls under; genre of video | object or string | ... |
| trending_date | date video was trending | object or string | ... |
| tags | tags attached to video; video identifiers added by video creator | object or string | ... |
| view_count | number of views video received | int64 or integers | ... |
| likes | number of likes video received | int64 or integers | ... |
| dislikes | number of dislikes video received | int64 or integers | ... |
| comment_count | number of comments on video | int64 or integers | ... |

| Name | Variable description | Type | Units of measurement |
|---|---|---|---|
| comments_disabled | whether the comments were disabled | bool or true/false | ... |
| ratings_disabled | whether the ratings were disabled | bool or true/false | ... |
| year_published | what year the vide was published | int64 or integers | 4-digit year values |
| month_published | what month the year was published | int64 or integers | 1 or 2-digit month value |
| year_trending | what year the video was trending | int64 or integers | 4-digit year value |
| month_trending | what month the video was trending | int64 or integers | 1 or 2-digit month value |

### Example rows

In [2]:
```
# load new csv
trending = pd.read_csv(r'C:\Users\candy\Documents\PSTAT100FinalProject\trending.csv')

# print a few example rows of dataset in tidy format
trending.drop(columns=['Unnamed: 0'], inplace=True)

trending.head(4)
```

Out[2]:

| | title | date_published | channel_name | category | trending_date | |
|---|---|---|---|---|---|---|
| **0** | I ASKED HER TO BE MY GIRLFRIEND... | 2020-08-11 | Brawadis | People & Blogs | 2020-08-12 | brawadis\|prank\|basketball\|skit |
| **1** | Apex Legends \| Stories from the Outlands – “Th... | 2020-08-11 | Apex Legends | Gaming | 2020-08-12 | Apex Legends\|A character |
| **2** | I left youtube for a month and THIS is what ha... | 2020-08-11 | jacksepticeye | Entertainment | 2020-08-12 | jacksepticey meme\|men |
| **3** | XXL 2020 Freshman Class Revealed - Official An... | 2020-08-11 | XXL | Music | 2020-08-12 | xxl freshman\|xxl fresh |

# Initial explorations

# Basic properties of the dataset

## Variable summaries

Our dataset consists of 16 columns adn 113391 rows. There are no missing values in our dataset. Our resulting dataset consists of the variable: title, date_published channel_name, category, trending_date, tags, view_count, likes, dislikes, comment_count, comments_disabled, ratings_disabled,year_published, month_published, year_trending, month_trending. Trending dates range from 2020-08-12 to 2022-02-25.

As we observed our dataset, we found some cool things. The most viewed and liked video is "Butter" by BTS ( a iconic KPOP songs). In fact, we see KPOP music in the top charts quite often. Curious as to which genres have the most total views, we found that music, entertainment, and gaming tend to have a highest amount of view counts.

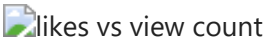
The two boolean variables in our dataset have the following allocations:

| variable name | number observations with True | number of observations with False |
|---|---|---|
| comments_disabled | 1739 | 112252 |
| ratings_disabled | 779 | 113212 |

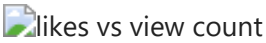
Our cateogry variable can be represented as one of the following 15 categories:

| category | number of observations |
|---|---|
| Nonprofits & Activism | 88 |
| Travel & Events | 516 |
| Pets & Animals | 551 |
| Autos & Vehicles | 2073 |
| Education | 2724 |
| Howto & Style | 3599 |
| Science & Technology | 3859 |
| News & Politics | 4077 |
| Film & Animation | 4486 |
| Comedy | 6561 |
| People & Blogs | 10302 |
| Sports | 12204 |
| Music | 19558 |
| Gaming | 20437 |
| Entertainment | 22956 |

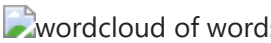
# Exploratory analysis


likes vs view count

The above chart panels are the number of views per video against the number of likes per video. Since our dataset is so large, we took a random sample of 5000 observations for the graphics here. We can see that the category with the most likes and views is music for 2020 and 2021, but is a toss-up between Sports and Science & Technology for 2022. We can expect our dataset to have more observations for 2020 and 2021 since we are still early on in 2022.


likes vs view count scaled

The above chart is a scaled plot of the number of views against the number of likes per video scaled to only look at the values that fell below the median so as to get a better view of the majority of the data.


wordcloud of words included in tags

Finally, we've included a wordcloud of the words listed under the tags variable. This allows us to visualize which words in our random sample of the dataset appear most frequently which helps us determine the top trending topics. Here, 'among us', 'hip hop', and 'music video' appear to be the most popular.

# Planned work

## Two Topics We Plan to Explore

1. Is there a pattern to which videos make it on the top trending video list?
2. Is there a relationship between comments being disabled and the number of dislikes? Do videos with more likes have a bigger proportion of dislikes?

## Proposed approaches

1. Look at the variables associated with each video such as their tag, category, words used in the title.
2. Try linear modeling of number of dislikes against comments_disabled. Calculate the proportion of dislikes and compare with likes.

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# Submission Checklist

1. Save file to confirm all changes are on disk
2. Run *Kernel* > *Restart & Run All* to execute all code from top to bottom
3. Save file again to write any new output to disk
4. Select *File* > *Download as* > *HTML*.
5. Open in Google Chrome and print to PDF on A3 paper in portrait orientation.
6. Submit to Gradescope