

IMPACT OF COVID-19 ON ANIME POPULARITY

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All resources are referenced at the end of the slides.



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01.

RESEARCH QUESTION

Background of Anime
during COVID-19;
Research Question;
Research Scope

Background

Drop in Anime Sales

According to various sources, the anime sales dropped during the onset of COVID-19. It fell 1.8%, and is the first fall in a decade.

The obvious next step to wonder is whether the popularity of anime itself has dropped along with the sales, or does it increase since people spend more time on the internet and television during the pandemic.

BUSINESS

Japan animation industry sales fall 1.8% in 2020, first drop in decade



A sign of a movie based on popular manga 'Demon Slayer' by Koyoharu Gotoge is seen at a movie theater in Tokyo on the film's opening day on Oct. 16, 2020. | KYODO

KYODO

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Sales in Japan's animation production industry fell 1.8% on year in 2020, the first drop in a decade, as hit movies such as the record-breaking success of the film on the blockbuster 'Demon Slayer' manga series failed to offset the pandemic impact, according to a credit research firm.

The industry's sales totaled ¥251.1 billion (\$2.3 billion) last year, down from a record ¥255.7 billion in 2019, Teikoku Databank said in a recent survey report.

In the movie business, the industry had smash-hit "Demon Slayer — Kimetsu no Yaiba — The Movie: Mugen Train," which became the highest-grossing film in Japanese box-office history with more than ¥40 billion in revenue.

Among other hit movies was "Violet Evergarden: The Movie," a Kyoto Animation Co. film that some of the victims of the deadly arson attack at a studio of the company two years ago had been working on.

Still, the COVID-19 pandemic had delayed production processes at many studios, leading 48.6% of 300 animation production companies surveyed to report a sales fall in 2020.

カラオケ

Research Question:



Following the onset of COVID-19, is anime popularity dropping, constant, or increasing?

Research Scope:



*Seasonal anime since 2000; TV shows only.
The synthesized popularity feature over
time will be analysed.*

02. METHOD- OLOGY

Defining popularity;
Obtaining popularity;
Choosing model;
Steps to take;
Splitting data



How do we **define** anime popularity?



Score

How much people like the anime.

First of all, it is prudent to define what “popularity” is for clarity.

The notion of popularity that I will use is based on two criteria: anime score and number of audience.

If everyone who watches the anime thinks its a masterpiece but only a few of them watches it, or if a lot of people watches it but a few likes it, it will not be popular in our definition.

A popular anime, then, is when many people watches and likes it.



Members

How much people watch the anime.

How do we *obtain* anime popularity?

1. Collect scores and members for each anime.
2. Since we usually regard number of people by the number of digits, we apply logarithmic transformation to members value.
3. Scale the members value to the scale of scores.
4. Multiply both values to get popularity (called “acclaim” in the code, since the term is already taken).
5. Look for the most 5 popular anime in each season, since averaging them all will create a feature dependent on how many unpopular anime there are in a season.
6. The average popularity of top 5 anime will be the popularity of that season.

ARIMA vs. LSTM

The popularity over time is what will be measured; it is essentially a time series.

ARIMA is one way to predict popularity, but since the prediction period is a long range of 2 years (since onset of COVID-19 pandemic), I will use LSTM, which is known to be able to predict more than one timestep in the future.

Both models are used in my code, but I will focus on LSTM.

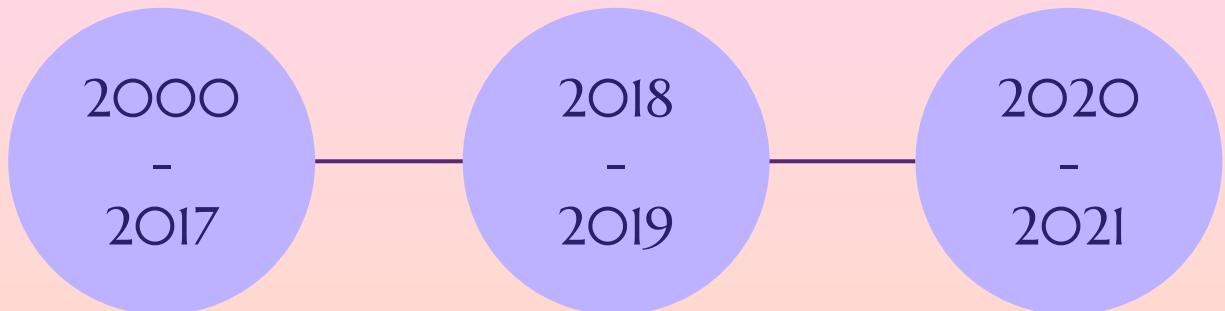


Methodology

1. Collect, explore, and preprocess data.
2. Split data into training, testing, and prediction data.
3. Train the model on training data.
4. Test the performance of the model on testing data.
5. Use the model to predict popularity during COVID-19 and compare to actual data.
6. If the actual data is “more popular” than the prediction data, COVID-19 is said to increase anime popularity (since the COVID-19 factor is unaccounted for in the model), and vice versa.



DATA SPLIT - OVERVIEW



Training Data

For training the model. (72 seasons)

Testing Data

For testing the model. (8 seasons)

Prediction Data

For comparing actual data with model prediction to obtain insight. (8 seasons)



DATA SPLIT - TIMELINE

“

2000

Is the period around when studios starts to produce more anime. Following the rise of popularity in anime - or anime boom - all season after 2000, contains more than 5 anime per season.

“

2020-2021

Is the period of COVID-19 pandemic. COVID-19 is first detected in late 2019, and continues to spread until now. At the time of data collection, the first season of 2022 is still airing.

03.1

DATA COLLECTION

Anime Database;
Web Scraping Tool;
Codebook

Anime Database

The data is obtained from MyAnimeList website, which contains a large database for anime and manga.

MyAnimeList is a commercial social networking and social cataloging website created by Garrett Gyssler in 2004.



MyAnimeList Website - Seasonal Anime List

One of the features of MyAnimeList is that it lists anime airing in each season.

This way, we can obtain the anime data from each season and compile it into a time series.

The screenshot shows the MyAnimeList website's seasonal anime list for the Spring 2022 season. The top navigation bar includes links for Anime, Manga, Community, Industry, Watch, Read, Help, and a search bar. Below the navigation is a breadcrumb trail: Top > Anime > Seasonal Anime. A navigation bar at the top of the page allows switching between Winter 2022, Spring 2022, Summer 2022, Fall 2022, Later, Schedule, and Archive. A "Jump to" dropdown is also present. The main content area displays a grid of anime entries under the heading "TV (New)". Each entry includes the anime title, release date, episode count, genre, synopsis, thumbnail, rating, user count, and an "Add to List" button. The first few entries are:

- Tate no Yuusha no Nariagari Season 2**: The Rising of the Shield Hero Season 2. Released on April 6, 2022, with 13 eps. 23 min. Action, Adventure, Drama, Fantasy genres. Studio: DR Movie, Kinema Citrus. Source: Light novel. Theme: Isekai. Rating: 7.67, 485K users. Synopsis: Second season of Tate no Yuusha no Nariagari.
- Kaguya-sama wa Kokurasetai: Ultra Romantic**: Kaguya-sama: Love Is War - Ultra Romantic. Released on April 9, 2022, with ? eps. 24 min. Comedy genre. Studio: A-1 Pictures. Source: Manga. Themes: Psychological, Romantic Subtext, School. Demographic: Seinen. Rating: 9.00, 371K users. Synopsis: Third season of Kaguya-sama wa Kokurasetai: Tensai-tachi no Renai Zunousen.
- Spy x Family**. Released on April 9, 2022, with 12 eps. 24 min. Action, Comedy genres. Studio: CloverWorks, Wit Studio. For the agent known as "Twilight", no order is too tall if it is for the sake of peace. Operating as Westals' master spy, Twilight works tirelessly to prevent extremists from sparking a war with neighboring country Ostania. For his latest mission, he must investigate Ostanian politician Donovan Desmond by . Rating: 9.02, 347K users. Synopsis: For the agent known as "Twilight", no order is too tall if it is for the sake of peace. Operating as Westals' master spy, Twilight works tirelessly to prevent extremists from sparking a war with neighboring country Ostania. For his latest mission, he must investigate Ostanian politician Donovan Desmond by .

Below these, there are more entries like "Kawaii dake ja Nai Shikimori-san" and "Komi-san wa, Comyushou desu. 2nd Season".

MyAnimeList Website - Anime Page

Each anime has its own page, and MyAnimeList has variety of data for each anime like score, number of viewers, and ranking.

Shingeki no Kyojin: The Final Season
Attack on Titan: The Final Season

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Top > Anime > Shingeki no Kyojin: The Final ...

Score
8.86
1,012,072 users

Ranked #26 Popularity #47 Members 1,536,734
Winter 2021 | TV | MAPPA

[Add to List](#) [Select](#) Episodes: 0/16

* Your list is public by default.

Synopsis
Gabi Braun and Falco Grice have been training their entire lives to inherit one of the seven Titans under Marley's control and aid their nation in eradicating the Eldians on Paradis. However, just as all seems well for the two cadets, their peace is suddenly shaken by the arrival of Eren Yeager and the remaining members of the Survey Corps.

Having finally reached the Yeager family basement and learned about the dark history surrounding the Titans, the Survey Corps has at long last found the answer they so desperately fought to uncover. With the truth now in their hands, the group set out for the world beyond the walls.

In *Shingeki no Kyojin: The Final Season*, two utterly different worlds collide as each party pursues its own agenda in the long-awaited conclusion to Paradis' fight for freedom.

[Written by MAL Rewrite]

Background
No background information has been added to this title. Help improve our database by adding background information here.

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Alternative Titles
Synonyms: Shingeki no Kyojin Season 4

[f](#) [t](#) [r](#) [t](#)

PV
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Web Scraper

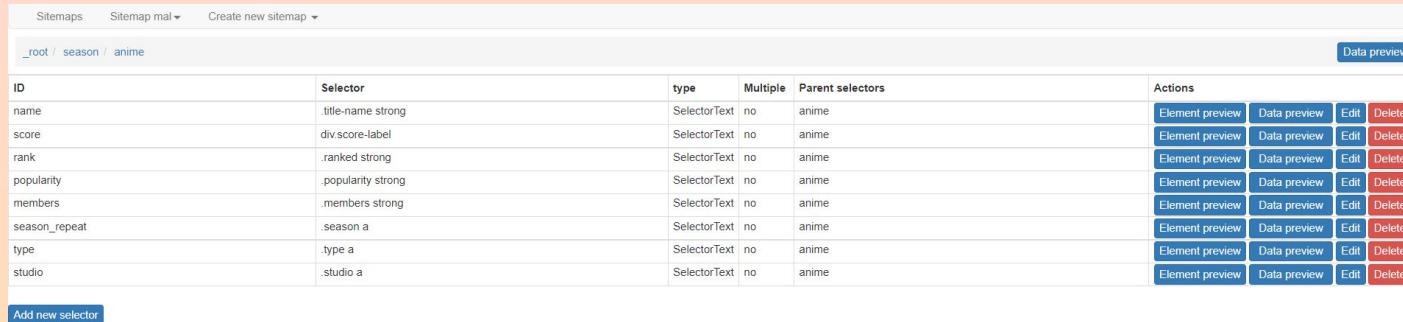
MyAnimeList is scraped using Google Chrome Extension tool. This tool made it easy to extract data from websites. More than 400,000 users use this tool.



Web Scraper - Implementation

The web scraper tool starts with a root URL to scrape. It traverses the link we selected and scrapes the data from each page, iterating one by one.

I executed the scrape in March 29th, and the scraping took 9 hours.



The screenshot shows a web-based application for managing scrapers. At the top, there are navigation links: 'Sitemaps' (selected), 'Sitemap m1' (disabled), and 'Create new sitemap'. Below the navigation is a breadcrumb trail: '_root / season / anime'. On the right side of the breadcrumb trail is a blue button labeled 'Data preview'. The main area is a table with the following columns: 'ID', 'Selector', 'type', 'Multiple', 'Parent selectors', and 'Actions'. There are nine rows in the table, each corresponding to a selector name and its details:

ID	Selector	type	Multiple	Parent selectors	Actions
name	title-name strong	SelectorText	no	anime	Element preview Data preview Edit Delete
score	div.score-label	SelectorText	no	anime	Element preview Data preview Edit Delete
rank	ranked strong	SelectorText	no	anime	Element preview Data preview Edit Delete
popularity	popularity strong	SelectorText	no	anime	Element preview Data preview Edit Delete
members	members strong	SelectorText	no	anime	Element preview Data preview Edit Delete
season_repeat	season a	SelectorText	no	anime	Element preview Data preview Edit Delete
type	type a	SelectorText	no	anime	Element preview Data preview Edit Delete
studio	studio a	SelectorText	no	anime	Element preview Data preview Edit Delete

At the bottom left of the table is a blue button labeled 'Add new selector'.

Codebook (Only Relevant Parts)



Season

The season the anime is aired.



Name

The name of the anime.



Score

The score of the anime given by the community.



Rank

The rank of the score.



Members

How many viewers in the community watches the anime.



“Popularity”

The rank of the members.
NOT the popularity we discussed.



Type

Type of show. For our scope, it is always “TV show”.



Studio

The studio that produced the anime.

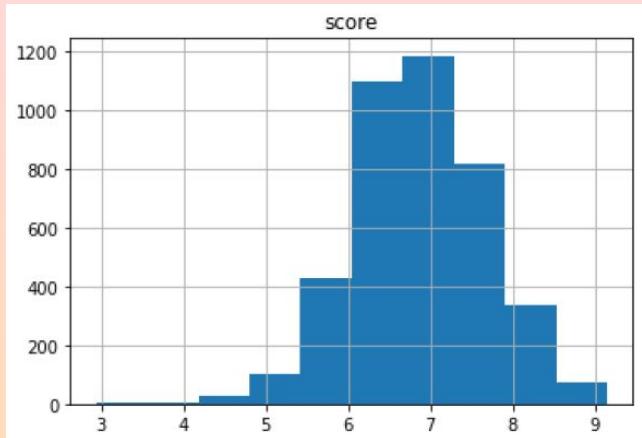
03.2

DATA EXPLORATION

Score Distribution;
Studio Distribution;
Highest Scored/Viewed Anime;
Anime per Season;
Time Series Characteristics

Score Distribution

Here is the distribution of anime scores given in MyAnimeList. Both mean and median is around 6.9. The maximum score is 9.15.



	score
count	4080.000000
mean	6.867375
std	0.797936
min	2.940000
25%	6.340000
50%	6.870000
75%	7.390000
max	9.150000

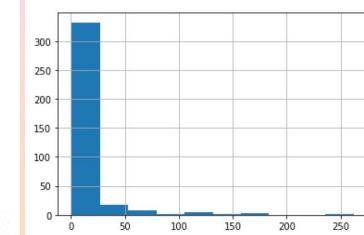
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Highest Scored Anime and Most Produced Studio

	anime	rank
2874	Fullmetal Alchemist: Brotherhood	1
4255	Gintama?	2
3121	Steins;Gate	3
3955	Shingeki no Kyojin Season 3 Part 2	4
1627	Shingeki no Kyojin: The Final Season Part 2	5

Fullmetal Alchemist: Brotherhood is the anime that is scored the most by the community. Toei Animation produced the most anime TV shows. From the distribution, most animes are produced by few studios.

studio	
Toei Animation	262
Sunrise	178
Studio Deen	161
J.C.Staff	160
Madhouse	154



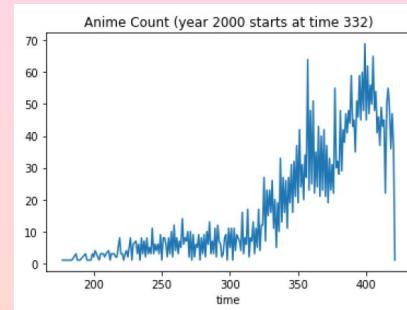
Most Viewed Anime and Anime Count by Season

The table on the left shows the count of animes by season, ordered descendingly; some seasons have up to 84 anime TV shows.

The anime per season is plotted over time in the right line chart; the anime produced start to increase around year 2000.

Finally, Attack on Titan is the most viewed anime overall, with more than 3 million viewers registered on MyAnimeList.

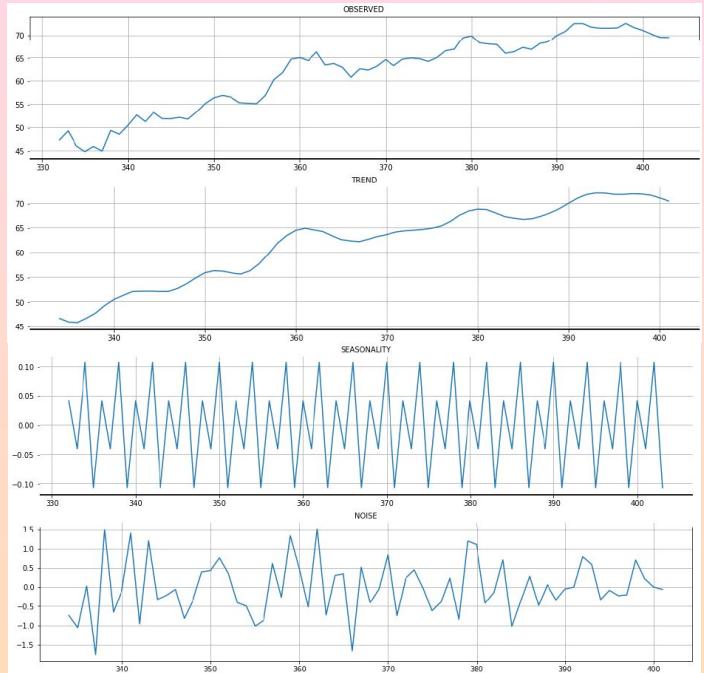
season	
Spring 2017	84
Fall 2016	80
Spring 2018	76
Spring 2016	75
Spring 2006	72



	anime	popularity	members
1139	Shingeki no Kyojin	1	3340909
2210	Death Note	2	3331576
2874	Fullmetal Alchemist: Brotherhood	3	2822351
2405	One Punch Man	4	2731807
2973	Sword Art Online	5	2701850

Time Series Characteristics

Here is the synthesized popularity of an anime season over time. The top chart is the original data, followed by trend, seasonality, and noise.

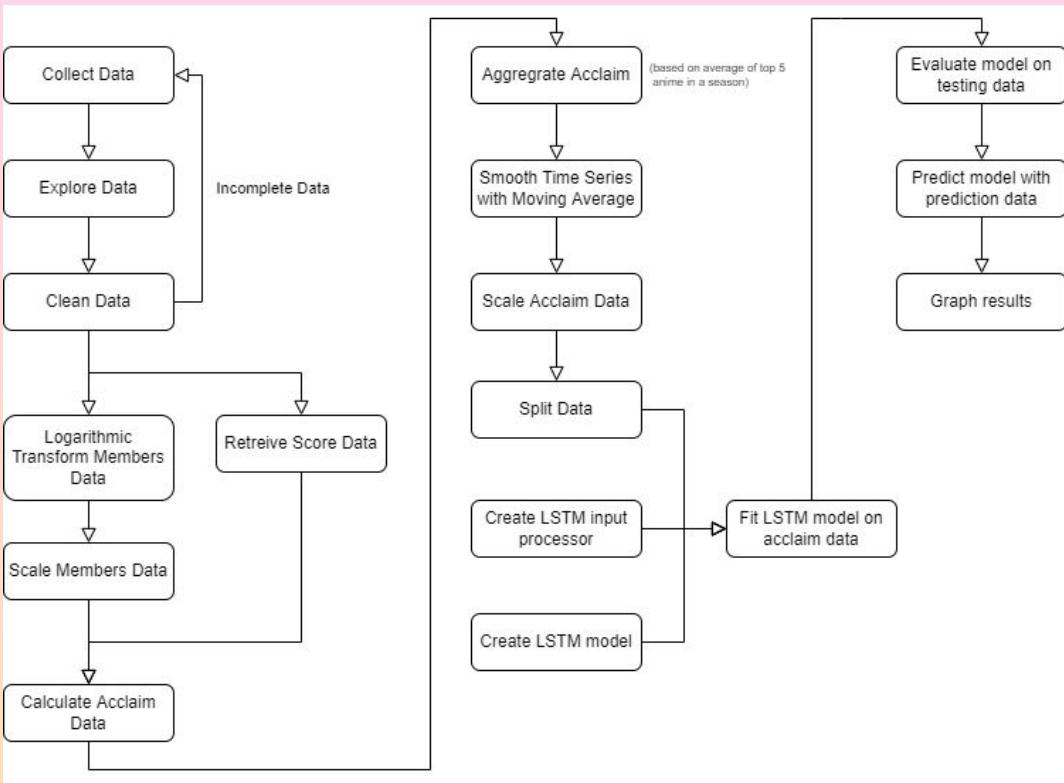




04. DATA ANALYSIS PROCEDURE

Flowchart

Data Analysis Flowchart



05. DATA ANALYSIS RESULTS

Model Parameters;
Testing and Prediction Performance;
Result Deliberation

Model Parameters



8

Number of
input timesteps

8

Number of
output timesteps

8

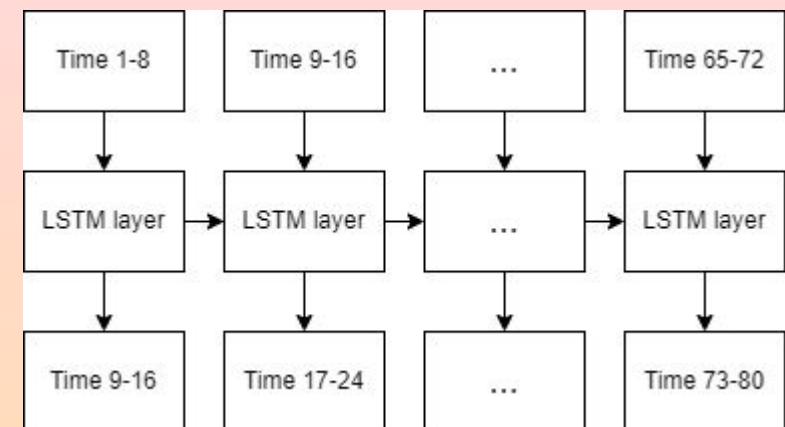
Number of shifts
in timesteps

32

Nodes in LSTM layer

200

Epochs



2.2462%

The *MAPE* of the **testing** data for the LSTM model.

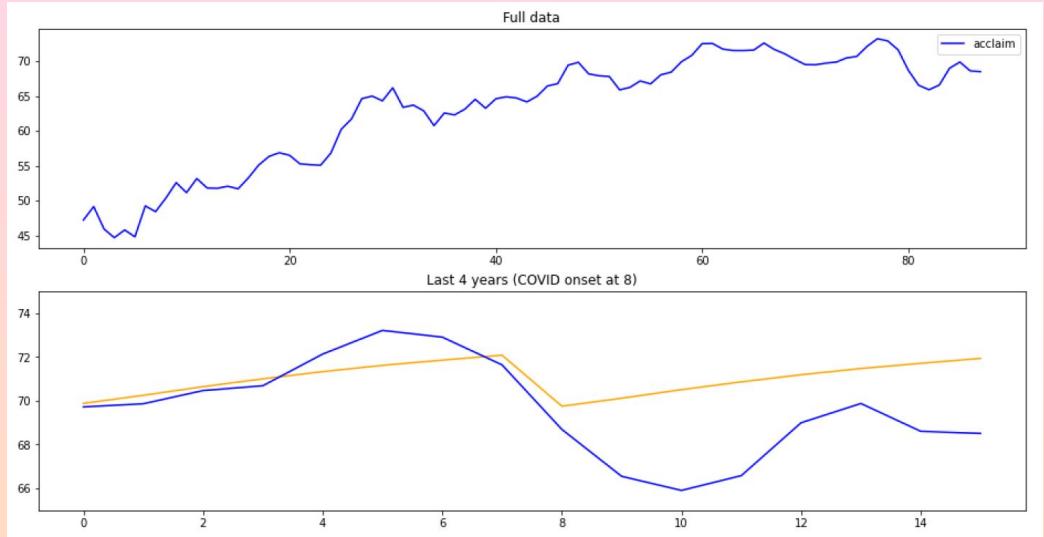
13.0901%

The *MAPE* of the **prediction** data for the LSTM model.

Prediction Result

We train the LSTM model for 72 seasons, and tested it on the years 2018-2019 (Left part of the bottom graph). The test has less than 5% of MAPE, so we used the model to predict anime popularity on COVID-19 period (Right part of the bottom graph). The prediction data's MAPE is more than 5%.

Since the model's prediction is inaccurate, we can see that the anime popularity has been affected by unforeseen incident, presumably COVID-19.



06. CONCLUSION

Concluding Remark;
Future Research;
References;
Appreciation Slide;
QR Code to Project



“From the results, we can conclude that anime popularity has been affected negatively following the onset of COVID-19.”

Future Improvements

The analysis could be expanded as follows:

Data could be generalized from just TV shows to include movies. We also did not account for anime that spans more than one season or those that have sequels.

The analysis only shows correlations, there could be some research over why exactly COVID-19 diminishes anime popularity.

We could tune the LSTM hyperparameters for more accurate predictions.

Finally, models other than LSTM could be explored.



References

Naruto Logo:

<https://www.artstation.com/artwork/g2BL4L>

Anime Sales Drop News:

<https://www.japantimes.co.jp/news/2021/08/15/business/anime-industry-sales/>

Java Anime Illustrations:

https://drive.google.com/file/d/oBo9a_TYwhKDZNGtBam9pdWRWTUU/view?usp=sharing&resourcekey=o-IE7A4BjTSp3rFfUEgp29pQ

MyAnimeList Pictures:

<https://myanimelist.net/>

Web Scraper Pictures:

<https://webscraper.io/>

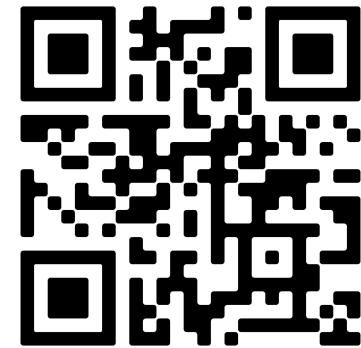




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Project Code



Project Slides

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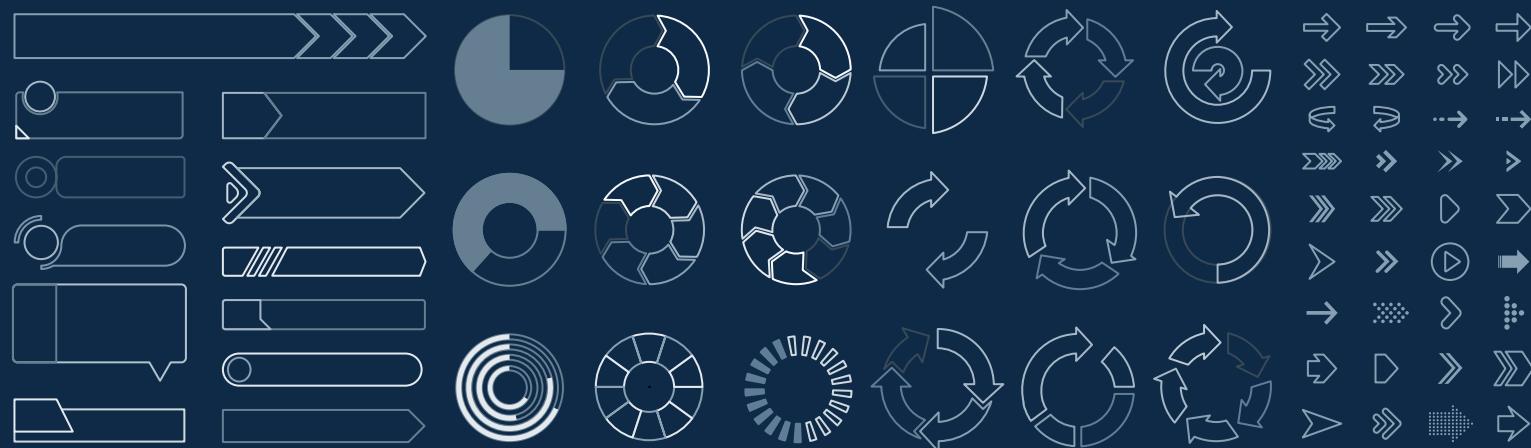
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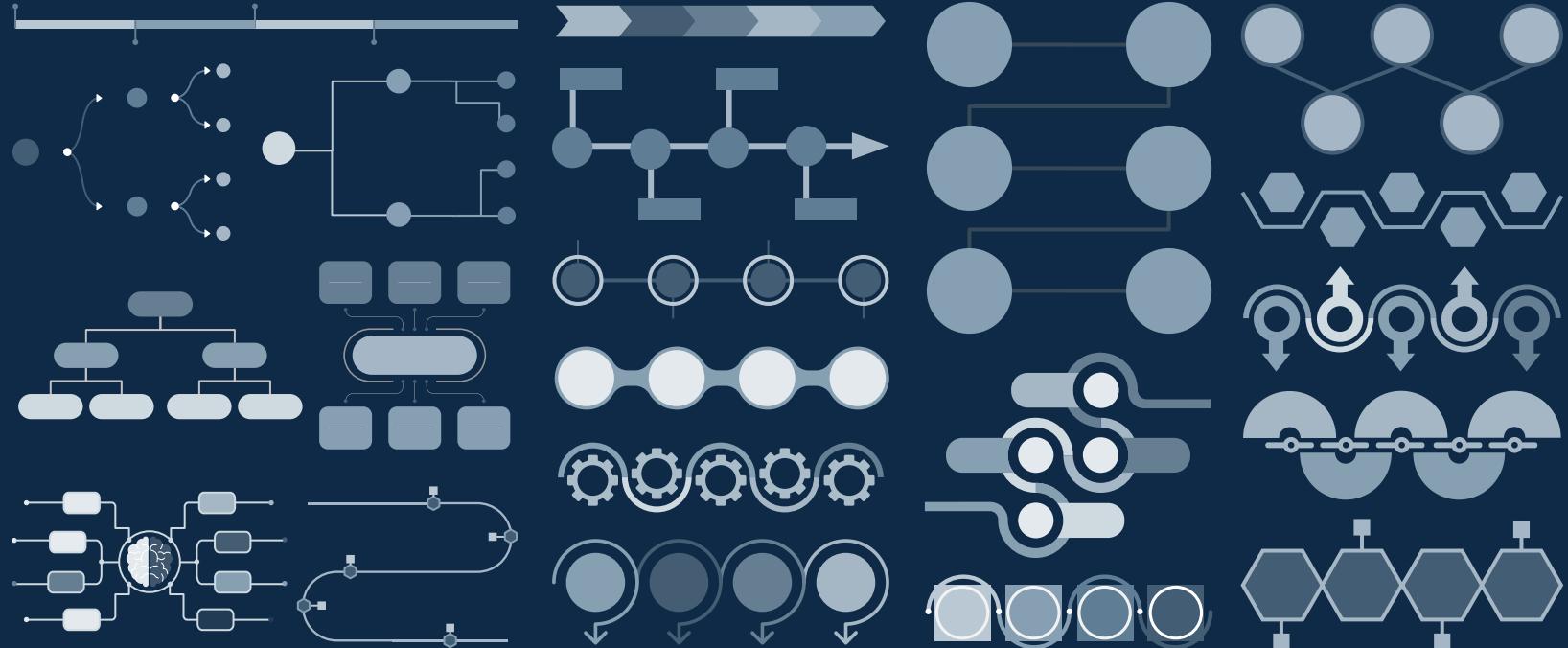
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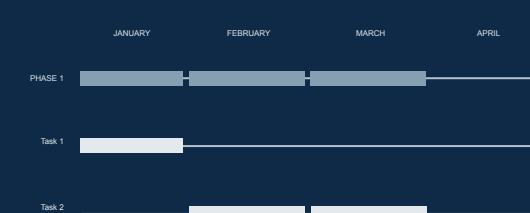
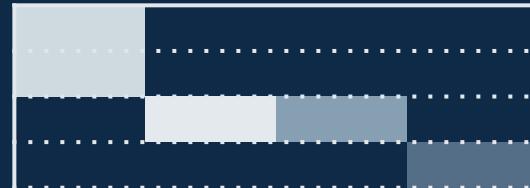
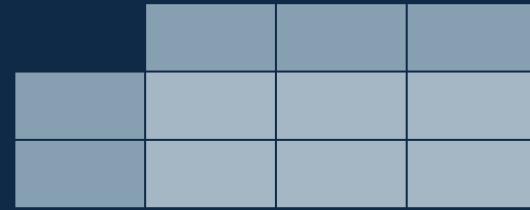
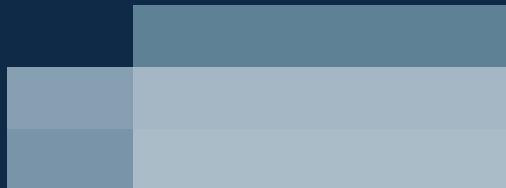
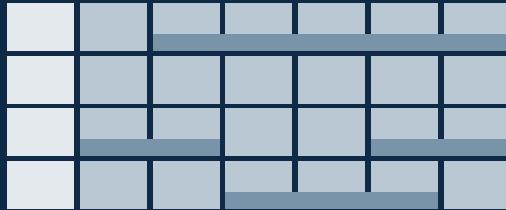
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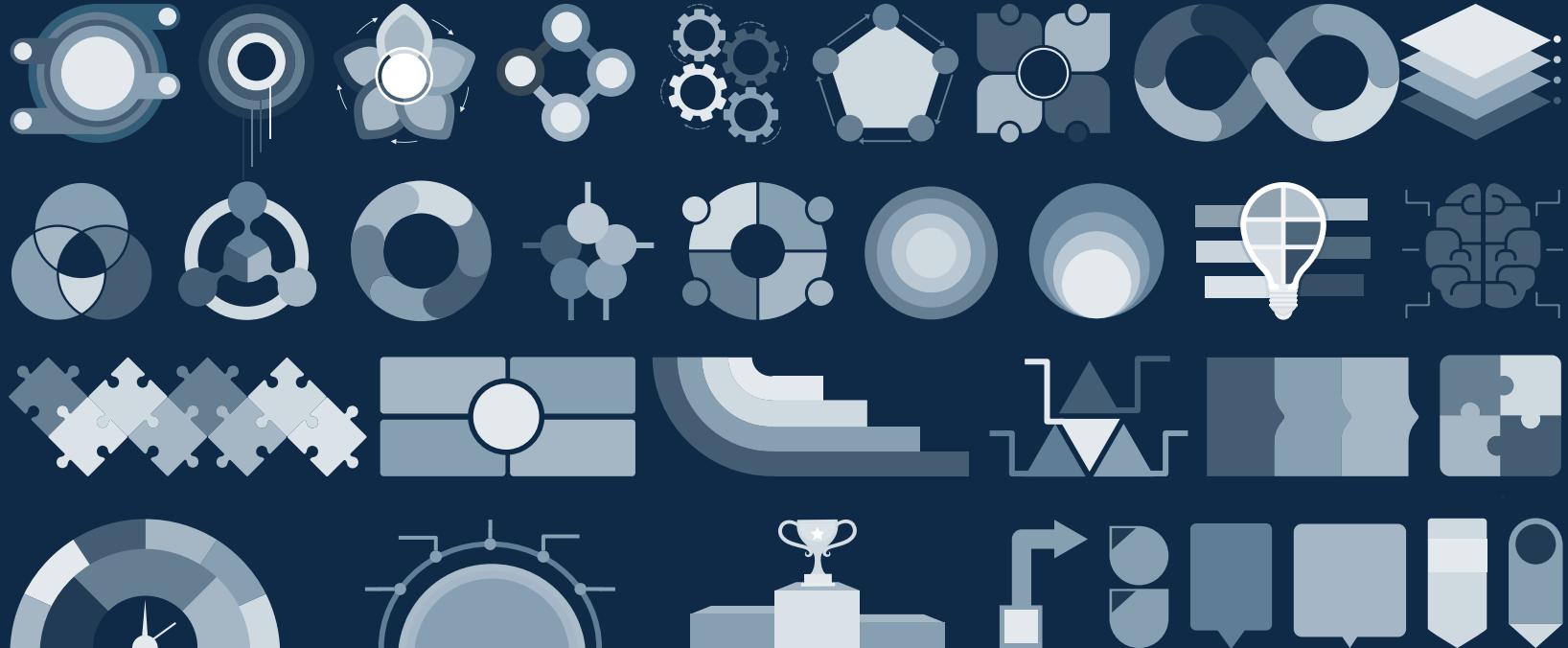
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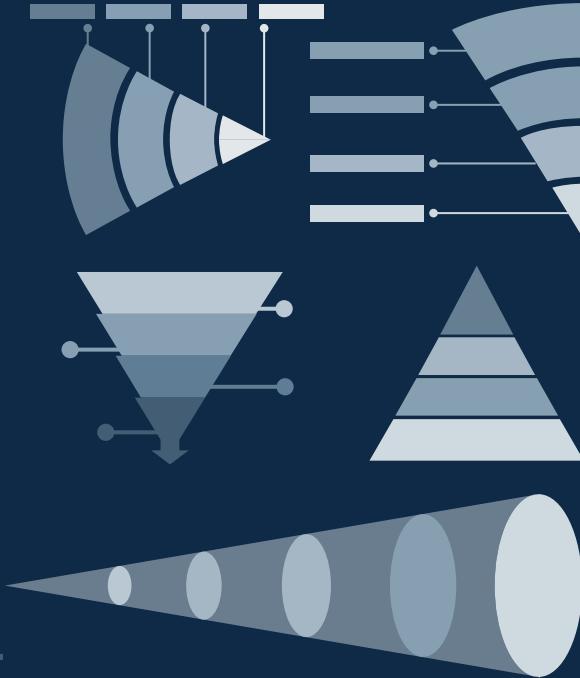
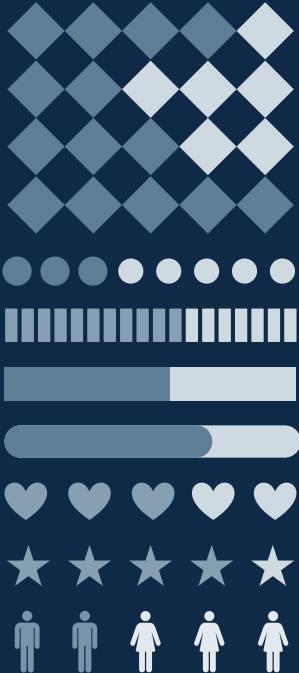
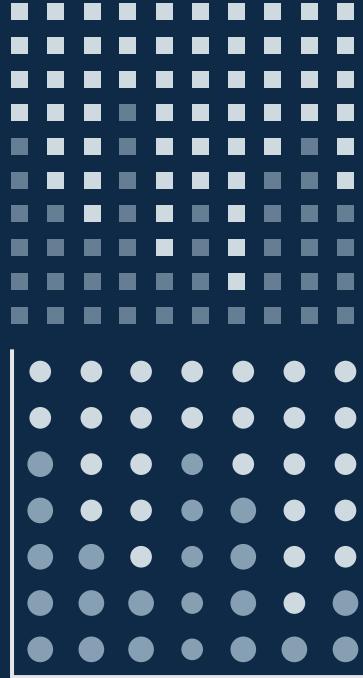












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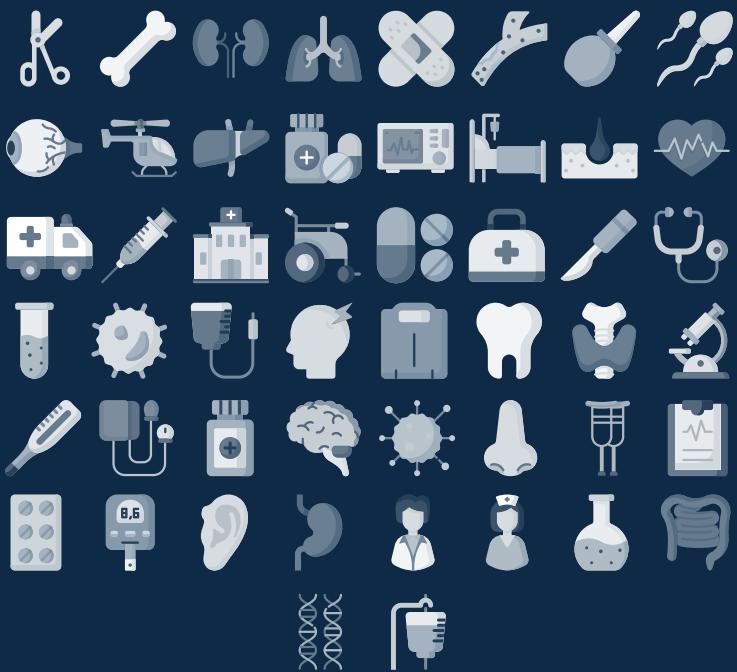
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Avatar Icons



Creative Process Icons



Performing Arts Icons



Nature Icons



SEO & Marketing Icons



