Making HBO Max More Data-Driven:

DAV 6050: Data Driven Organizations Final Project Write-Up

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I) Introduction

HBO (Home Box Office) is a subscription-based TV network founded in 1972 and based in the United States. Part of the WarnerMedia family, HBO has been recognized for decades as one of the most respected and innovative entertainment brands in the world. It is one of the older TV networks in this country and has some international reach with channels like HBO Latino. HBO is best known for producing and airing many popular and award-winning TV series like Game of Thrones, True Detective, among others. They also produce a variety of original content. In the United States, there are many ways to watch HBO shows and films: the linear HBO channel, HBO on Demand, the HBO app, and HBO MAX, which includes all of HBO with even more amazing shows and films.

HBO Max has stated that they use a human-centered design recommendation approach for the content on their platform. This varies from other industry competitors like Netflix and Amazon Prime Video. This being said, HBO Max doesn't forgo the use of data-based algorithms completely. They still have sections of their content calculated using data-based algorithms. The focus of our assignment is to help HBO Max find a way to incorporate data-based decision making into their current quasi-social approach. Discovery in the HBO Max and their process has led us to recommend using data to inform a collaborative filtering method that includes both hand-picked and algorithm-based recommendations into consideration. Collaborative filtering works by finding similarities between users and the products and media to provide a between user experience. This strives to increase the user's personalized experience and provide more competitive advantages to HBO Max's platform.

II) Strategy

Competitive Landscape Analysis

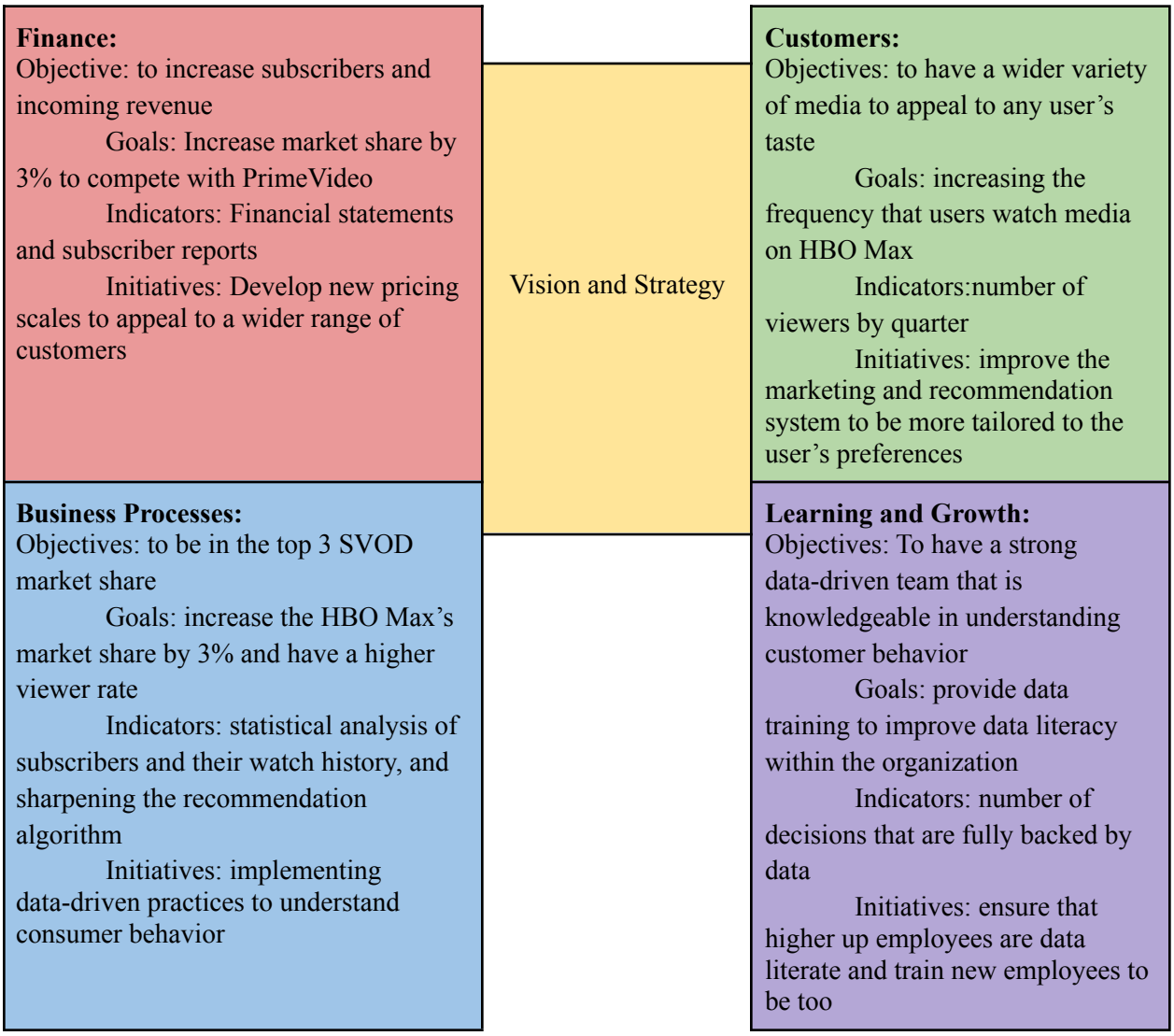
HBO Max's primary competitors are Netflix, Amazon Prime Video, and Hulu in order of market share. According to recent surveys, Netflix's market share dropped from 29% in 2019 to 20% in 2020 due to the rise of other streaming services such as Peacock and HBO Max. Despite this, Netflix still leads in the SVOD (subscription video-on-demand) world and is closely followed by Amazon Prime Video with 16% of the market share. Learning more about HBO Max's

competitors uncovers opportunities to increase the subscribership and market share of the HBO Max in the future.

- ❖ Our focus for this project will analyze HBO Max's Streaming Services and use a data-driven approach to increase subscription by tailoring the content to a larger audience.

Balanced Scorecard

The objective of a balanced scorecard is to provide a strategic planning and management system that organizations can use to focus on strategy and improve performance. The BSC reinforces positive activity in an organization by analyzing 4 areas or legs: learning and growth, business processes, customers, and finance.



Business Model Canvas

<table>
<tr>
<td rowspan="2">Key Partners:

- Content owners
- Internet service and other providers (i.e. AT&T)
- Cinemas & theaters
- Film festivals
- Cable companies and broadcasters
- Producers & studios
- Influencers
- Universities</td>
<td>Key Activities:

- Tech & development
- Content creation
- Products & licensing
- Advertisements
- Marketing</td>
<td rowspan="2">Value Propositions:

- Watch exclusive HQ TV and movies
- Ad placement to targeted users
- Content libraries
- No ads (for specific users)
- Ability to binge watch
- Personalization
- Localization
- New movies</td>
<td>Customer Relationships:

- Self-service app/website
- AI recommendations
- User support
- Customer service
- Social media
- Recommendation systems
- Targeted ads
- Sales team</td>
<td rowspan="2">Customer Segments:

- Customers vs advertisers
- Users segmentation
  - Age
  - Genre preferences
  - Viewing behaviors
  - Browsing behaviors
  - Technology
  - Channel preferences
- Non-user segmentation
  - Demographic
  - Interaction with social media
  - Rating</td>
</tr>
<tr>
<td>Key Resources:

- HBO brand
- Exclusive content portfolio
- App/website
- Algorithms & data
- Staff, actors, filmmakers, content creators</td>
<td>Channels:

- Desktop, tablet, mobile, etc.
- HBO channels
- Social media
- Media outlets
- Film festivals</td>
</tr>
<tr>
<td colspan="3">Cost Structure:

- Production & licensing
- Technology development
- Marketing</td>
<td colspan="2">Revenue Streams:

- Subscriptions
- Merchandise
- Advertisements
- US streaming
- International streaming</td>
</tr>
</table>

Recommended OKRs

1. **Objective:** Increase subscribtionship for HBO Max by using data to inform decisions

➔ **KR1:** Increase advertising to have at least 47 million subscribers for Q4 2020
➔ **KR2:** Decrease the average time from opening to app to clicking play by 30%
➔ **KR3:** Increase net promoter score by at least 5 points

2. **Objective:** Increase the audience satisfaction with HBO Max

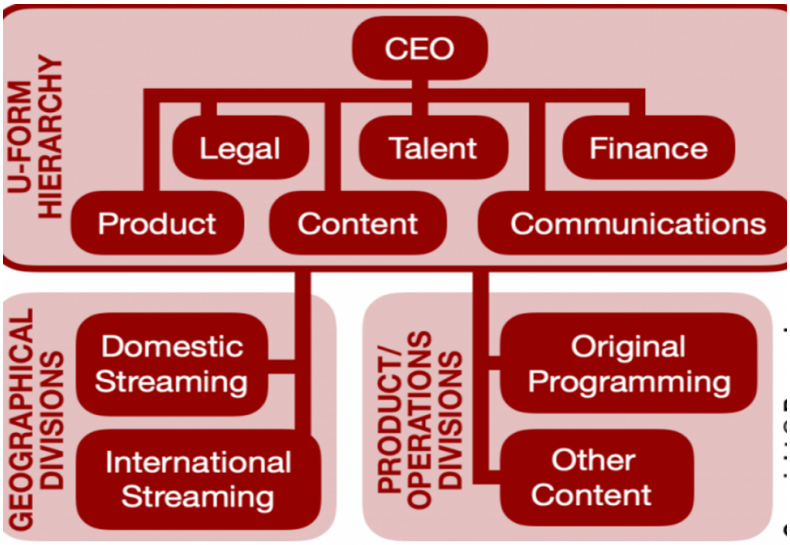
➔ **KR1:** Make HBO Max more accessible on gaming consoles and on all smart TVs

➔ **KR2:** Add 4k HDR streaming for 50% of all streaming content

Team Chart

After exploring HBO Max's organizational structure (keep in mind that HBO is under Warner Media), here are some people who are key to achieving our strategies to include more data-driven strategies into HBO Max's content recommendation system.

Title	**Responsibilities**
CEO	Responsible for the overall management of the world's most successful pay TV service.
EVP & General Manager, HBO Max	Leads the HBO Max operating business unit at WarnerMedia, reporting directly to the CEO. responsible for the product, marketing, consumer engagement, and operations of HBO Max.
Executive Vice President and Chief Revenue Officer	Overseeing U.S. advertising sales, networks and HBO Max distribution, home entertainment and content licensing. And responsible for Otter Media, a leader in fan-centric, digital-first entertainment that houses a portfolio of digital media brands including, Fullscreen, Crunchyroll, VRV, Rooster Teeth, Gunpowder & Sky and Hello Sunshine.
Chair and CEO, WarnerMedia Studios and Networks Group	Responsible for all of WarnerMedia's content-focused teams, uniting the Warner Bros. Pictures Group, HBO and HBO Max, the Warner Bros. Television Group, DC, kids/young adults/classics (Cartoon Network, Adult Swim, Boomerang, TCM, Cartoon Network Studios, WB Animation), TBS, TNT, truTV, Wizarding World, consumer products and gaming, to work together across titles, brands and franchises.
Chief Technology Officer	Responsible for WarnerMedia's technology and operations organization including technology strategy, platform development and operations as well as shared services across WarnerMedia.



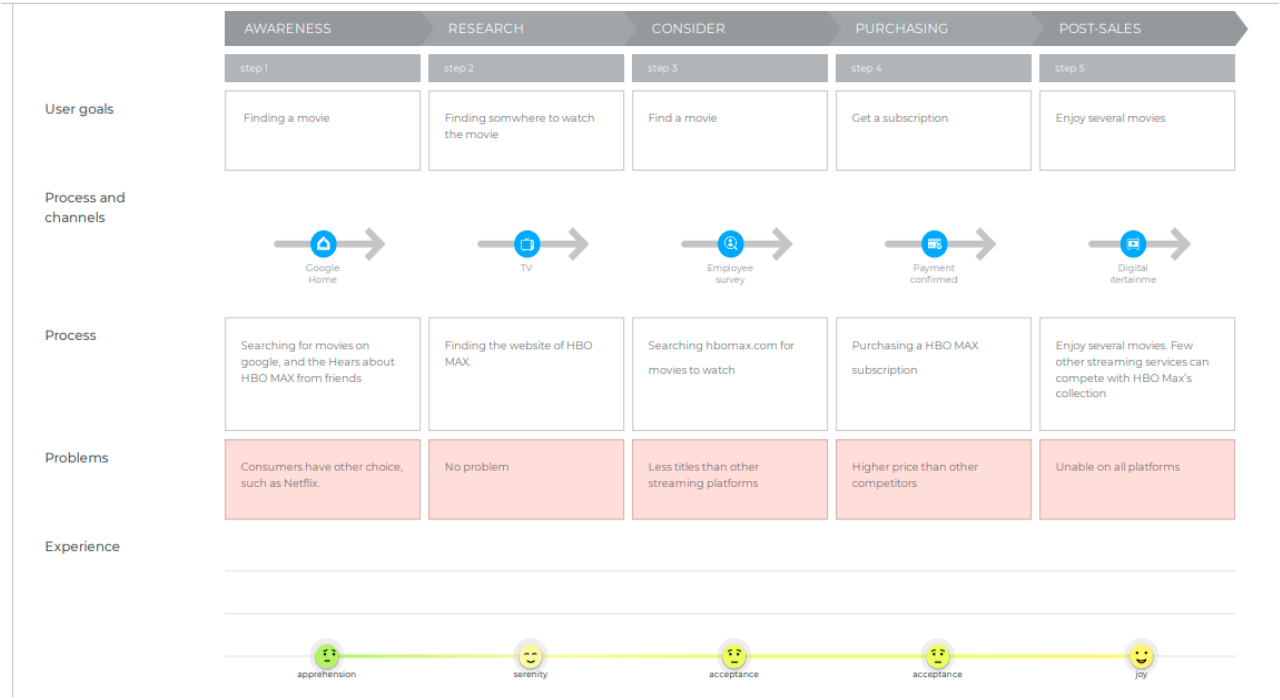
III) Design

Personas

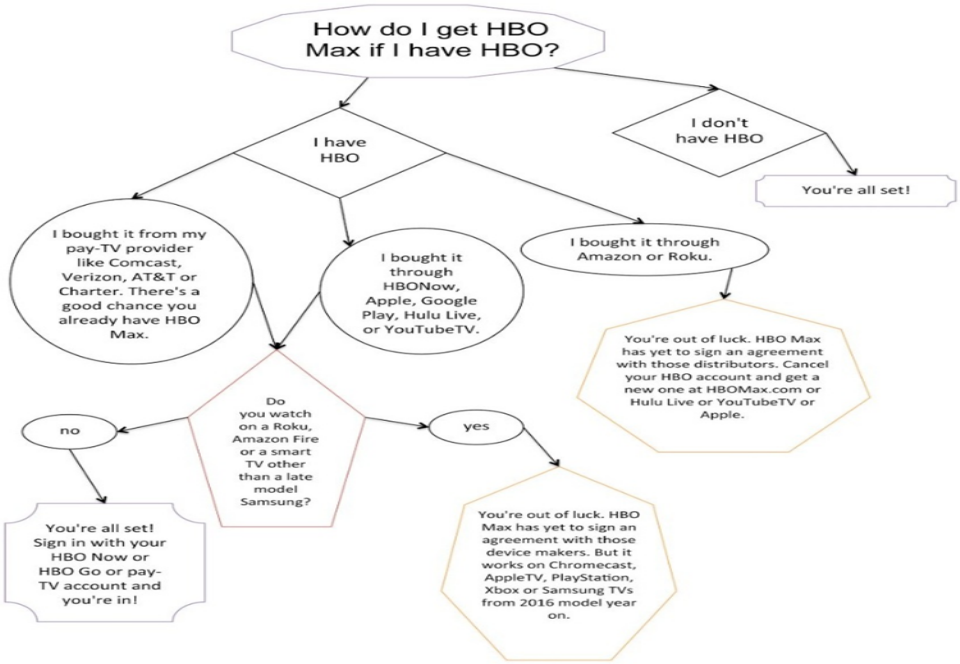
Customers	Jobs	Gains	Pains
	• Consuming media provided by HBO Max • Streaming and discovering more things to watch via the HBO Max platform → finding content to keep them entertained	• Get access to popular content easily via HBO Max • Add free • Has a lot of popular content	• High price for no 4k HDR streaming quality • Only has popular titles • Less titles than other streaming platforms • Only in America • Unable on all platforms
Data Consumers	• Consume data insights and analytics to make data-based decisions • Can distinguish if certain data can answer their questions	• Want to understand how data can be used to inform their decisions • Interested in making data a primary part of their decisions	• Intuition is not always representative of reality • Non-data-based decisions contain a lot of bais

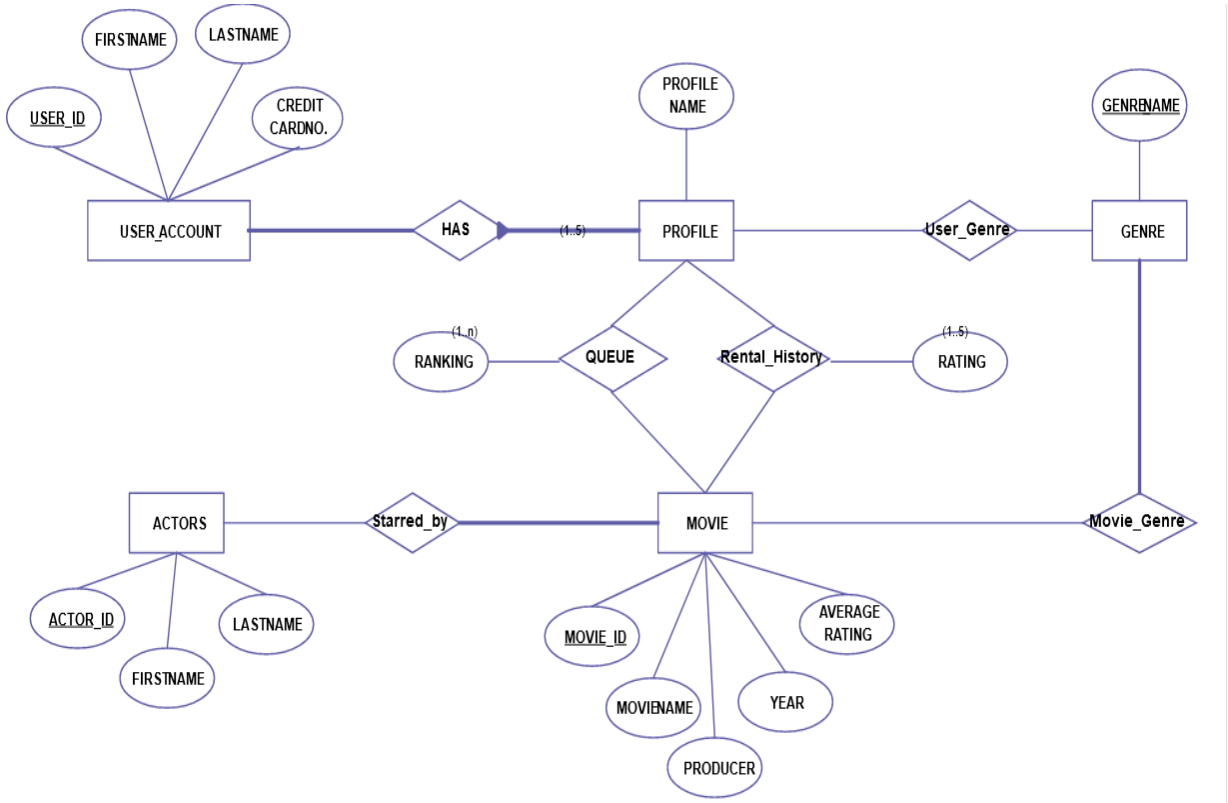
Data Analysts / Scientists / Engineers	• Analyzing and reporting insights from analytics • Understanding the ML workflow and tying it back to business applications • Getting data in the hands of the right people	• Collecting data directly useful to creating valuable insights • Organizing data in a quick and user-friendly manner • Understanding what data is useful for informing decisions in a particular sector (Marketing, Creative, etc.)	• Figuring out how to apply data to decisions that were previously solely qualitative • Having the data analysis/science/ engineering efforts to unused
Creative Decision Makers	• Deciding what content is included in HBOMax • Influencing the creative direction that shows/movies/etc. take	• Having a quantitative way to understand the audience's perspective • Finding gaps in qualitative decisions • Easy to get the bigger picture and a clean understanding of how HBO Max is performing	• Having their creative freedom be limited • Not being able to take risks for their craft • Feeling trapped by the numbers

Journey Maps



Process Flow Diagram





Use-Cases

Three primary recommendations:

I. Bring HBO Max to increase the number of subscribers and to collect evenmore user data.
II. Expanding the reach of AI by including elements from hand-picked content to refine the recommendation algorithm. This includes the personalized content recommendations from humans in curating the suggestions to the users. It accounts for the fact that some users may prefer to watch algorithm-recommended content, whereas others may lean towards watching hand-picked content.
III. Using AI to monitor live and historical analytics to help predict when human recommendations are not producing the expected user response. This allows HBO Max to keep their quasi-social approach, and helps the team identify when this approach doesn't work.

Analytics Use-Case and Dataset

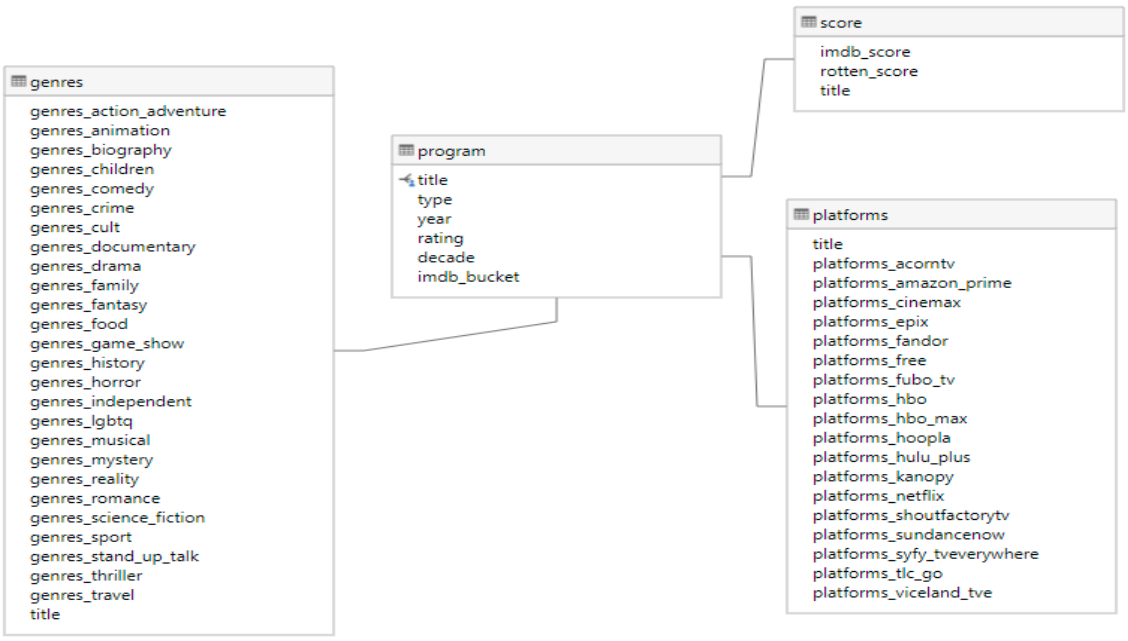
Based on our primary recommendations we will dive into the analytics use-case. There is publicly available data on HBO's TV Shows, Documentaries, and Movies as of 2020 on Kaggle. This data is useful in identifying what media is the top rated media, what genres are most

popular, and the platforms where the media is found. The data helps us identify what media is most consumed/highly rated. (insert details about how this data was cleaned) However, just this data isn't enough to move our business plan into motion. More information is needed and streaming companies like to keep a tight lid on their data.

Other data that is necessary to drive up the subscribsionship is user data. HBO Max can use information about user profiles such as location, watch history, viewing duration, time of activity, ratings, media saved, media rewatched, interactions with the page, etc. to build user profiles. The most important analytics are the analytics that combine user data with media data.

Last but not least, data about trends on new media is invaluable to this. Having information about the users and analytics about how the media exists on HBO Max is good for understanding the audience, but this kind of data helps predict what kind of media will make the platform more desirable. For example, HBO Max became more desirable when they started hosting F.R.I.E.N.D.S. and the Harry Potter collection; this kind of value can be expanded upon by predicting upcoming popular and highly watched content.

Dimensional Model



Governance Model

Full Data Dictionary:

This can be found in the Excel document attached to Github.

Mini Business Glossary:

Live Streaming	It is the process of broadcasting real-time, video feed or live video footage to an audience over the internet.
Metadata	Content Metadata means various properties (information) of a content such as title, description, story, actor, poster, trailer etc.
4K (Ultra HD)	It is a new resolution standard designed for computer graphics and digital cinema.
Cloud Video Distribution	Videos that are stored on internet servers that can be accessed by viewers without downloading the video file.
Data Management Platform (DMP)	A system that allows the collection of audience intelligence by advertisers and ad agencies
Pay-TV	It is a subscription-based television service from a satellite, cable or telephone company.
OTT device	Any device through which you can watch audio or video content over the internet. It includes laptops, smartphones, iPhone.
Roku TV	Roku TV is a smart TV with an in-built Roku operating system that uses Wi-Fi or ethernet connection to play your favorite television series, movies, sports and much more.
Video on Demand (VoD)	It is a media distribution system allowing access to videos without the constraints of a typical static broadcasting schedule or traditional video playback devices.
Ratings	A Rating is a code or classification given to a work to alert consumers whether particular attention should be given to the work's suitability for audience members below a particular age level.

AI Use Case

HBO Max has a lot of different types and genres of content. How do they know which content to recommend to their users? Artificial intelligence (A.I.) is a great tool to use to determine this as it has powerful tools like deep learning and machine learning. Including this into the engineering behind HBO Max's content recommendation system is very valuable. As of now, HBO Max takes a more human-curated approach. They do utilize the A.I. in addition to the hand curated content, however it isn't the primary tool for their recommendations.

As data professionals, AI can include aspects from hand-curated selections in the algorithms. HBO Max takes a more quasi-social aspect that is more in line with products like Spotify. They create social aspects by including pockets of recommendations that are hand-picked by people like celebrities, WarmerMedia content editors, among others. They can include user interaction with their content into the AI algorithm to analyze user interactions with both the AI and the hand-picked recommendations. This accounts for the fact that some users may prefer algorithm-based content recommendations and some users may prefer hand-picked content recommendations. This is useful to utilize in the HBO Max's recommendation engine.

The use of a recommendation engine is specifically designed for this purpose. A recommendation engine is a data tool that uses data and algorithms to predict what content is most relevant to the user. This engine uses both content based and collaboration-based elements into their engine. The content-based aspect includes the types of media the user enjoys watching. The collaboration-based elements include all the media consumed by all users of HBO Max to uncover patterns larger than one user. Since HBO Max, also includes hand-picked recommendations, these should also be used to inform the recommendation engine.

There is both business and social benefit from using AI for the recommendation engine. The business benefit comes from user's being more engaged with and using HBO Max's platform more often. The more content recommendations are tailored to the user, the less time the user spends from opening the app and clicking play to watch something they enjoy. This seamlessness creates product value in the competitive SVOD space. The social benefit comes from HBO Max's current quasi-social approach. Because of aspects of direct human interaction in their content recommendation, AI can be used to work user interactions with this material into the larger recommendation system. This allows HBO Max to analyze how these recommendations compare to algorithm-based recommendations. Predicting user behavior is also useful to designing the platform in a seamless and intuitive manner.

Data to be used in the model:

Data useful in this model comes from a variety of sources such as individual user data, general user data, rating/review data, marketing data, social media activity data, etc. Combining all of these types of data is useful in forming an AI approach to training a recommendation system. It's important to note that we are working with open source data, mainly this dataset (https://data.world/hunterkempf/hbo-content-as-of-june-28-2020/workspace/file?filename=HBO_Content.csv) from data.world. This dataset contains information about the content, ratings, score, genres, and platforms of various titles. Being a particularly limited dataset, there is not much feature selection we can do. The most useful data is the data that HBO Max themselves has access to. This includes user data, data about the content, viewing streaming data, among others. We will use this information and our domain knowledge to provide suggestions about what features will be useful for HBO Max to utilize.

Details about our data:

There are a few categorical variables that are one-hot-encoded. This includes the genres and the platforms for each title. This data is a bit more complicated to work with on Tableau. We have listed the columns below. In our data prep we reversed the encoding. However, this was also tricky because each title can have many types of genres. With more time, this process can be further refined.

Binary one-hot encoded data:

> genres_action_adventure,genres_animation,genres_biography,genres_children,genres_comedy,genres_crime,genres_cult,genres_documentary,genres_drama,genres_family,genres_fantasy,genres_food,genres_game_show,genres_history,genres_horror,genres_independent,genres_lgbtq,genres_musical,genres_mystery,genres_reality,genres_romance,genres_science_fiction,genres_sport,genres_stand_up_talk,genres_thriller,genres_travel,platforms_acorntv,platforms_adult_swim_tveverywhere,platforms_amazon_prime,platforms_amazon_prime,platforms_amc,platforms_amc_premiere,platforms_bbc_america_tve,platforms_britbox,platforms_cartoon_network,platforms_cbs_all_access,platforms_cinemax,platforms_comedycentral_tveverywhere,platforms_criterion_channel,platforms_crunchyroll_premium,platforms_curiositystream,platforms_dc_universe,platforms_epix,platforms_fandor,platforms_free,platforms_fubo_tv,platforms_funimation,platforms_hbo,platforms_hbo_max,platforms_hoopla,platforms_hulu_plus,platforms_kanopy,platforms_nbc_tveverywhere,platforms_netflix,platforms_shoutfactorytv,platforms_showtime,platforms_shudder,platforms_starz,platforms_sundancenow,platforms_syfy_tveverywhere,Platforms_tbs,Platforms_tnt,platforms_trutv_tveverywhere,platforms_urbanmoviechannel,platforms_velocity_go,platforms_watch_tcm.

Non-one-hot-encoded data:

> title, year, rating, rotten_score, imdb_score and imdb_bucket

Five potential ethical issues:

1. AI replaces human workers: An issue is that AI-enabled systems will replace workers across a wide range of industries. People should learn more knowledge and improve them to suit new categories of employment. This pertains to people that hand-pick the content featured on HBO Max.
2. AI algorithms can be biased and make certain popular content more popular and can prevent smaller and newer content from being seen. I think having a section of “yet to be mainstream” content is a way to combat this.
3. AI may unknowingly recommend content unsuitable for some viewers. It’s difficult to know if a show crosses trigger warnings that audience members may have. This can be

prevented by having the option for users to enter trigger warnings on their profile, and having HBO Max filter out that content from their recommendations.

4. AI can also suggest polarized recommendations. This can be the case especially with political content. Recommendations for this type of content should come with some sort of variety.
5. User information is really helpful when training an algorithm to tailor itself to user preferences. However, some users may be uncomfortable sharing their information. It is important to be mindful and transparent about how HBO Max uses personal data. This can be addressed by giving the users options to withhold personal information and by being fully open with why their data helps make the product better.

IV) Visualization

The link to the Tableau visualization can be found here:
https://public.tableau.com/app/profile/pujita.ravichandar/viz/HBO_dashboard/Dashboard1?publish=yes

V) References

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