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EJKghLh1Unswx1wdpx1p8isLmZHBreqR29zJNLbTy/bmsLaIRGMNJuADMdx4AySMdquXdxrOkW3264uLa8t48G5jjgMbKvdlJY9OuD1x1FHLG9hpsjt9WvJNektLm6t7M+eywWssJ3XEQH3kfcAT34BxjBHeukHQVnJWKi7i0UigooAKKACigAooAKKACigAooAKKACigCnqdn/aGl3dlv2faIXi3Yzt3AjP61npo1zPdwXOp3qXH2Y7oIoYfLRXwV3kFmJOCQOcDPSqUrIhxbZXi0DUBpEGlT6jbtawpCimO2ZXKoynBJcjkKQeO/4VdTRIl1y41EuSJYtnk44VjgM/1Kqg/4D703PsHL3KVn4eutMihOn6iiTrCkM3nQb0mCDCsQGBDAcZB5xzTn8NtcB5ry8869kmgd5RHtUJFIHEarngZz3J5yc0c/XqLl6D5PDo8t7WG42WLTRTrblMiNkkDkKc8KcY29s8ccU+20E20lmq3TNb2dw0sEbLkqpRl2Zz0BY49Bgds0e00sHLrcUeH42sby2edwZ7trtJUADROWDKRnPIIH19MVHJo+o3yxwanqUU1ojBmjgtzE02DkBzuPGRyABn6cUKaG4sfcaRe3dzGtxqCPZx3K3Cp9nAlyrblXfnGAQP4c44z1rbHSpck9hxVhaKRQUUAFFABRQAUUAFFABRQAUUAFFABRQAUUAFFABRQAUUAFFABRQB//2f/hMeRodHRwOi8vbnMuYWRvYmUuY29tL3hhcC8xLjAvADw/eHBhY2tldCBiZWdpbj0n77u/JyBpZD0nVzVNME1wQ2VoaUh6cmVTek5UY3prYzlkJz8+DQo8eDp4bXBtZXRhIHhtbG5zOng9ImFkb2JlOm5zOm1ldGEvIj48cmRmOlJERiB4bWxuczpyZGY9Imh0dHA6Ly93d3cudzMub3JnLzE5OTkvMDIvMjItcmRmLXN5bnRheC1ucyMiPjxyZGY6RGVzY3JpcHRpb24gcmRmOmFib3V0PSJ1dWlkOmZhZjViZGQ1LWJhM2QtMTFkYS1hZDMxLWQzM2Q3NTE4MmYxYiIgeG1sbnM6eG1wPSJodHRwOi8vbnMuYWRvYmUuY29tL3hhcC8xLjAvIj48eG1wOkNyZWF0b3JUb29sPldpbmRvd3MgUGhvdG8gRWRpdG9yIDEwLjAuMTAwMTEuMTYzODQ8L3htcDpDcmVhdG9yVG9vbD48eG1wOkNyZWF0ZURhdGU+MjAyMS0xMS0wNVQwNzowNzowNDwveG1wOkNyZWF0ZURhdGU+PC9yZGY6RGVzY3JpcHRpb24+PC9yZGY6UkRGPjwveDp4bXBtZXRhPg0KICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgIC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MSc in Data Science

***Big Data Management***

#### **Project 2**

**Nikolaos-Marios Tsarouchas**

***AM: dit2120dsc***

***Email: dit2120dsc@go.uop.gr***

**Zoi Papakonstantinou**

***AM: dit2118dsc***

***Email: dit2118dsc@go.uop.gr***

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# Abstract

The purpose of this project is to study data related to the most popular YouTube videos during the period Nov’17-Mar’18. The data are reported in ten regions: U.S.A(US), Great Britain (GB), Germany (DE), Canada (CA), France (FR), Russia (RU), Mexico (MX), South Korea (KR), Japan (JP), and India (IN). Data processing was implemented into a NoSQL database, MongoDB. In the first chapter, the necessary conversions and transformations of the data needed for the purposes of this project is performed. Next, in chapter two we showed the number of views, "likes" and "dislikes" for each video for the channel "Saturday Night Live". In the third chapter, we created a new metric that counted the number of tags for each video and visualized the number of views and tags in a scatter plot. In the fourth chapter, we compared the number of videos displayed on each tag between the two areas of Grant Britain (GB) and the USA. The results were represented by a bar chart. In the fifth chapter, we calculated the average number of views, "likes" and "dislikes" for videos that have disabled comments. We visualized and analyzed the results. Finally, we grouped the videos by publication date from December 5, 2017 to March 5, 2018. We were asked to visualize the data with a scatter plot, however since the scatter plot did not indicate a clear correlation, we also visualized the data with a bar chart.

All the scripts are available at the [git](https://github.com/nikolis7/Big-Data-Management-Project-2) repo.

# Glossary

Existing Dimensions/Measures

|  |  |
| --- | --- |
| video\_id | Unique video code |
| trending\_date | The video date that was found in the list of popular videos (in YY.DD.MM format) |
| title | The title of the video |
| channel\_title | The title of the channel that posted the video |
| category\_id | The code of the category to which the video belongs |
| publish\_time | The date of publication of the video (in ISO 8601 format), |
| tags | The tags used in the video |

New Measures

|  |  |
| --- | --- |
| Num\_tags | Numerous tags that appeared in a video |
| Count\_tags | Count the appearance of tags |

# 1. Preprocessing of the data

The data provided for the purposes of this project comprised of 20 files 10 in json format and the rest in csv format. Based on the assignment requirements we requested to convert the csv files to json. In order to do this, we developed a function and ran it to all csv files. The following code was used in python:

# Import the necessary libraries

import csv

import json

import glob

import os

import time

cwd = os.getcwd()

path =cwd+"\Data"

extension = 'csv'

all\_filenames = [i for i in glob.glob('\*.{}'.format(extension))]

# Create the function for converting the data

def csv\_to\_json(csvFilePath, jsonFilePath):

jsonArray = []

#read csv file

with open(csvFilePath, encoding='latin-1') as csvf:

#load csv file data using csv library's dictionary reader

csvReader = csv.DictReader(csvf)

#convert each csv row into python dict

for row in csvReader:

#add country in each dictionary

row["country"] = csvFilePath[0:2]

#add this python dict to json array

jsonArray.append(row)

extension = 'csv'

all\_filenames = [i for i in glob.glob('\*.{}'.format(extension))]

#convert python jsonArray to JSON String and write to file

with open(jsonFilePath, 'w', encoding='latin-1') as jsonf:

jsonString = json.dumps(jsonArray, indent=4)

jsonf.write(jsonString)

# Convert files

for i in all\_filenames:

csv\_to\_json(i, i.split('.')[0]+'.json')

As shown in the above code we decided to add an extra name/value pair for county in order to add all the json files in one collection and separate them by filtering based on country. An example of how the data are portrayed in the compass is shown below:

Graphical user interface, text, application, email

Description automatically generated

Apart from this addition, in order to answer the necessary queries, some transformations were necessary. These transformations were:

* Converting publish time to date format
* Converting views, likes and dislikes from string to integer
* Converting tags in Array

The tags after the conversion[[1]](#footnote-1) are in an array format and displayed in compass in the following format:

Graphical user interface, text, application, email

Description automatically generated

Values conversion is possible either via code or via the environment of compass and Studio 3T. For publish time we used code while for the rest the environment of Studio 3T in order to explore more options.

# 2. What do we know about the publications of the very popular channel Saturday Night Live?

We found the publications of the channel "Saturday Night Live" in the GB (Grant Britain) area. For each video, we displayed the title of the video, the number of views, the number of "likes" and "dislikes" and sorted them in descending order of views.

Firstly, we imported the data into MongoDB Compass and filled in the fields as below.

**MongoDB**

**Graphical user interface, text, application, email, Teams

Description automatically generated**

Secondly, we copied the code and ran in Python.

**Python**

We displayed the results with aggregation and with mongo query:

**Graphical user interface, text, application

Description automatically generated**

Graphical user interface, text, application, email

Description automatically generated

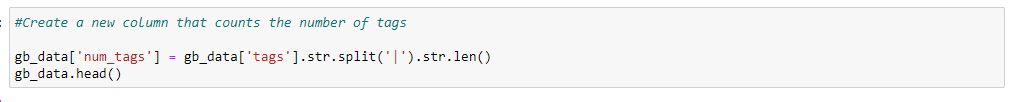
It is observed that videos with many views have more likes as opposed to dislikes, which is to be expected because the user often watches the video he likes.

# 2. How many tags are commonly used in video posts?

We tried to approach the number of tags in two ways in Python. In the first way, we created a new column that counts the number of tags and the second way was to break the tags into an array.

**Python**

Create new column:



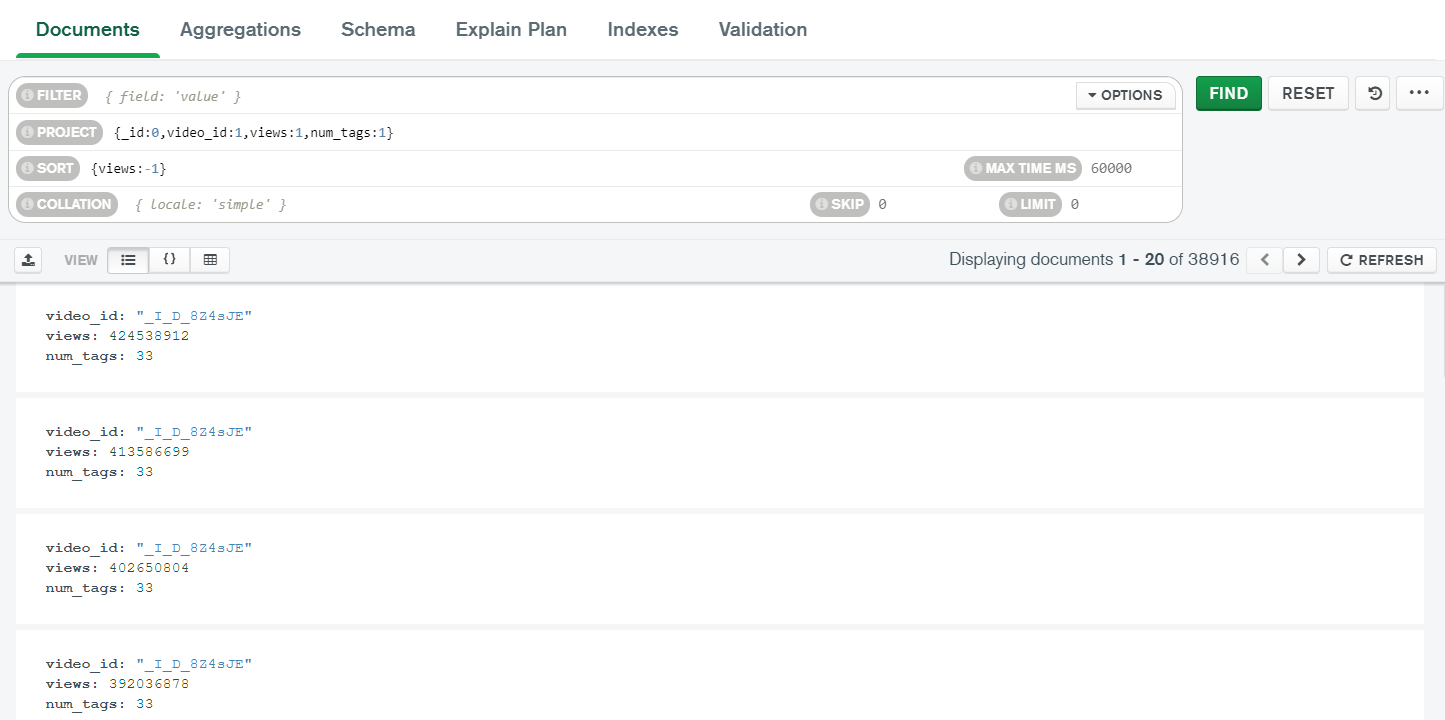
Break tags into an array:

Graphical user interface

Description automatically generated with medium confidence

After calculating the number of tags, we imported the new file into MongoDB Compass and selected the required fields.

**MongoDB**



As mentioned above, we copied the code to run in Python and created a scatter plot that shows the number of views on the x-axis and the number of tags on the y-axis.

**Python**Graphical user interface, text, application, email

Description automatically generated

Table

Description automatically generated

A useful graph for understanding the extreme values in this case is the box plot:

A picture containing chart

Description automatically generated

Because the range of numbers is different, we split the graphs into two to better understand the outliers:Box and whisker chart

Description automatically generated with medium confidence

According to our results, the number of views and tags are independent measures. The number of views from the tags is not affected, so the views in a video do not increase if it has more tags. Clearly, in each case, there are outliers but the issue of views we consider to be other factors and not the tags. For example, the large number of views may be due to the advertising of the video that has been made, the artist the type of video.

# 3. What are the most popular tags in upcoming videos?

We calculated the number of videos for each tag in GB and USA.

**Python**

|  |  |
| --- | --- |
| Grant Britain (GB) | USA |
|  |  |
|  |  |

It is observed that the main labels such as funny, comedy appear in both areas. In general, the number of labels in the US is larger than the GB, this makes sense as one area has a larger population than the other. Note that there are many "None" in the two regions, perhaps because the youtuber has blocked the tags or the user did not find the video interesting.

# 4. What impact does the deactivation of comments have on the public?

We calculated the average number of views, likes and dislikes per comment disabled in Python.

**Python**

|  |  |
| --- | --- |
| Comments Disabled=False | Comments Disabled=True |
| Text  Description automatically generated |  |
|  |  |

To have a complete picture, we divided all the measures by 1000 so that we can compare them.

Chart, bar chart, waterfall chart

Description automatically generated

According to our results, users did not prefer video comments to be turned off. The specific preference can be found with the number of views. The videos that have the "dislike" comments off are no more than "likes". Users do not think that disabling comments is a good way to avoid negative attention.

# 5. What were the most popular dates for video posting?

**Python**

We approached the request in two ways. Initially, we changed the data format to display the video publish date split by year, month and day.

A picture containing rectangle

Description automatically generated

We limited the period between December 5, 2017 and March 5, 2018 to calculate the number of videos per day.Graphical user interface, text, application

Description automatically generated

We represented the data on Scatter plot. At first glance, it is observed that most videos are played in December’17 and February’18.

Chart, scatter chart

Description automatically generated

Due to the volume of data, we could not conclude anything from the scatter plot. There is not clear correlation between Date and the number of videos. We decided to visualize the data with a bar graph showing value fluctuations. It is noticed that most of the videos were published at the end of the year and most of them appear at the end of January’18. In addition, we found that most of the videos are published at the end of each month.

Chart, bar chart

Description automatically generated

# Bonus

We calculated the duration only for the GB region. First of all, we modified the "trend\_date" and "publish\_time" fields because they had different date types. Second, we uploaded the file to Mongo DB and calculated the duration with aggregations as shown below:

Graphical user interface, text, application

Description automatically generated

To verify the results, we calculated the duration in Python:

Table

Description automatically generated

We notice that most popular videos are those which were published within ten days as showing in the following histogram:

Chart, histogram

Description automatically generated

# Conclusion

In recent years, people's interest in YouTube videos has increased. A useful tool for managing the volume of data produced by the videos is Mongo DB, which we also used in our work to answer the questions posed to us. After preprocessing our data, we focused on GB and USA areas primarily. We concluded that the main tags are "funny" and "comedy" that appear in both areas and we noticed that users do not prefer to disable comments on videos. Most videos were published at the end of the year 2017 and in January 2018.

# Analytical Results

**2.1 Query (First 20 results)**

Table

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**2.2 Query (First 20 Results)**

**Table

Description automatically generated**

**2.3 Query (First 20 results)**

**A picture containing text, electronics, screenshot

Description automatically generated**

**Chart, bar chart, histogram

Description automatically generated**

**Chart, bar chart, histogram

Description automatically generated**

**2.5 Query (First 20 results)**

Table

Description automatically generated with medium confidence

1. The code is provided in chapter 2 [↑](#footnote-ref-1)