YOUTUBE OPTIMIZATION AND SHORTENING

Instructor:
Manasee Parulekar

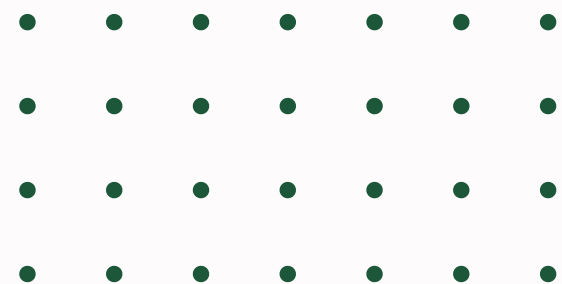## Group Members:

Aradhana Anandkumar,

Wenfan Zhong,

Anthony Hartman,

Thomas Motais,

Rishil Saxena,

Anwar Rehman,

Andrew Yim

Table of Contents

Objectives

Project Context-

We collaborated with a client aiming to enhance the reach and popularity of their content by creating concise reels and YouTube shorts from their videos.

To streamline the process, we developed machine learning models that automatically generate AI-driven tags, descriptions, titles, and analytics. These capabilities were seamlessly integrated into a React application, providing our client with a powerful tool to optimize and broaden their audience engagement.

Target Group

Target Group#1

Content creators

Target Group #2

Business individuals

Title Generation

Objective: Generate titles for client's video based off of their descriptions

Data:

Uses YouTube Data API v3 to find similar videos, then sorts through most relevant => popular. From there, it calls the GPT API to generate new titles based on the retrieved data

xYYLI6HvWL0

Generate Titles!

Potential titles based on your video:
Building a Powerful $535 ITX Gaming PC | Intel i3-12100F & GTX
Building a $535 ITX Gaming PC with Intel i3-12100F and GTX
Building a Powerful $535 ITX Gaming PC! Intel i3-12100F & GTX
Building a $535 Budget ITX Gaming PC | Affordable and Upgradeable | CPU, GPU, and Performance Tests
Building a $535 Budget ITX Gaming PC | Affordable and Upgradeable!
Building a Budget ITX Gaming PC for $535! (with Room for Upgradeability)
Building an Epic $500 ITX Gaming PC | Intel i3-12100F & GTX
Building a $535 Budget ITX Gaming PC | 12100F & GTX 1660 Super
Building a $535 Budget ITX Gaming PC [Intel i3 12100f + GTX

GL55Lc6W5Fs

Generate Titles!

Potential titles based on your video:
Building an RTX 4090 and AMD Ryzen 7 7800X3D Mini
Building an RTX 4090 and AMD Ryzen 7 7800X3D Mini
Building an RTX 4090 and AMD Ryzen 7 7800X3D Mini
Building a Water-Cooled Open Case PC: Stunning Art Piece or High-Performance Machine?
Building a Water-Cooled Open Build Case: The Ultimate Gaming Setup
Building a Water Cooled Artistic PC Case | Incredible Thermal and Gaming Performance!
"Building the Ultimate Gaming Beast: RTX 4090 and Ryzen 7 7800X
Insane Gaming Performance! Water Cooled Art PC Build with RTX 4090 | $
Building a Water Cooled Art PC with Vertical Design | Gaming & Thermal Performance

Tag Generation

Objective: Generate tags for client's video based off of their descriptions

Data: Uses YouTube Data API v3 to find similar videos, then finds the most popular tags. To create a more comprehensive list, the transcript was put into a Word2Vec model to find the most important words. Also, the list of part names is being scraped from the description to provide more specific tags.

Potential tags based on your video:
tonytechbytes
motherboard
high
budget
using
like
fractal terra
build
let_s
fractal design
etaprime
power
case
going
would
fractal
pc build
sff
one
frames
pc gaming
terra
computer
lower
eta prime
budget gaming pc
pc
well
nzxt
mini gaming pc
cpu
gaming
nzxt h1
gaming pc
Head to https
Intel i3-12100F
GTX 1660 Super
ASRock H610M-ITX/ac
Corsair DDR4-3200
Crucial P3 Plus
Thermaltake Core V1
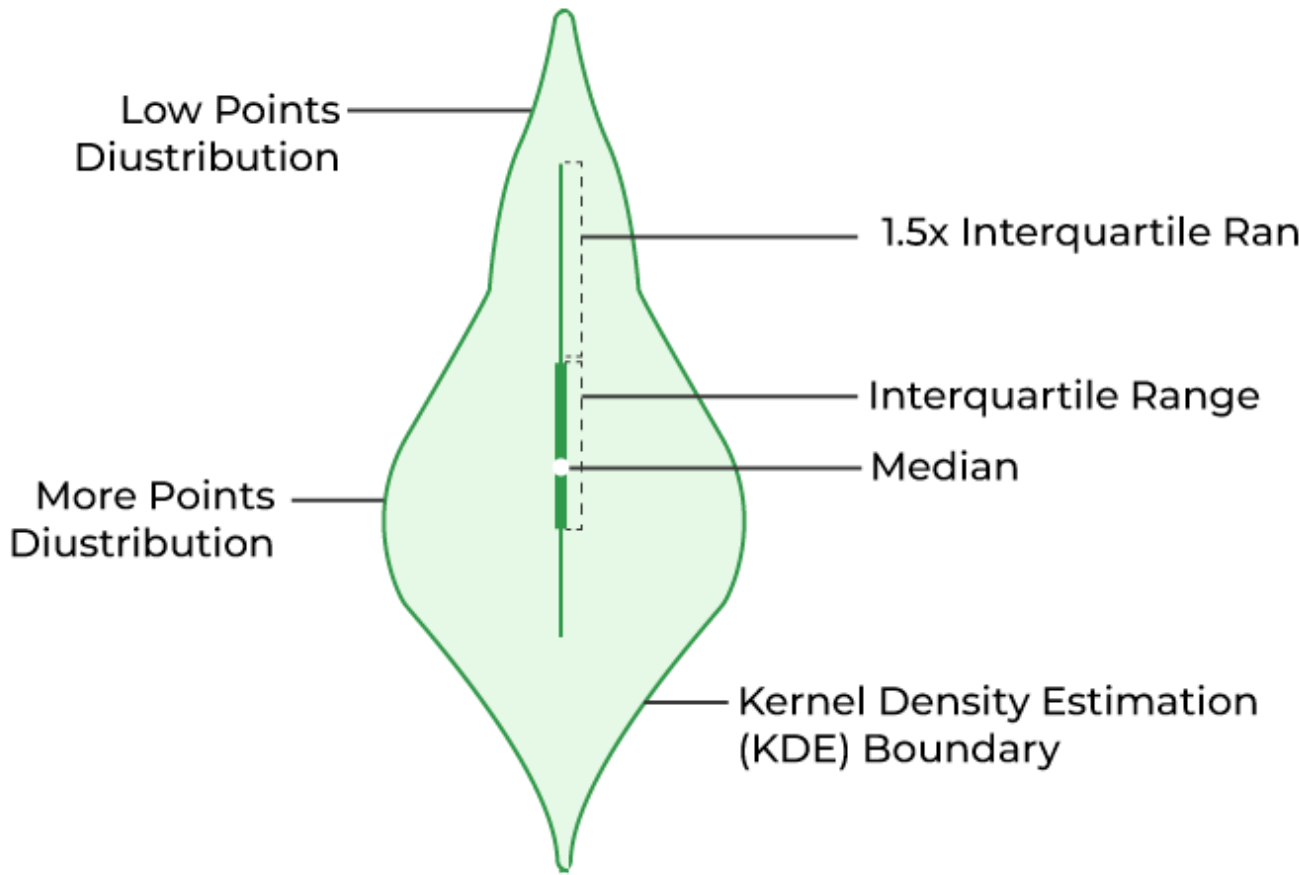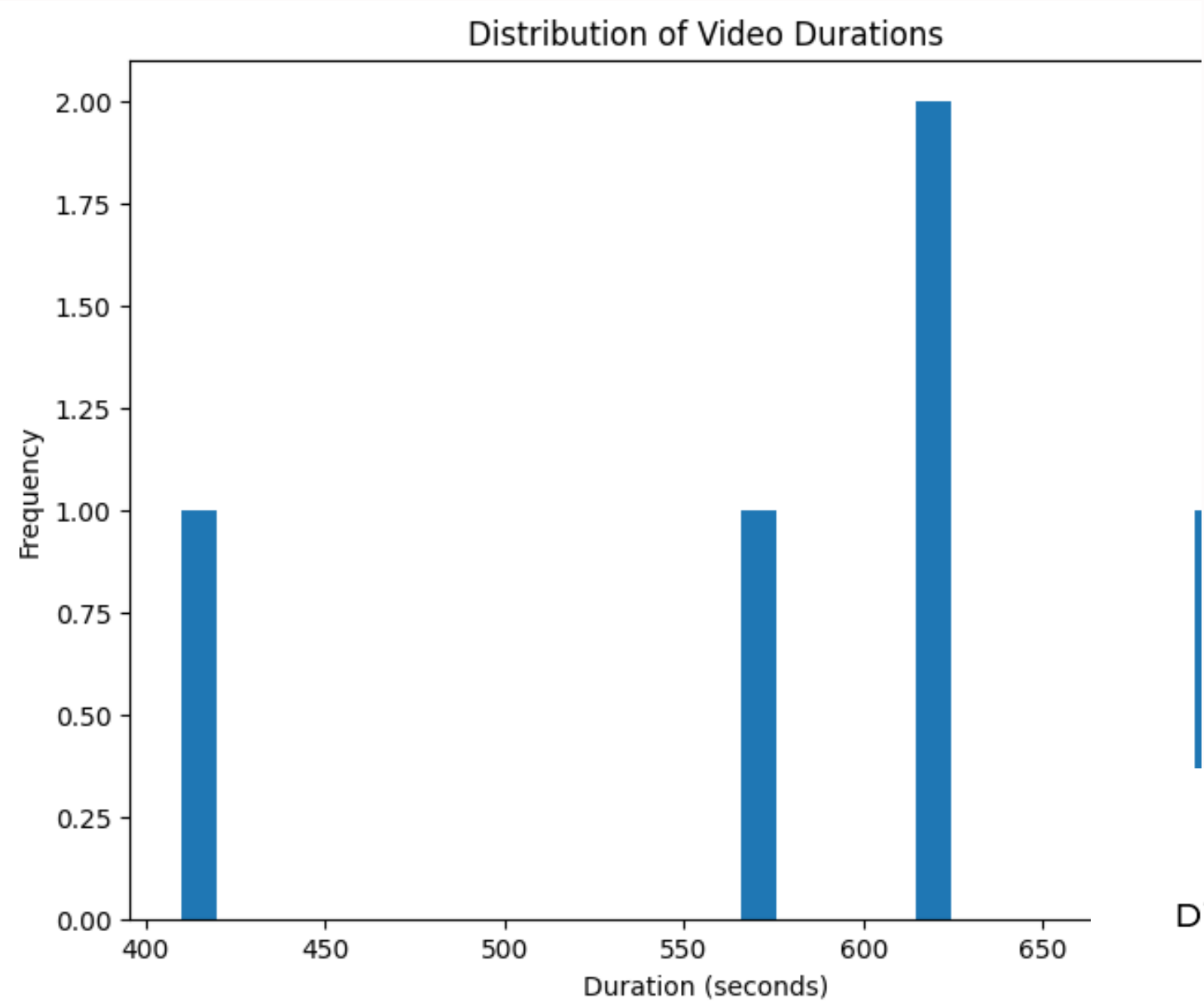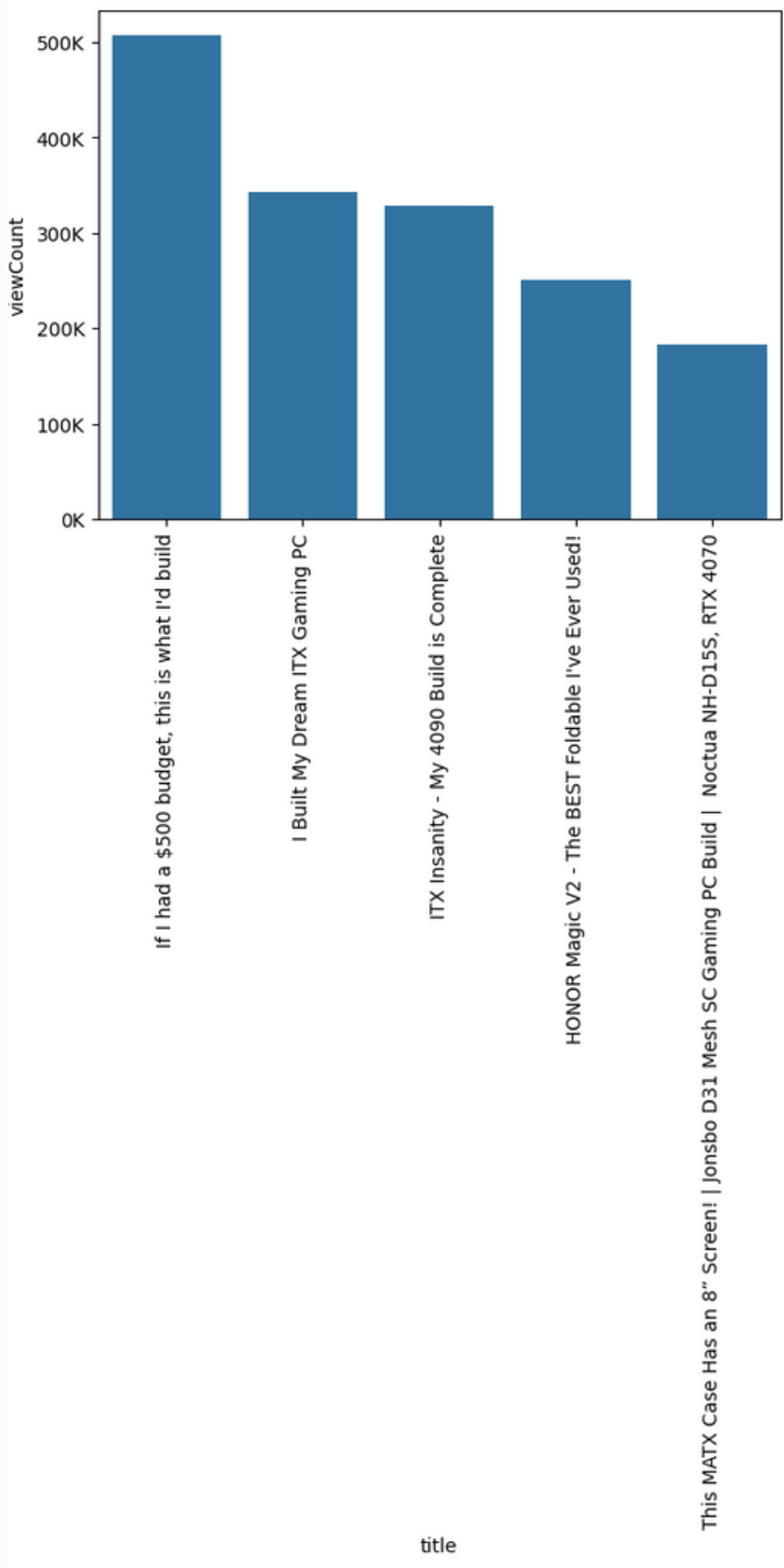Corsair CX650m
Sony A7 iii
Sony 28-70mm Lens

Data Analytics

Video Duration:
   - Importance: Viewers' attention spans are finite; optimizing video duration is pivotal.
   - Impact: Shorter videos tend to retain audience interest, reducing viewer drop-off rates.
   - To the point: Optimal video length enhances viewer engagement and encourages sustained attention.

Violin Plots:
   - Importance: Violin plots visually represent data distributions, aiding in pattern recognition.
   - Impact: They help identify trends, outliers, and audience preferences in a compact, insightful manner.
   - Violin plots are particularly useful when comparing the distribution of a numerical variable across different categories.
   - In the context of a YouTube channel, a violin plot might help visualize the distribution of video views within different content categories or the relationship between video views and comments for various types of content.

Distribution of Video Durations

Low Points Diustribution

1.5x Interquartile Ran

Interquartile Range

Median

More Points Diustribution

Kernel Density Estimation (KDE) Boundary

Video Shortening

objectives: Convert YouTube video to 1 minute short video.

solution:

It takes in the retention data about the YouTube video, the link to the video to find the change in retention between timestamp. Then, it find the highest change in retention since it's where the audience most interested, adjust the size of the video, and clip them to create a shorts video based on the long YouTube video.

Example

Input

```
0,96.19,3.23
1,79.54,10.17
2,68.17,16.19
3,59.13,21.77
4,57.75,28.57
5,55.71,36.34
6,54.05,44.43
7,48.56,51.43
8,51.95,55.95
9,56.22,57.63
10,52.81,57
11,47.56,54.87
12,47.71,52.06
13,47.35,48.98
14,45.73,45.35
15,43.56,41.2
16,42.18,37.38
17,42.09,34.77
18,41.33,33.6
```

https://www.youtube.com/watch?v=xYYLI6HvWL0&t=1s

output

Description Generation

- **Objectives: Create a descriptive yet entertaining description for the short form video. using the OpenAI Chat-GPT model as the NL processing AI.**

- **Data resources and models used:**
  - **Open AI whisper model**
    - **transcription generation**
  - **Open AI Chat-GPT Model**
    - **NLP based Description generation**

Input examples
○ Transcription of original video ○ Keywords entered by user ○ Title of the original video ○ An example of what result should look like taken from a already made description on YouTube ○ Wordplay in the prompt of the NL processing AI to help it create the tone (For example: A fun description/a short story) ○ Length of what result should look like (For example: 200 characters/25 words)

Description Generator Output Comparison

YouTube Video Title:

UNREAL Mini Gaming PC - PS5 on Steroids

Descriptions Before

Console-sized 7800X3D and RTX 4070 Mini-ITX Build in the Fractal Design Ridge

Descriptions After

Get ready, gamers! In this video, we're supersizing the power while miniaturizing the size with our UNREAL Mini Gaming PC - a PS5 on Steroids! Buckle up as we dive deep into the realms of extreme gaming, pushing limits like never before. Whether you're a PS5 fan or a PC enthusiast, this mini beast will blow your socks off! So, grab your controllers, put on your gaming headset, and let's turbocharge our gaming experience together! Click play NOW!

THANK YOU FOR LISTENING!