

Data analysis on K.J YouTuber

Dan Hua Li 12/7/2022

This project attempt to help better understand the growth of YouTube community and find the best ways that as a data scientist how to improve the benefit for their Youtuber in data science area. Definitely, the best ways to be a successful YouTuber is to tell a wonderful story and work hard on the content. However, here I just ignore the content of Ken Jee's YouTube but focus on the title, video's length and I assume those are the important factors that impact the profit. Hopefully, through this project may help making profit on our channel at the beginning. This project objective will try to answer the follow questions: • what is the outlook of data science, is it popular? • What types of video titles drive the most traffic? • Does it exist a appropriate length of video that could help maximizing the profit? This project will combine the tools of Excel, Python and Weka, to envision, execute, and summarize above issues based on a data-science-oriented study. Processing data includes: ▪ Data description

- Data Background information
- Data Dictionary
- Missing values

▪ Data mining process

- data cleansing,
- attribute selection
- transformation,
- training and testing process (10/5-fold cross-validation).
- Linear Regression model

▪ Final Results and Recommendation Data Description Data Background information: The data for this project is loading from Ken's Kaggle, a famous YouTuber in data science, who provided his personal YouTube data Dan Hua Li for analysis. Notice: the study is only based on the data science YouTuber and the limitation of Ken Jee's Private YouTube Data source. The data set I selected includes two parts:

1. Aggregated Metrics By Video with Country and Subscriber Status

- data includes dimensions for which country people are viewing from and if

the viewers are subscribed to the channel or not. - Attributes:15 instances: 55292 2) Aggregated Metrics By Video

- includes all the topline metrics from the channel from its start (around 2015 to






Jan 22 2022). There are 111857 original records and group it into 224 records.

```
In [2]: import numpy as np # Linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

In [3]: # Using 1st data to analyze videos in geographical way
Country_df = pd.read_csv('Data_Aggregated_Metrics_By_Country_And_Subscriber_Status.csv')
Country_df
```

Out[3]:

	Video Title	External Video ID	Video Length	Thumbnail link	Country Code
0	 Hot Topics in Tech: Data Science Explained #...	OtqQYqRNDGI	59	https://i.ytimg.com/vi/OtqQYqRNDGI/hqdefault.jpg	HK
1	 Hot Topics in Tech: Data Science Explained #...	OtqQYqRNDGI	59	https://i.ytimg.com/vi/OtqQYqRNDGI/hqdefault.jpg	ME
2	 Hot Topics in Tech: Data Science Explained #...	OtqQYqRNDGI	59	https://i.ytimg.com/vi/OtqQYqRNDGI/hqdefault.jpg	RW
3	 Hot Topics in Tech: Data Science Explained #...	OtqQYqRNDGI	59	https://i.ytimg.com/vi/OtqQYqRNDGI/hqdefault.jpg	US
4	 Hot Topics in Tech: Data Science Explained #...	OtqQYqRNDGI	59	https://i.ytimg.com/vi/OtqQYqRNDGI/hqdefault.jpg	DE
...
55287	#66DaysOfData - 3 Reasons to Start!	sICJ6a2wX5g	53	https://i.ytimg.com/vi/sICJ6a2wX5g/hqdefault.jpg	MM
55288	#66DaysOfData - 3 Reasons to Start!	sICJ6a2wX5g	53	https://i.ytimg.com/vi/sICJ6a2wX5g/hqdefault.jpg	SA
55289	#66DaysOfData - 3 Reasons to Start!	sICJ6a2wX5g	53	https://i.ytimg.com/vi/sICJ6a2wX5g/hqdefault.jpg	DZ
55290	#66DaysOfData - 3 Reasons to Start!	sICJ6a2wX5g	53	https://i.ytimg.com/vi/sICJ6a2wX5g/hqdefault.jpg	MX
55291	#66DaysOfData - 3 Reasons to Start!	sICJ6a2wX5g	53	https://i.ytimg.com/vi/sICJ6a2wX5g/hqdefault.jpg	SR

55292 rows × 15 columns



In [4]: `pip install pycountry`

Requirement already satisfied: pycountry in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (22.3.5)Note: you may need to restart the kernel to use updated packages.

Requirement already satisfied: setuptools in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from pycountry) (63.2.0)

```
In [5]: import pycountry
def do_fuzzy_search(country):
    try:
        result = pycountry.countries.search_fuzzy(country)
    except Exception:
        return np.nan
    else:
        return result[0].alpha_3

iso_map = {country: do_fuzzy_search(country) for country in Country_df["Country Code"]}

Country_df["Country_Code"] = Country_df["Country Code"].map(iso_map)

Country_df = Country_df.loc[~(Country_df['Country_Code'].isna()),]

GIS_plot_df = Country_df.groupby(by=['Country_Code', 'Country Code'], as_index=False,
GIS_plot_df.head()
```

```
Out[5]:
```

	Country_Code	Country Code	Video Length	Is Subscribed	Views	Video Likes Added	Video Dislikes Added	Video Likes Removed	Subscript Ad
0	ABW	AW	700.216867	0.361446	3.036145	0.048193	0.000000	0.000000	0.132
1	AFG	AF	746.267857	0.422619	5.160714	0.184524	0.011905	0.011905	0.202
2	AGO	AO	912.624204	0.401274	5.210191	0.184713	0.012739	0.000000	0.177
3	ALA	AX	490.285714	0.000000	1.857143	0.000000	0.000000	0.000000	0.000
4	ALB	AL	906.320423	0.461268	9.728873	0.274648	0.035211	0.014085	0.123

```
In [6]: pip install plotly
```

Requirement already satisfied: plotly in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (5.11.0)Note: you may need to restart the kernel to use updated packages.

Requirement already satisfied: tenacity>=6.2.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from plotly) (8.1.0)

```
In [7]: import plotly.graph_objects as go
fig = go.Figure(data=go.Choropleth(locations = GIS_plot_df['Country_Code'],
                                   z = GIS_plot_df['Average Watch Time'],
                                   text = GIS_plot_df['Country Code'],
                                   colorscale = 'burg',
                                   colorbar_tickprefix = 'hrs',
                                   colorbar_title = 'Average Watch Time')
fig.update_layout(
    title={'text': 'Average Watch Time by Country',
```

```
'y':0.9,  
'x':0.5,  
'xanchor': 'center',  
'yanchor': 'top'})
```

```
fig.show()
```

Average Watch Time by



```
In [27]: import seaborn as sns  
import os
```

```
In [28]: # check the sum of null values  
Country_df.isnull().sum()
```

```
Out[28]: Video Title          0
         External Video ID    0
         Video Length         0
         Thumbnail link       0
         Country Code         386
         Is Subscribed        0
         Views                 0
         Video Likes Added    0
         Video Dislikes Added 0
         Video Likes Removed  0
         User Subscriptions Added 0
         User Subscriptions Removed 0
         Average View Percentage 1438
         Average Watch Time    1438
         User Comments Added   0
         dtype: int64
```

```
In [31]: import numpy as np # Linear algebra
         import pandas as pd
         import seaborn as sns
         import os
```

```
In [34]: #Aggregated_Metrics_By_Video2
         video_df=pd.read_csv('Aggregated_Metrics_By_Video.csv')
         video_df
```

Out[34]:

	Video	Video title	Video publish time	Comments added	Shares	Dislikes	Likes	Subscribers lost	s
0	Total		NaN	NaN	14197	39640	3902	225021	45790
1	4OZip0cgOho	How I Would Learn Data Science (If I Had to St...	8-May-20	907	9583	942	46903	451	
2	78LjdAAw0wA	100K Channel Update + AMA Stream!	12-Nov-20	412	4	4	130	15	
3	hO_YKK_0Qck	Uber Driver to Machine Learning Engineer in 9 ...	16-Jul-20	402	152	15	881	9	
4	uXLnbdHMf8w	Why I'm Starting Data Science Over Again.	29-Aug-20	375	367	22	2622	40	
...
219	FBgs-BSTIJE	Demystifying Data Science Roles	30-Nov-18	3	5	1	48	1	
220	Yr5T3T4tq-g	Most Data Science Hopefuls Overlook This Impor...	25-May-19	3	0	0	44	0	
221	j-Z-je6K4Yg	IT'S NOT TOO LATE TO LEARN CODE!	18-Dec-18	3	1	0	35	0	
222	5jntoZX-Tc8	NASA Physicist Turned Data Scientist (Tim Bowl...	5-May-19	2	5	0	38	0	
223	5p73clRYCZg	ProjectDemoCSC478_UFCFightData	6-Jun-17	0	2	0	1	0	

224 rows × 19 columns



Missing Values --> Data Cleansing

```
In [35]: video_df=pd.read_csv('Aggregated_Metrics_By_Video.csv')
video_df.isnull().sum()
```

```
Out[35]: Video                                0
Video title                                  1
Video publish time                          1
Comments added                              0
Shares                                       0
Dislikes                                    0
Likes                                       0
Subscribers lost                            0
Subscribers gained                          0
RPM (USD)                                   0
CPM (USD)                                   2
Average percentage viewed (%)               0
Average view duration                       0
Views                                       0
Watch time (hours)                         0
Subscribers                                0
Your estimated revenue (USD)               0
Impressions                                0
Impressions click-through rate (%)         0
dtype: int64
```

```
In [40]: video2_df= video_df.dropna()
video2_df.isnull().sum()
```

```
Out[40]: Video                                0
Video title                                  0
Video publish time                          0
Comments added                              0
Shares                                       0
Dislikes                                    0
Likes                                       0
Subscribers lost                            0
Subscribers gained                          0
RPM (USD)                                   0
CPM (USD)                                   0
Average percentage viewed (%)               0
Average view duration                       0
Views                                       0
Watch time (hours)                         0
Subscribers                                0
Your estimated revenue (USD)               0
Impressions                                0
Impressions click-through rate (%)         0
dtype: int64
```

```
In [3]: pip install statsmodels
```


Collecting statsmodelsNote: you may need to restart the kernel to use updated package s.

Downloading statsmodels-0.13.5-cp310-cp310-win_amd64.whl (9.1 MB)
----- 9.1/9.1 MB 4.1 MB/s eta 0:00:00

Collecting patsy>=0.5.2

Downloading patsy-0.5.3-py2.py3-none-any.whl (233 kB)
----- 233.8/233.8 kB 1.6 MB/s eta 0:00:00

Requirement already satisfied: packaging>=21.3 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from statsmodels) (21.3)

Requirement already satisfied: pandas>=0.25 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from statsmodels) (1.4.4)

Requirement already satisfied: numpy>=1.22.3 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from statsmodels) (1.23.2)

Requirement already satisfied: scipy>=1.3 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from statsmodels) (1.9.1)

Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from packaging>=21.3->statsmodels) (3.0.9)

Requirement already satisfied: python-dateutil>=2.8.1 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from pandas>=0.25->statsmodels) (2.8.2)

Requirement already satisfied: pytz>=2020.1 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from pandas>=0.25->statsmodels) (2022.2.1)

Requirement already satisfied: six in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from patsy>=0.5.2->statsmodels) (1.16.0)

Installing collected packages: patsy, statsmodels

Successfully installed patsy-0.5.3 statsmodels-0.13.5

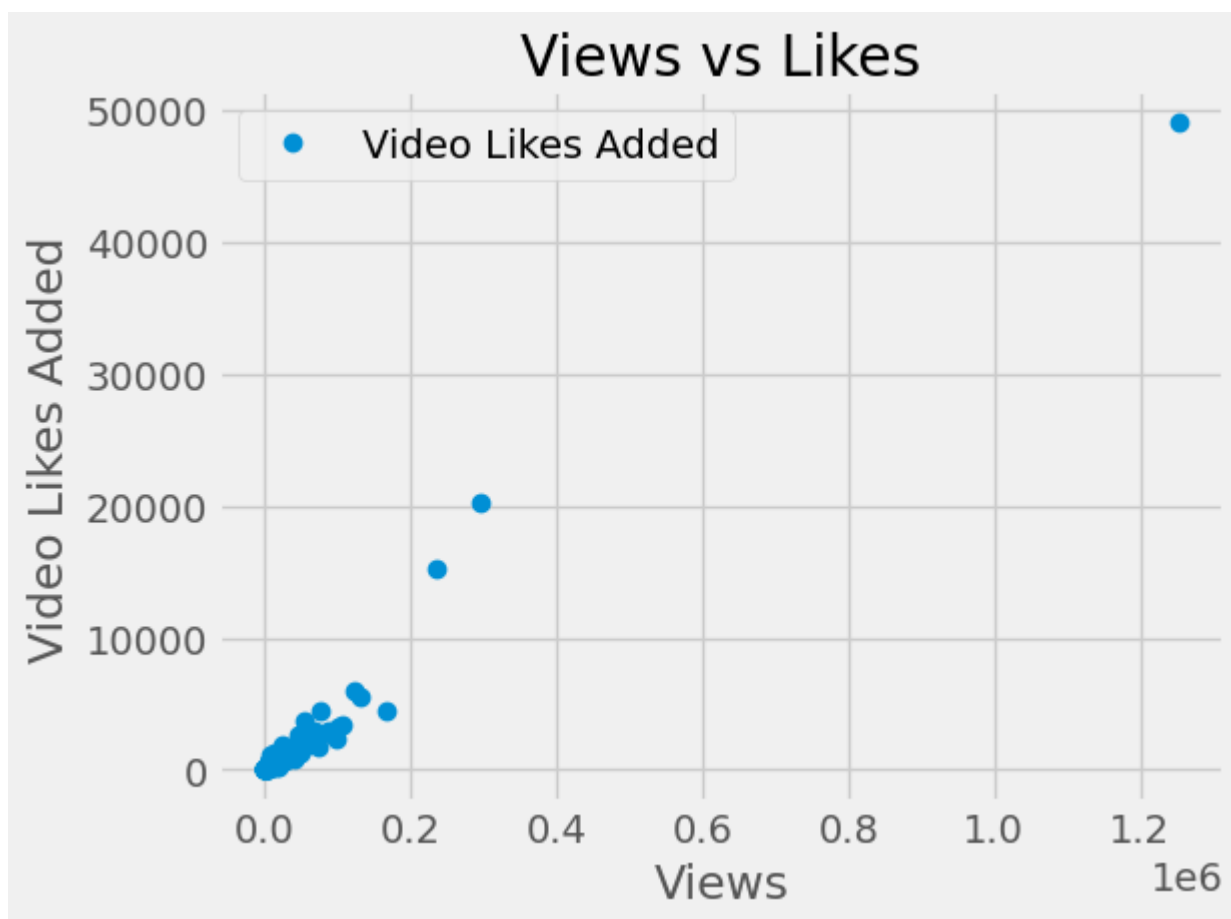
```
In [6]: import pandas as pd
import statsmodels.api as sm
dataset = pd.read_csv('video view_like.csv')
dataset.head()
```

```
Out[6]:
```

	Video Title	Video Length	Views	Video Likes Added
0	Hot Topics in Tech: Data Science Explained #SH...	59	8003	409
1	git for Data Science Made Simple... (Hopefully)	392	12629	667
2	Work From Home Data Scientist: Day in the Life	331	26582	754
3	Why is Balance Important in Data Science?	238	612	33
4	Why are APIs Important for Data Science?	322	6537	363

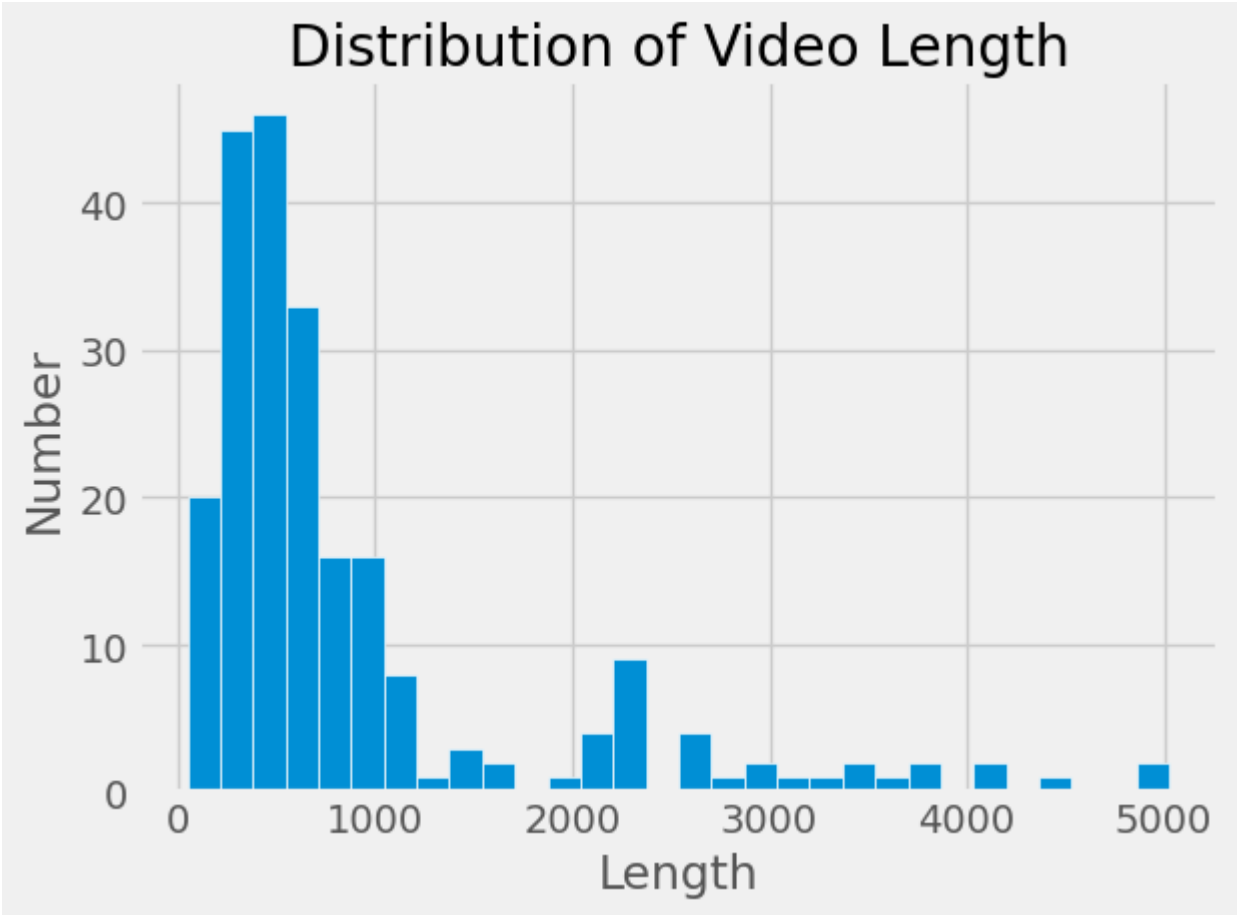
```
In [7]: import matplotlib.pyplot as plt
%matplotlib inline
```

```
In [35]: plt.style.use('fivethirtyeight')
dataset.plot(x='Views', y='Video Likes Added', style='o')
plt.title('Views vs Likes')
plt.xlabel('Views')
plt.ylabel('Video Likes Added')
plt.tight_layout()
plt.show()
```



In []:

```
In [38]: plt.hist(dataset["Video Length"],bins=30,edgecolor='white')
plt.title('Distribution of Video Length')
plt.xlabel('Length')
plt.ylabel('Number')
plt.tight_layout()
plt.show()
```



```
In [42]: import pandas as pd
import statsmodels.api as sm
import matplotlib.pyplot as plt
%matplotlib inline
title = pd.read_csv('data top title of views.csv')
title.head()
```

Out[42]:

	Video Title	Video Length	Views	Video Likes Added	Unnamed: 4
0	How I Would Learn Data Science (If I Had to St...	516	1252970	49000	How I Would Learn Data Science (If I Had to St...
1	The Best Free Data Science Courses Nobody is T...	375	297050	20293	The Best Free Data Science Courses Nobody is T...
2	3 Proven Data Science Projects for Beginners (...)	454	237192	15281	3 Proven Data Science Projects for Beginners (...)
3	Beginner Kaggle Data Science Project Walk-Thro...	2296	167881	4523	Beginner Kaggle Data Science Project Walk-Thro...
4	The Projects You Should Do To Get A Data Scien...	770	131573	5458	The Projects You Should Do To Get A Data Scien...

```
In [47]: #plt.bar(title['Video Title'], title['Views'])
#plt.title('most hot titles for view')
#plt.xlabel('hot titles')
#plt.ylabel('Number of views')
```

```
#plt.tight_layout()
#plt.show.head(5)
```

```
In [12]: import csv
csvfile=open('data_title_views.csv','r')
data_title_views={}
for row in csv.DictReader(csvfile):
    #print(row)
    data_title_views[row['Title']] = row['Views']
    #print(data_title_views.keys())
print(data_title_views)
```

{'How I Would Learn Data Science (If I Had to Start Over)': '1252970', 'The Best Free Data Science Courses Nobody is Talking About': '297050', '3 Proven Data Science Projects for Beginners (Kaggle)': '237192', 'Beginner Kaggle Data Science Project Walk-Through (Titanic)': '167881', 'The Projects You Should Do To Get A Data Science Job': '131573', 'How I Would Learn Data Science in 2021 (What Has Changed?)': '123484', 'Why You Probably Won't Become a Data Scientist': '108043', 'Data Science Project from Scratch - Part 1 (Project Planning)': '102708', 'Why I Quit Data Science': '98758', '3 Reasons You Should NOT Become a Data Scientist': '93282', 'Data Science Certificate vs Bootcamp vs Masters Degree': '92300', 'How I Learned Data Science': '87146', 'How I Would Learn Data Science in 2022 (If I Had to Start Over)': '77307', 'How to Set Up Your Data Science Environment (Anaconda Beginner)': '75207', 'Data Science Project from Scratch - Part 2 (Data Collection)': '71055', 'Is Data Science Dying?': '69900', 'How to Make A Data Science Portfolio Website with Github Pages': '69004', 'Data Science Advice for College Students': '62121', 'How to ULTRALEARN Data Science': '55294', 'What is the #66DaysOfData?': '52811', '5 Essential Data Science Projects for Your Portfolio': '51025', 'How YOU Can Land a Sports Analytics Job': '50447', 'Data Science Project from Scratch - Part 3 (Data Cleaning)': '50173', 'Why I'm Starting Data Science Over Again.': '49559', 'Math Needed for Mastering Data Science': '48363', 'The 7 Biggest Data Science Beginner Mistakes': '48181', 'Data Science Project from Scratch - Part 4 (Exploratory Data Analysis)': '47138', 'Different Data Science Roles Explained (by a Data Scientist)': '44953', 'How to Build a Data Science Portfolio Website with Hugo & Github Pages [feat. Data Professor]': '44871', 'Is Data Science Right For You?': '44034', 'Scrape Twitter Data in Python with Twitterscraper Module': '41486', 'How to Go From Data Analyst to Data Scientist': '40169', '9 Ways You Can Make Extra Income as a Data Scientist': '39327', 'The Data Science Projects that Got Me a Job': '33377', 'Data Science Project from Scratch - Part 5 (Model Building)': '27619', 'The Best Computer for Data Science Beginners': '27566', 'Work From Home Data Scientist: Day in the Life': '26582', 'How To Get Data Science Experience (Without a Job)': '26355', 'Kaggle Project From Scratch - Part 1 (Data Science Profession Survey)': '25699', 'How To Learn Programming for Data Science [3 Steps]': '25605', 'What Does a Data Scientist Actually Do?': '25358', 'How a Subscriber Landed a Data Analyst Job in Less Than a Year (Ray Ojel) - KNN EP. 09': '25133', 'I Wish I Had Known THIS Before Starting in Data Science': '23388', 'How I Learned to Learn.': '23379', 'Avoid These Data Science Resume Mistakes!': '22757', 'Uber Driver to Machine Learning Engineer in 9 Months! (@Daniel Bourke) - KNN EP. 05': '21328', 'Reviewing Your Data Science Resumes - Episode 12 (3 Different Resumes!)': '21027', 'I Built the FIRST EVER YouTube Subscriber LEADERBOARD': '21000', 'Reviewing Your Data Science Projects - Episode 5 (Very Detailed Project)': '20655', 'How I Got My First Data Science Internship (And How You Can Land One)': '20307', 'Data Scientist Reacts: REAL Data Science Job Application Data': '20139', 'My Regrets as a Data Science Student': '20136', 'The State of Data Science with Krish Naik & The Data Professor [Panel Discussion]': '20088', 'How I Chose My Masters Degree for Breaking into Data Science': '18606', 'Should You Get A Masters in Data Science?': '18480', 'Data Science Project from Scratch - Part 6 (Putting the Model into Production)': '18311', '7 Things to Look For in a Masters For Data Science (feat. @Tina Huang)': '18286', 'The 4 Types of Sports Analytics Projects': '17958', 'Why Is Data Engineering So HOT Right Now?': '17236', 'How Zillow Lost \$500 MILLION With Machine Learning': '16891', 'Where to Start Learning Data Science': '16874', 'Predicting Crypto-Currency Price Using RNN LSTM & GRU': '16550', 'How She Dominated the FAANG Data Science Interview (@Tina Huang) - KNN EP. 11': '15758', 'The 5 Stages of Learning Data Science': '15394', 'Should You Learn R for Data Science?': '15227', 'Why Kaggle Should Be Your Favorite Data Science Resource #shorts': '14759', 'Kaggle Project From Scratch - Part 2 (Exploratory Data Analysis)': '14696', 'Why You're Struggling to Learn Data Science': '14551', 'Reviewing Your Data Science Projects - Episode 18 (Job-Worthy GitHub)': '14372', 'What It's Like to be a Socially Distanced Data Scientist (A Day in the Life)': '14347', 'Data Science Project - Expectations vs Reality (funny) #shorts': '14043', 'Find a Data Science Project With These 3 Techniques': '13927', 'How to Simulate NBA Games in Python': '13740', 'Data Science Fundamentals: Data

Exploration in Python (Pandas)': '13647', 'Interview with the Director of AI Research @ NVIDIA (Anima Anandkumar) - KNN EP. 07': '13428', 'What is Sports Analytics Really?': '13310', 'Inside the Mind of the Ultimate Kaggle Grandmaster (@Abhishek Thakur) - KNN EP. 10': '13152', 'What is Pandas? (Data & Data Science) #shorts': '12920', 'The Plagiarism Problem in Data Science': '12674', 'git for Data Science Made Simple... (Hopefully)': '12629', 'Data Science Project from Scratch - Part 7 (Documenting Your Work)': '12416', 'A Quick Data Science Project Tip! #SHORTS': '12312', 'What You Need to Know for a Data Science Internship': '12295', 'How to Get a Data Science Job at FAANG (@Data Science Jay) - KNN EP. 03': '11865', 'We Need to Talk About The LinkedIn Machine Learning Assessment.': '11758', 'How to Scrape NBA Data Using the nba_api Python Module': '11715', 'Critiquing MY OWN Data Science Resume': '10850', 'Reviewing Your Data Science Projects - Episode 4 (Resume & Github)': '10761', 'How I Learn Data Science Through Studying Other People's Code | #66DaysOfData': '10587', 'Data Science Fundamentals: Data Cleaning in Python': '10411', 'Is Data Visualization Important for Data Science? (A Data Scientist's Perspective)': '10390', 'Collision Course: Sports Betting + Data Science': '10273', 'The Only Data Science Explanation You Need': '10132', 'Data Science Project Example Start to Finish (Deep Learning Image Classifier)': '9753', 'The 5 Pillars of Success I Live By': '9743', 'How to Stay Productive & Motivated When Learning Data Science': '9659', 'The Secret Data Scientists Don't Want You to Know': '9501', 'Advice from a Data Analytics CEO (@How to Get an Analytics Job) - KNN EP. 17': '9449', 'Reviewing Your Data Science Projects - Episode 17 (Best Portfolio Website Yet)': '9374', 'How Data Science Projects Pay Off': '9339', 'MARCH MADNESS - Will My Machine Learning Model Beat Your Bracket?': '9332', 'Unboxing the Ultimate Z by HP Data Science Package (FIRST EVER HP Workstation w/ Data Science Stack)': '9256', 'How I Use Data to Optimize My Life | What I Collect & How I Analyze It': '9126', 'Data Science Resume Round-Up With @Tina Huang - Episode 1': '9043', 'Kaggle vs Github - Which is Best for Your Data Science Portfolio?': '8810', 'Reviewing Your Data Science Projects - Episode 7 (Incredible Portfolio Website)': '8772', 'Sh*t Data Scientists Say (Parody)': '8724', 'Reviewing Your Data Science Projects - Episode 21 (The Cleanest Portfolio)': '8697', 'My First Data Science Contracting Side-Gig (How I Did It)': '8636', 'Data Science Fundamentals: Data Manipulation in Python (Pandas)': '8617', 'My Top 5 Data Science Internship Tips': '8403', 'What is a lambda function (python)? #shorts': '8268', '5 Proven Strategies to Break into a Data Science Job': '8167', 'Hot Topics in Tech: Data Science Explained #SHORTS': '8003', 'Where YOU Should Start With Data Science Projects': '7994', 'Building a Deep Learning BEAST (NVIDIA TITAN RTX + RYZEN 3900X)': '7864', 'Reviewing Your Data Science Projects - Episode 15 (Quant Finance)': '7695', 'Reviewing Your Data Science Projects - Episode 1 (Exploratory Analysis)': '7478', '5 Sports Analytics Books to Get You Started': '7382', '5 Unusual Data Science Projects that Will Land You a Job': '7348', 'Don't Buy My Course.': '7196', 'Predicting Season Long NBA Wins Using Multiple Linear Regression': '6859', 'Hedge Funds, Startups, and Data Science Oh my! (@DataLeap) - KNN EP. 14': '6858', 'Kaggle Project From Scratch - Part 3 (Advanced Graphs & Gender Imbalance Analysis)': '6823', 'Discouraged with Data Science? - Watch THIS video.': '6820', 'How I Balance Data Science and Content Creation (7 Secrets)': '6775', 'Why Data-Viz is so Darn Important (@Story by Data | Kate Strachnyi) - KNN EP. 16': '6691', 'Is Spotify Shuffle Really Random? #Shorts': '6574', 'Why are APIs Important for Data Science?': '6537', '6 Lessons from #66DaysOfData': '6350', 'Dealing with Doubt in Data Science (My Impostor Syndrome Story)': '6282', '7 Incredible Books That Transformed My Health and My Life': '6184', 'The Data Science Interview: What to Expect': '6182', '#66DaysOfData - What is it? #shorts': '6089', 'Project Presentation - Expectations vs. Reality (funny) #shorts': '5918', 'Building a Burrito Dashboard - Data Science Project from Scratch with atoti': '5864', 'Should You Major in Data Science? (Jaemin Lee) - KNN EP. 04': '5799', 'The YouTube Algorithm EXPLAINED! (Tips from a Data Scientist)': '5688', 'Applying Data Science To My YouTube Data: My Surprising Findings': '5638', 'How I Became A Data Scientist From a Business Background': '5512', 'Reviewing Your Data Science Projects - Episode 6 (Only 3 months of coding experience)': '5503', 'How to Build a Website - Building my ULTIMATE Portfolio Website': '5480', 'Reviewing Your Data Science P

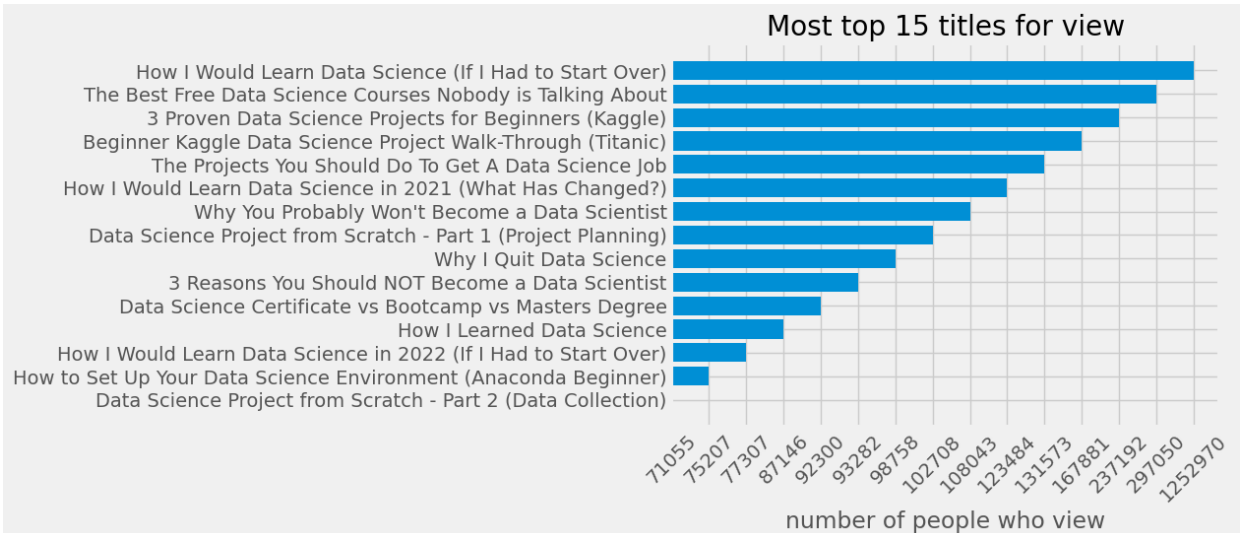
rojects - Episode 13 (BONUS LinkedIn Review)': '5105', 'Data Science Resume Round-Up With @Tina Huang | Episode 3': '5007', 'What the Heck is WSL 2? (My New Favorite Too 1)': '4986', '5 Tips for Crushing the Work From Home Life': '4934', 'What is the Future of my Comment Leaderboard Project?': '4909', 'Land a Data Science Job in a Different Country (Vijay Pravin Maharajan) - KNN EP. 13': '4884', 'Data Science Fundamentals: Linear Regression': '4838', 'Data Science Fundamentals: SQL Queries': '4772', 'Data Science, Machine Learning, and AI: What's the Difference?': '4713', 'Reviewing Your Data Science Projects - Episode 2 (Resume and Portfolio)': '4579', 'His Startup Will Land You a Data Science Job (Jeremie Harris) - KNN EP. 15': '4566', 'Is Your Phone REALLY Listening to You?': '4564', 'Reviewing Your Data Science Projects - Episode 14 [Deep Learning Focus]': '4469', 'Sports Analytics & Streaming Data Science on Twitch (Nick Wan) - KNN EP. 08': '4414', 'Business Skills for Data Science: What are they REALLY?': '4403', 'Sports Analytics 101: The Pythagorean Theorem of Sports': '4337', 'ML Ops: What is it REALLY?': '4244', 'Reviewing Your Data Science Projects - Episode 10 (Leveraging Your Data)': '4226', 'Golf STATS: Strokes Gained Explained': '4140', 'Should You Be Excited About Web 3? (As a Data Scientist)': '4081', 'Reviewing Your Data Science Projects - Episode 8 (College Student Help)': '4049', 'Reviewing Your Data Science Projects - Episode 3 (Student Portfolio)': '4027', 'Why Right NOW is a Great Time to Learn Data Science': '4024', 'Data Science Explained with ... Cooking?': '3939', 'The TRUTH About My First Data Science Project': '3936', 'Data Science: Pros and Cons': '3914', 'Data Science Productivity, Motivation, and Organization (ft. Data Professor & Codebasics)': '3710', 'Was Captain Marvel Bad? A Sentiment Analysis of Twitter Data': '3673', 'Reviewing Your Data Science Projects - Episode 20 (Bootcamp Capstone)': '3671', 'My Daily Battle With Time - Will I Win? [Vlog]': '3615', 'Reviewing Your Data Science Projects - Episode 19 (One Big Improvement)': '3614', 'Why I Have 2 Offices for Data Science & Content Creation': '3541', '#66DaysOfData - 3 Reasons to Start!': '3437', 'My Top 5 Data Science Resources for 2019': '3406', 'Reviewing Your Data Science Projects - Episode 11(GITHUB CLEANING)': '3352', 'The Problem with Data Science': '3299', 'How Statistics Saved the US SERIOUS \$\$\$\$ During WW2 #Shorts': '3115', 'Why EVERYONE Should Start a Podcast (Including YOU)': '3089', 'The Best Way to Predict NBA Minutes Played': '3087', '10000 Subscriber and 100th Video Special (Data Science)': '3064', 'The 9 Books That Changed My Perspective in 2019': '3037', 'Reviewing Your Projects - Episode 16 (Project Review for Beginners)': '2998', 'Data Science in Sports - Talk for Northwestern (Kellogg) MBA Students': '2794', 'How To Build A Word Cloud From Scraped Data (Python)': '2791', 'Where to Look for Data Science Jobs': '2581', 'By The Numbers: Where Should The NBA Put a 4 Point Line?': '2344', 'Ken Jee Q & A Live Stream (50,000 Sub Special!)': '2326', 'Should @Luke Barousse Take This Data Analyst Job? (Funny) #Shorts': '2320', 'How Far Should the NBA 3-Point Line Actually Be?': '2311', '100K Channel Update + AMA Stream!': '2291', 'I Eat a Papaya Live on Stream (Plus Q&A for 150K Subs!)': '2271', 'Reviewing Your Data Science Projects - Episode 9 (Professional Violinist)': '2242', 'Do You Have a Data Science Mentor? (@Danny Ma) - KNN EP. 06': '2188', 'Questions You Should Ask Your Data Science Interviewers': '2133', '#66DaysOfData Round 3 Live Event! (feat. @StatQuest with Josh Starmer)': '2037', 'The PODCAST you might have asked for?': '1836', 'How to Integrate Data Science into Your Business': '1826', 'Fast Cars to Faster Data (Alex Castrounis) - KNN EP. 12': '1823', 'Is it Important to Share Your Data Science Work? (Ft. Eric Weber)': '1795', 'Data Science: Startup vs. Large Corporation': '1701', 'When Data Science Goes Wrong': '1668', '6 Habits of Successful Data Scientists': '1589', 'Why Selling Is An Important Data Science Skill': '1418', 'Take Your Data Science Projects From Good to Great': '1413', 'Watch This Before Applying to Data Science Jobs': '1261', 'Welcome To My Channel | Ken Jee | Data Science': '1225', 'Can You Learn Data Science Without a Computer?': '1102', 'NASA Physicist Turned Data Scientist (Tim Bowling) - KNN EP. 02': '1094', 'What I Learned From My Three Degrees': '1078', 'Demystifying Data Science Roles': '978', 'The 5 Stages of Data Science Adoption': '972', 'How Much Did Cheating Help the Astros Win? (What the Numbers Say)': '959', 'Golf: Would You Rather Be the LONGEST or STRAIGHTEST Driver on the PGA Tour?': '816', 'IT'S NOT TOO LATE TO LEARN CODE!': '721', 'Why You DON'T Want to be a WFH Data Scientist': '664', 'Why is

Balance Important in Data Science?': '612', 'Most Data Science Hopefuls Overlook This Important Skill': '548', 'Thank You For The Support | What's Next | Ken Jee | Data Science': '506', 'Data Science in Golf: PGA Merchandise Show 2020': '482', '5 Data Science Resolutions for 2020': '455', 'ProjectDemoCSC478_UFCFightData': '56'}

```
In [13]: #turn the dic into two list: one for keys another for value. later use them for plot
title_list=list(data_title_views.keys())[0:15]
views_list=list(data_title_views.values())[0:15]
print(title_list)
print(views_list)
```

```
['How I Would Learn Data Science (If I Had to Start Over)', 'The Best Free Data Science Courses Nobody is Talking About', '3 Proven Data Science Projects for Beginners (Kaggle)', 'Beginner Kaggle Data Science Project Walk-Through (Titanic)', 'The Projects You Should Do To Get A Data Science Job', 'How I Would Learn Data Science in 2021 (What Has Changed?)', 'Why You Probably Won't Become a Data Scientist', 'Data Science Project from Scratch - Part 1 (Project Planning)', 'Why I Quit Data Science', '3 Reasons You Should NOT Become a Data Scientist', 'Data Science Certificate vs Bootcamp vs Masters Degree', 'How I Learned Data Science', 'How I Would Learn Data Science in 2022 (If I Had to Start Over)', 'How to Set Up Your Data Science Environment (Anaconda Beginner)', 'Data Science Project from Scratch - Part 2 (Data Collection)']
['1252970', '297050', '237192', '167881', '131573', '123484', '108043', '102708', '98758', '93282', '92300', '87146', '77307', '75207', '71055']
```

```
In [147... title_list.reverse()
views_list.reverse()
plt.barh(title_list,views_list)
plt.title('Most top 15 titles for view')
plt.xlabel('number of people who view')
plt.xticks(rotation=45)
plt.show()
```



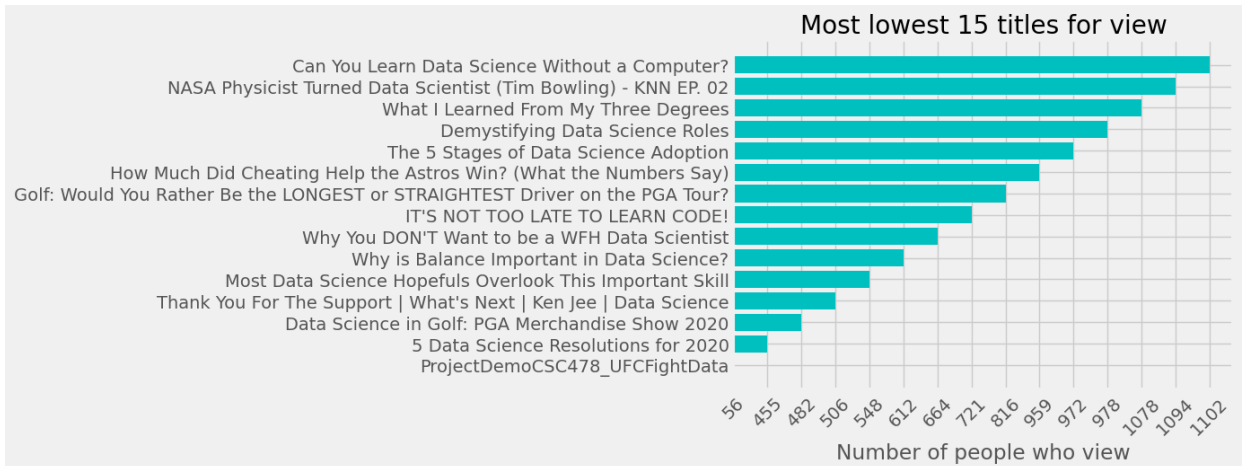
```
In [146... # get the freeze-15 titles people don't like to view
title_list2=list(data_title_views.keys())[-15:]
views_list2=list(data_title_views.values())[-15:]
print(title_list2)
print(views_list2)
```



```
[ 'Can You Learn Data Science Without a Computer?', 'NASA Physicist Turned Data Scientist (Tim Bowling) - KNN EP. 02', 'What I Learned From My Three Degrees', 'Demystifying Data Science Roles', 'The 5 Stages of Data Science Adoption', 'How Much Did Cheating Help the Astros Win? (What the Numbers Say)', 'Golf: Would You Rather Be the LONGEST or STRAIGHTEST Driver on the PGA Tour?', "IT'S NOT TOO LATE TO LEARN CODE!", "Why You DON'T Want to be a WFH Data Scientist", 'Why is Balance Important in Data Science?', 'Most Data Science Hopefuls Overlook This Important Skill', "Thank You For The Support | What's Next | Ken Jee | Data Science", 'Data Science in Golf: PGA Merchandise Show 2020', '5 Data Science Resolutions for 2020', 'ProjectDemoCSC478_UFCFightData']
['1102', '1094', '1078', '978', '972', '959', '816', '721', '664', '612', '548', '506', '482', '455', '56']
```

In [157...

```
title_list2.reverse()
views_list2.reverse()
plt.barh(title_list2,width=views_list2,color='c')
plt.title('Most lowest 15 titles for view')
plt.xlabel('Number of people who view')
plt.xticks(rotation=45)
plt.show()
```

In [4]: `pip install nltk`

Requirement already satisfied: nltk in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (3.7)Note: you may need to restart the kernel to use updated packages.

Requirement already satisfied: joblib in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from nltk) (1.1.0)

Requirement already satisfied: regex>=2021.8.3 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from nltk) (2022.10.31)

Requirement already satisfied: click in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from nltk) (8.1.3)

Requirement already satisfied: tqdm in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from nltk) (4.64.1)

Requirement already satisfied: colorama in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from click->nltk) (0.4.5)

In [20]: `pip install spacy`

Collecting spacyNote: you may need to restart the kernel to use updated packages.

```

Downloading spacy-3.4.3-cp310-cp310-win_amd64.whl (11.9 MB)
----- 11.9/11.9 MB 179.6 kB/s eta 0:00:00
Requirement already satisfied: setuptools in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from spacy) (63.2.0)
Requirement already satisfied: Jinja2 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from spacy) (3.1.2)
Requirement already satisfied: tqdm<5.0.0,>=4.38.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from spacy) (4.64.1)
Collecting pydantic!=1.8,!=1.8.1,<1.11.0,>=1.7.4
  Downloading pydantic-1.10.2-cp310-cp310-win_amd64.whl (2.1 MB)
----- 2.1/2.1 MB 163.7 kB/s eta 0:00:00
Collecting catalogue<2.1.0,>=2.0.6
  Downloading catalogue-2.0.8-py3-none-any.whl (17 kB)
Collecting thinc<8.2.0,>=8.1.0
  Downloading thinc-8.1.5-cp310-cp310-win_amd64.whl (1.3 MB)
----- 1.3/1.3 MB 164.1 kB/s eta 0:00:00
Collecting spacy-loggers<2.0.0,>=1.0.0
  Downloading spacy_loggers-1.0.3-py3-none-any.whl (9.3 kB)
Collecting wasabi<1.1.0,>=0.9.1
  Downloading wasabi-0.10.1-py3-none-any.whl (26 kB)
Requirement already satisfied: packaging>=20.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from spacy) (21.3)
Collecting preshed<3.1.0,>=3.0.2
  Downloading preshed-3.0.8-cp310-cp310-win_amd64.whl (94 kB)
----- 94.7/94.7 kB 90.2 kB/s eta 0:00:00
Collecting typer<0.8.0,>=0.3.0
  Downloading typer-0.7.0-py3-none-any.whl (38 kB)
Requirement already satisfied: numpy>=1.15.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from spacy) (1.23.2)
Collecting langcodes<4.0.0,>=3.2.0
  Downloading langcodes-3.3.0-py3-none-any.whl (181 kB)
----- 181.6/181.6 kB 104.5 kB/s eta 0:00:00
Collecting cymem<2.1.0,>=2.0.2
  Downloading cymem-2.0.7-cp310-cp310-win_amd64.whl (29 kB)
Collecting spacy-legacy<3.1.0,>=3.0.10
  Downloading spacy_legacy-3.0.10-py2.py3-none-any.whl (21 kB)
Requirement already satisfied: requests<3.0.0,>=2.13.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from spacy) (2.28.1)
Collecting srsly<3.0.0,>=2.4.3
  Downloading srsly-2.4.5-cp310-cp310-win_amd64.whl (479 kB)
----- 479.4/479.4 kB 100.1 kB/s eta 0:00:00
Collecting murmurhash<1.1.0,>=0.28.0
  Downloading murmurhash-1.0.9-cp310-cp310-win_amd64.whl (18 kB)
Collecting pathy>=0.3.5
  Downloading pathy-0.10.0-py3-none-any.whl (48 kB)
----- 48.9/48.9 kB 246.0 kB/s eta 0:00:00
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from packaging>=20.0->spacy) (3.0.9)
Collecting smart-open<6.0.0,>=5.2.1
  Downloading smart_open-5.2.1-py3-none-any.whl (58 kB)
----- 58.6/58.6 kB 52.5 kB/s eta 0:00:00
Collecting typing-extensions>=4.1.0
  Downloading typing_extensions-4.4.0-py3-none-any.whl (26 kB)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy)

```

(2.1.1)

Requirement already satisfied: certifi>=2017.4.17 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (2022.9.24)

Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (1.26.13)

Requirement already satisfied: idna<4,>=2.5 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (3.4)

Collecting blis<0.8.0,>=0.7.8

Downloading blis-0.7.9-cp310-cp310-win_amd64.whl (7.0 MB)

----- 7.0/7.0 MB 98.8 kB/s eta 0:00:00

Collecting confection<1.0.0,>=0.0.1

Downloading confection-0.0.3-py3-none-any.whl (32 kB)

Requirement already satisfied: colorama in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from tqdm<5.0.0,>=4.38.0->spacy) (0.4.5)

Requirement already satisfied: click<9.0.0,>=7.1.1 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from typer<0.8.0,>=0.3.0->spacy) (8.1.3)

Requirement already satisfied: MarkupSafe>=2.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from jinja2->spacy) (2.1.1)

Installing collected packages: wasabi, cymem, typing-extensions, spacy-loggers, spacy-legacy, smart-open, murmurhash, langcodes, catalogue, blis, typer, srsly, pydantic, preshed, pathy, confection, thinc, spacy

Successfully installed blis-0.7.9 catalogue-2.0.8 confection-0.0.3 cymem-2.0.7 langcodes-3.3.0 murmurhash-1.0.9 pathy-0.10.0 preshed-3.0.8 pydantic-1.10.2 smart-open-5.2.1 spacy-3.4.3 spacy-legacy-3.0.10 spacy-loggers-1.0.3 srsly-2.4.5 thinc-8.1.5 typer-0.7.0 typing-extensions-4.4.0 wasabi-0.10.1

In [33]: pip install gensim

Collecting gensim

Downloading gensim-4.2.0-cp310-cp310-win_amd64.whl (23.9 MB)

----- 23.9/23.9 MB 36.8 kB/s eta 0:00:00

Requirement already satisfied: numpy>=1.17.0 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from gensim) (1.23.2)

Requirement already satisfied: smart-open>=1.8.1 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from gensim) (5.2.1)

Requirement already satisfied: scipy>=0.18.1 in c:\users\yy\appdata\local\programs\python\python310\lib\site-packages (from gensim) (1.9.1)

Collecting Cython==0.29.28

Downloading Cython-0.29.28-py2.py3-none-any.whl (983 kB)

----- 983.8/983.8 kB 63.3 kB/s eta 0:00:00

Installing collected packages: Cython, gensim

Successfully installed Cython-0.29.28 gensim-4.2.0

Note: you may need to restart the kernel to use updated packages.

```
In [48]: from sklearn.decomposition import LatentDirichletAllocation, TruncatedSVD
from sklearn.feature_extraction.text import CountVectorizer, TfidfVectorizer
from sklearn.model_selection import GridSearchCV
from pprint import pprint

from spacy.cli import download
download("en_core_web_sm")
import re, nltk, spacy, gensim
import matplotlib.pyplot as plt
%matplotlib inline
```

✓ Download and installation successful

You can now load the package via `spacy.load('en_core_web_sm')`

```
In [29]: import pandas as pd
#df = pd.read_csv('hotelreviews.csv', encoding='utf-8')
df = pd.read_csv('data_title_views.csv')
df.info()
df.head(10)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 223 entries, 0 to 222
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype
---  -
 0   Title   223 non-null      object
 1   Views   223 non-null      int64
dtypes: int64(1), object(1)
memory usage: 3.6+ KB
```

```
Out[29]:
```

	Title	Views
0	How I Would Learn Data Science (If I Had to St...	1252970
1	The Best Free Data Science Courses Nobody is T...	297050
2	3 Proven Data Science Projects for Beginners (...)	237192
3	Beginner Kaggle Data Science Project Walk-Thro...	167881
4	The Projects You Should Do To Get A Data Scien...	131573
5	How I Would Learn Data Science in 2021 (What H...	123484
6	Why You Probably Won't Become a Data Scientist	108043
7	Data Science Project from Scratch - Part 1 (Pr...	102708
8	Why I Quit Data Science	98758
9	3 Reasons You Should NOT Become a Data Scientist	93282

```
In [39]: # df = pd.read_csv('data_title_views.csv')
def sent_to_words(sentences):
    for sent in sentences:
        sent = re.sub("\'", "", sent) # remove single quotes
        sent = gensim.utils.simple_preprocess(str(sent), deacc=True)
        yield(sent)

# Convert to List
data_words = list(sent_to_words(list(data_title_views.keys())[0:50]))
print(data_words)
```

```
[['how', 'would', 'learn', 'data', 'science', 'if', 'had', 'to', 'start', 'over'],
['the', 'best', 'free', 'data', 'science', 'courses', 'nobody', 'is', 'talking', 'abo
ut'], ['proven', 'data', 'science', 'projects', 'for', 'beginners', 'kaggle'], ['begi
nner', 'kaggle', 'data', 'science', 'project', 'walk', 'through', 'titanic'], ['the',
'projects', 'you', 'should', 'do', 'to', 'get', 'data', 'science', 'job'], ['how', 'w
ould', 'learn', 'data', 'science', 'in', 'what', 'has', 'changed'], ['why', 'you', 'p
robably', 'wont', 'become', 'data', 'scientist'], ['data', 'science', 'project', 'fro
m', 'scratch', 'part', 'project', 'planning'], ['why', 'quit', 'data', 'science'],
['reasons', 'you', 'should', 'not', 'become', 'data', 'scientist'], ['data', 'scienc
e', 'certificate', 'vs', 'bootcamp', 'vs', 'masters', 'degree'], ['how', 'learned',
'data', 'science'], ['how', 'would', 'learn', 'data', 'science', 'in', 'if', 'had',
'to', 'start', 'over'], ['how', 'to', 'set', 'up', 'your', 'data', 'science', 'enviro
nment', 'anaconda', 'beginner'], ['data', 'science', 'project', 'from', 'scratch', 'p
art', 'data', 'collection'], ['is', 'data', 'science', 'dying'], ['how', 'to', 'mak
e', 'data', 'science', 'portfolio', 'website', 'with', 'github', 'pages'], ['data',
'science', 'advice', 'for', 'college', 'students'], ['how', 'to', 'ultralearn', 'dat
a', 'science'], ['what', 'is', 'the', 'daysofdata'], ['essential', 'data', 'science',
'projects', 'for', 'your', 'portfolio'], ['how', 'you', 'can', 'land', 'sports', 'ana
lytics', 'job'], ['data', 'science', 'project', 'from', 'scratch', 'part', 'data', 'c
leaning'], ['why', 'im', 'starting', 'data', 'science', 'over', 'again'], ['math', 'n
eeded', 'for', 'mastering', 'data', 'science'], ['the', 'biggest', 'data', 'science',
'beginner', 'mistakes'], ['data', 'science', 'project', 'from', 'scratch', 'part', 'e
xploratory', 'data', 'analysis'], ['different', 'data', 'science', 'roles', 'explaine
d', 'by', 'data', 'scientist'], ['how', 'to', 'build', 'data', 'science', 'portfoli
o', 'website', 'with', 'hugo', 'github', 'pages', 'feat', 'data', 'professor'], ['i
s', 'data', 'science', 'right', 'for', 'you'], ['scrape', 'twitter', 'data', 'in', 'p
ython', 'with', 'twitterscraper', 'module'], ['how', 'to', 'go', 'from', 'data', 'ana
lyst', 'to', 'data', 'scientist'], ['ways', 'you', 'can', 'make', 'extra', 'income',
'as', 'data', 'scientist'], ['the', 'data', 'science', 'projects', 'that', 'got', 'm
e', 'job'], ['data', 'science', 'project', 'from', 'scratch', 'part', 'model', 'build
ing'], ['the', 'best', 'computer', 'for', 'data', 'science', 'beginners'], ['work',
'from', 'home', 'data', 'scientist', 'day', 'in', 'the', 'life'], ['how', 'to', 'ge
t', 'data', 'science', 'experience', 'without', 'job'], ['kaggle', 'project', 'from',
'scratch', 'part', 'data', 'science', 'profession', 'survey'], ['how', 'to', 'learn',
'programming', 'for', 'data', 'science', 'steps'], ['what', 'does', 'data', 'scientis
t', 'actually', 'do'], ['how', 'subscriber', 'landed', 'data', 'analyst', 'job', 'i
n', 'less', 'than', 'year', 'ray', 'ojel', 'knn', 'ep'], ['wish', 'had', 'known', 'th
is', 'before', 'starting', 'in', 'data', 'science'], ['how', 'learned', 'to', 'lear
n'], ['avoid', 'these', 'data', 'science', 'resume', 'mistakes'], ['uber', 'driver',
'to', 'machine', 'learning', 'engineer', 'in', 'months', 'daniel', 'bourke', 'knn',
'ep'], ['reviewing', 'your', 'data', 'science', 'resumes', 'episode', 'different', 'r
esumes'], ['built', 'the', 'first', 'ever', 'youtube', 'subscriber', 'leaderboard'],
['reviewing', 'your', 'data', 'science', 'projects', 'episode', 'very', 'detailed',
'project'], ['how', 'got', 'my', 'first', 'data', 'science', 'internship', 'and', 'ho
w', 'you', 'can', 'land', 'one']]
```

```
In [69]: def lemmatization(texts, allowed_postags=['NOUN', 'ADJ', 'VERB', 'ADV', 'WH', 'FW']): #
        texts_out = []
        for sent in texts:
            doc = nlp(" ".join(sent))
            texts_out.append(" ".join([token.lemma_ if token.lemma_ not in ['-PRON-'] else
            return texts_out
```

```
In [70]: # spacy for lemmatization
        # Initialize spacy 'en' model, keeping only tagger component (for efficiency)
        # Run in terminal: python -m spacy download en
```

```
nlp = spacy.load('en_core_web_sm', disable=['parser', 'ner'])

# Do Lemmatization keeping only Noun, Adj, Verb, Adverb, WH, FW
data_lemmatized = lemmatization(data_words, allowed_postags=['NOUN', 'ADJ', 'VERB', 'A

print(data_lemmatized)
```

```
['learn data science start', 'well free datum science course talk', 'prove data scien
ce project beginner kaggle', 'beginner science project walk titanic', 'project get da
tum science job', 'learn data science change', 'probably become data scientist', 'dat
a science project scratch part project planning', 'quit datum science', 'reason becom
e data scientist', 'data science certificate vs bootcamp master degree', 'learn data
science', 'learn data science start', 'set data science environment', 'data science p
roject scratch part datum collection', 'data science die', 'make data science portfol
io website page', 'datum science advice college student', 'ultralearn data science',
'daysofdata', 'essential datum science project portfolio', 'land sport analytic job',
'data science project scratch part datum cleaning', 'm start datum science over agai
n', 'math need master data science', 'big data science beginner mistake', 'data scien
ce project scratch part exploratory datum analysis', 'different datum science role ex
plain datum scientist', 'build datum science portfolio website page feat data profess
or', 'data science right', 'scrape twitter datum python twitterscraper module', 'go d
atum analyst data scientist', 'way make extra income data scientist', 'data science p
roject get job', 'data science project scratch part model building', 'good computer d
ata science beginner', 'work home datum day life', 'get data science experience job',
'project scratch part science profession survey', 'learn program datum science step',
'data scientist actually', 'land analyst job less year ray', 'wish know start data sc
ience', 'learn learn', 'avoid datum science resume mistake', 'driver machine learning
engineer month knn', 'review data science resume episode different resume', 'build fi
rst ever youtube subscriber leaderboard', 'review data science project episode very d
etailed project', 'get first data science internship land']
```

```
In [51]: vectorizer = CountVectorizer(analyzer='word',
                                     min_df=3,                # minimum reqd occurence
                                     stop_words='english',     # remove stop words
                                     lowercase=True,           # convert all words to
                                     token_pattern='[a-zA-Z0-9]{3,}', # num chars > 3
                                     # max_features=50000,      # max number of uniq wo
                                     )

data_vectorized = vectorizer.fit_transform(data_lemmatized)
```

```
In [52]: vectorizer
```

```
Out[52]: ▼ CountVectorizer
CountVectorizer(min_df=3, stop_words='english', token_pattern='[a-zA-Z0-9]
{3,}')
```

```
In [55]: #print(data_vectorized)
```

```
In [64]:
```

```
In [72]: # count the frequency of words
from collections import Counter
words_counter=Counter()
```

```

for row in data_lemmatized:
    words_counter.update(row.split(' '))
print(words_counter)

```

```

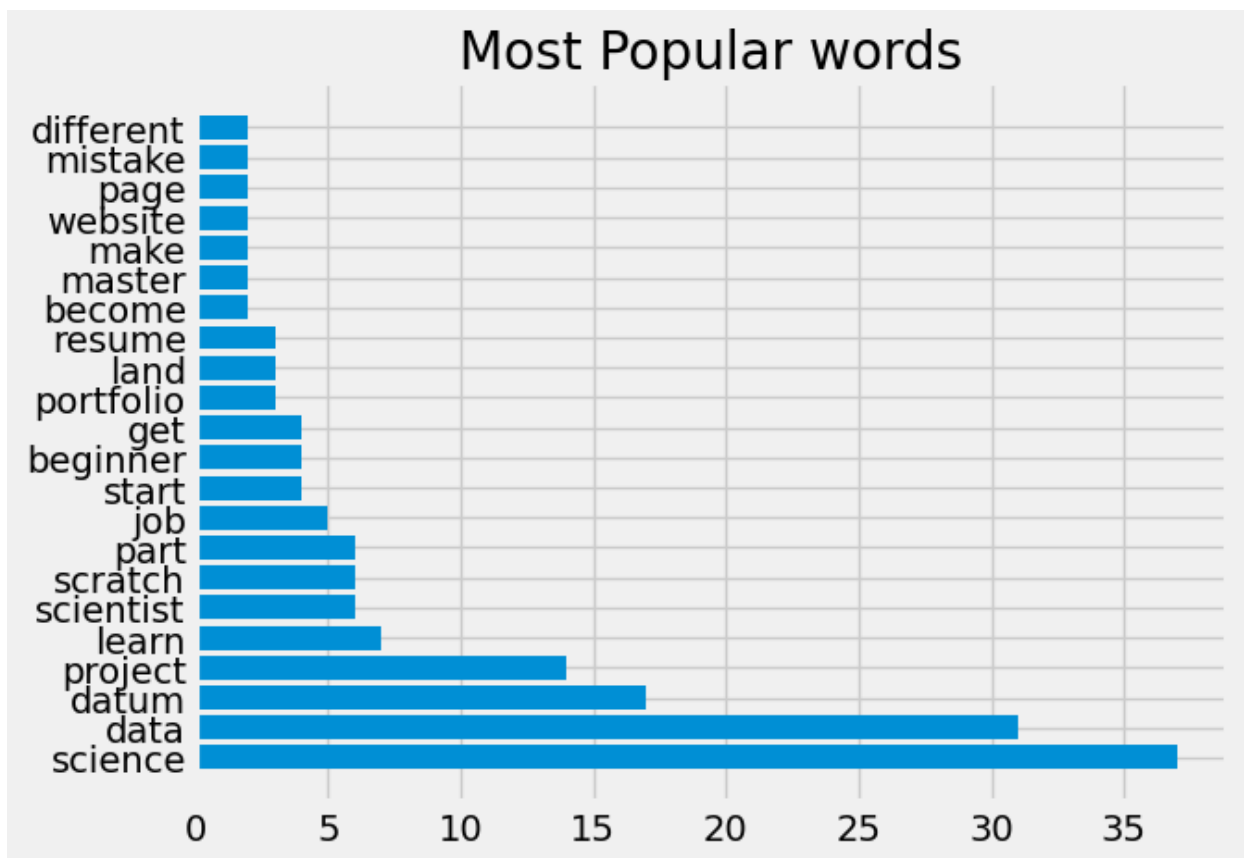
Counter({'science': 37, 'data': 31, 'datum': 17, 'project': 14, 'learn': 7, 'scientis
t': 6, 'scratch': 6, 'part': 6, 'job': 5, 'start': 4, 'beginner': 4, 'get': 4, 'portf
olio': 3, 'land': 3, 'resume': 3, 'become': 2, 'master': 2, 'make': 2, 'website': 2,
'page': 2, 'mistake': 2, 'different': 2, 'build': 2, 'analyst': 2, 'review': 2, 'epis
ode': 2, 'first': 2, 'well': 1, 'free': 1, 'course': 1, 'talk': 1, 'prove': 1, 'kaggl
e': 1, 'walk': 1, 'titanic': 1, 'change': 1, 'probably': 1, 'planning': 1, 'quit': 1,
'reason': 1, 'certificate': 1, 'vs': 1, 'bootcamp': 1, 'degree': 1, 'set': 1, 'enviro
nment': 1, 'collection': 1, 'die': 1, 'advice': 1, 'college': 1, 'student': 1, 'ultra
learn': 1, 'daysofdata': 1, 'essential': 1, 'sport': 1, 'analytic': 1, 'cleaning': 1,
'm': 1, 'over': 1, 'again': 1, 'math': 1, 'need': 1, 'big': 1, 'exploratory': 1, 'ana
lysis': 1, 'role': 1, 'explain': 1, 'feat': 1, 'professor': 1, 'right': 1, 'scrape':
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xtra': 1, 'income': 1, 'model': 1, 'building': 1, 'good': 1, 'computer': 1, 'work':
1, 'home': 1, 'day': 1, 'life': 1, 'experience': 1, 'profession': 1, 'survey': 1, 'pr
ogram': 1, 'step': 1, 'actually': 1, 'less': 1, 'year': 1, 'ray': 1, 'wish': 1, 'kno
w': 1, 'avoid': 1, 'driver': 1, 'machine': 1, 'learning': 1, 'engineer': 1, 'month':
1, 'knn': 1, 'ever': 1, 'youtube': 1, 'subscriber': 1, 'leaderboard': 1, 'very': 1,
'detailed': 1, 'internship': 1})

```

```

In [80]: words=[]
popularity=[]
for item in words_counter.most_common(22):
    words.append(item[0])
    popularity.append(item[1])
plt.style.use('fivethirtyeight')
plt.barh(words, popularity)
plt.title('Most Popular words')
#plt.xticks(rotation=45)
plt.show()

```



```
In [90]: data_words2 = list(sent_to_words(list(data_title_views.keys())[-50:]))
        #print(data_words2)

def lemmatization(texts, allowed_postags=['NOUN', 'ADJ', 'VERB', 'ADV', 'WH', 'FW']): #
    texts_out = []
    for sent in texts:
        doc = nlp(" ".join(sent))
        texts_out.append(" ".join([token.lemma_ if token.lemma_ not in ['-PRON-'] else
        return texts_out

nlp2 = spacy.load('en_core_web_sm', disable=['parser', 'ner'])
data_lemmatized2 = lemmatization(data_words2, allowed_postags=['NOUN', 'ADJ', 'VERB',
#print(data_lemmatized2)

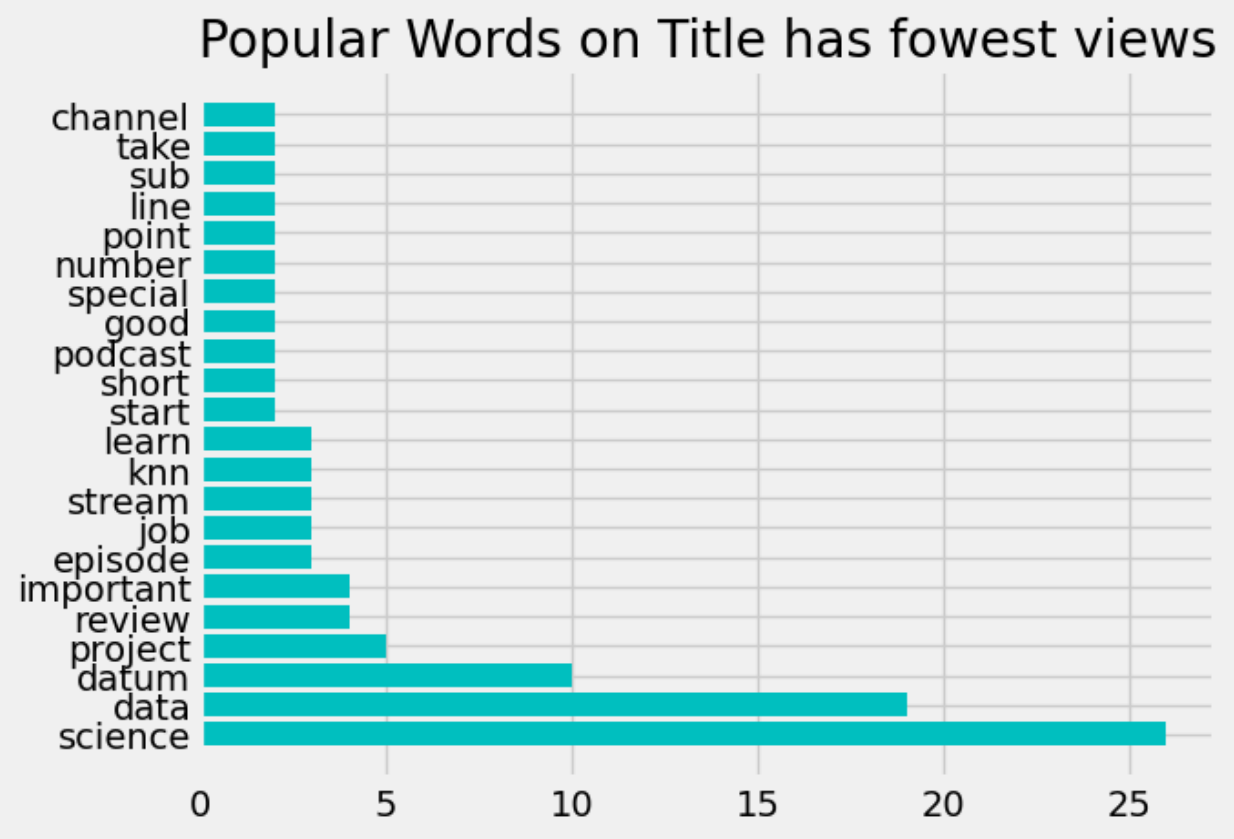
from collections import Counter
words_counter2=Counter()
for row2 in data_lemmatized2:
    words_counter2.update(row2.split(' '))
#print(words_counter2)

words2=[]
popularity2=[]
for item in words_counter2.most_common(22):
    words2.append(item[0])
    popularity2.append(item[1])

plt.style.use('fivethirtyeight')
plt.barh(words2, popularity2, color='c')
plt.title('Popular Words on Title has fowest views')
```



```
#plt.xticks(rotation=45)
plt.show()
```



```
In [ ]:
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```