

MS5128

EXAM ASSIGNMENT

Decision Theory AI and Analysis

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Q1. OPINION AND RECOMMENDATIONS TO ASSIST CEO'S DECISION.

The BA head of FilMine claims they already know the "right variables" for building an accurate recommendation system and "the algorithm will not be disclosed" due to company confidentiality. While FilMine offers several advantages, such as proven expertise, time savings, cost-effectiveness, and regulatory compliance, these statements raise important concerns about system transparency, biases, and regulatory requirements. To determine whether partnering with FilMine is the right choice, it is essential to evaluate their claims, address potential biases, and ensure alignment with Vidflix's goals for accuracy, fairness, and user satisfaction.

ADVANTAGES OF WORKING WITH FILMINE

Let's explore the advantages FilMine bring to the table and why they could be a strong partner for Vidflix.

1. **Proven Expertise and Accuracy:** FilMine has successfully worked with Vidflix's competitors, showing they can provide a reliable and accurate solution.
2. **Saves Time:** Their ready-made system can be set up quickly, saving time compared to building one from scratch.
3. **Cost-Effective:** Using FilMine's system is cheaper than creating one in-house, as it avoids extra costs for staff, research, and technology.
4. **Easy to Manage:** FilMine takes care of the technical side, including support and updates, so Vidflix can focus on its main business.
5. **Follows Regulations:** FilMine's experience with EU privacy rules (like GDPR) ensures the system is safe and legal in both Europe and the U.S.
6. **Lower Risk :** Their system is already tested and proven, reducing the risk of problems when launching it.

While these advantages are compelling, it is equally important to address the challenges that could arise, particularly the potential biases in FilMine's recommendation system, which may impact its performance and fairness.

CHALLENGES

Let's explore the main types of biases, their impact, and real-life examples to explain why they matter.

SELECTION BIAS

This bias happens when the data used to train the system doesn't represent all types of users. Since FilMine's algorithm is built using mostly European user data, it might not work well for American audiences.

For example:

- **Different Content Needs:** European users often prefer content in their own languages, while U.S. audiences are more diverse and enjoy a mix of genres that reflect their cultural variety.^[2]
- **Genre Preferences:** Americans tend to love action-packed and big-budget films, while Europeans lean toward more realistic, story-driven films.^[3]
- **Viewing Habits:** In 2020, people in Europe watched 15 minutes more TV daily, while North Americans watched 8 minutes less, showing different habits.^[4]

If the system only considers European preferences, it might suggest shows and movies that don't interest U.S. viewers.

STABILITY BIAS

Stability bias happens when a system doesn't adjust to new trends and user behaviours. With hundreds of new shows and movies released daily, the system needs to stay updated to recommend what's popular now.

For example:

Streaming services became more popular than cable TV in the U.S. between 2017 and 2018, showing a big change in how people watch content. If the system doesn't adjust to these kinds of changes, it could miss suggesting new, trending formats like web series or short films.^[5]

CONFIRMATION BIAS

Confirmation bias occurs when the system focuses on what it assumes is popular rather than what the data actually shows. For instance, FilMine's team might believe that blockbuster franchises like "Star Wars" or "Harry Potter" are always the best choices. However, this can lead the system to ignore newer or more unique options.

For example:

If the system keeps recommending older hits, it might miss out on promoting newer movies like "Everything Everywhere All At Once" or niche shows like "The Bear."

EMERGENT BIAS

Emergent bias happens over time when the system doesn't adapt to changes in society or user preferences. If the system keeps relying on old data, its suggestions may no longer match what people want to watch.

For example:

Formats like web series and short films are also gaining popularity, but the system may overlook these if it sticks to outdated viewing trends.

The lines between genres are becoming blurred. For instance, comedies like "Fleabag" or "The Bear" now include darker themes and deeper storytelling. If the system doesn't adjust, it might keep suggesting traditional comedies while ignoring these newer, more complex shows.

INTERPRETATION BIAS

This bias occurs when the system's recommendations are misunderstood due to a lack of transparency. Without clear explanations, it's easy for Vidflix managers to misinterpret why certain shows are recommended.

For example:

If the system keeps suggesting a specific genre without a clear reason, Vidflix's team might mistakenly focus on that genre, even if it doesn't align with what users actually want.

ADDRESSING THE CHALLENGES

These challenges, while significant, can be effectively addressed through collaborative efforts between Vidflix and FilMine :

TEST FOR BIASES:

Regular testing can help identify biases in the system and ensure that the algorithm performs fairly across different user groups.

"Algorithms should be rigorously tested with diverse datasets to uncover and address hidden biases".^[1]

USE DIVERSE DATA:

Train the system using data from both U.S. and European users to make it representative of both markets. Diverse datasets are essential for fairness.

"Using representative data is crucial for preventing algorithmic discrimination and ensuring fairness" ([6], World Economic Forum White Paper).

STAY UPDATED:

Regularly update the system with new data to reflect evolving trends and user behaviours. This can prevent emergent and stability biases.

"Algorithms must be periodically retrained with updated data to keep pace with societal and cultural changes" ([7], McKinsey Report).

KEEP ADAPTING:

Continuously monitor and retrain the system to account for changing societal norms and user preferences.

"Algorithms must be regularly updated to reflect changes in consumer behaviour and societal norms to avoid perpetuating outdated patterns" ([7], McKinsey Report).

EXPLAINABILITY:

Implement explainability frameworks to interpret results effectively for business stakeholders
"The right to understanding ensures that systems are explainable to both end users and business stakeholders" ([6], World Economic Forum White Paper).

AGREEMENT CONDITIONS

After evaluating all the factors, Vidflix and FilMine can find a middle ground by addressing key concerns while leveraging the advantages of their partnership. An agreement on the following points can ensure that both parties' goals are met effectively.

PROVE ACCURACY WITH TESTING

FilMine doesn't need to share how their algorithm works, but they must prove its accuracy. This can be done by testing and training the system using Vidflix's extensive data from both the EU and U.S. markets. This ensures the recommendations are relevant for all users.

CHECK AND FIX BIASES

FilMine should test for and fix biases like selection and stability bias before deployment. Vidflix can review the results to ensure the system treats all users and genres fairly.

FOLLOW DATA REGULATIONS

FilMine must explain how they handle user data to comply with laws like GDPR in Europe and privacy rules in the U.S. This ensures user data is processed safely and legally.

COLLABORATE ON SYSTEM IMPROVEMENT

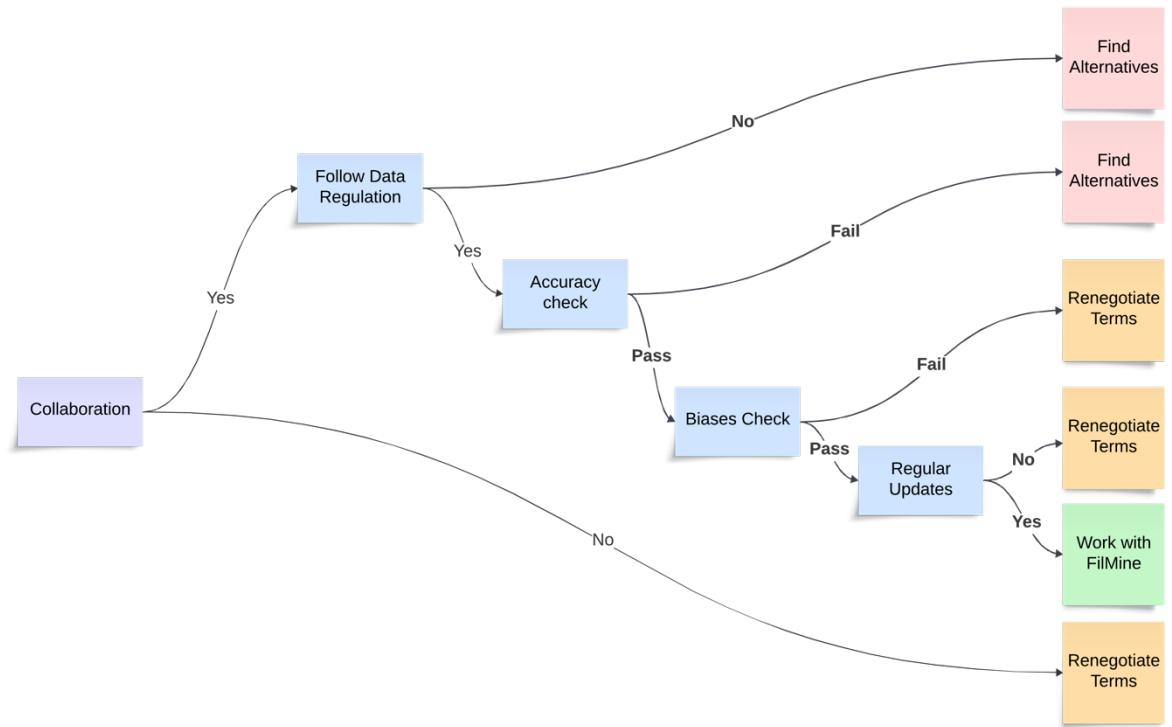
FilMine can share key details, such as what data or variables are used, so Vidflix can help improve the system. Vidflix can provide feedback to make recommendations more relevant.

REGULAR UPDATES AND REVIEWS

FilMine should commit to regular updates of the system using fresh data to reflect changing user behaviours and trends. Periodic reviews will ensure the system stays accurate and unbiased over time.

DECISION TREE

This decision tree can assist in decision making as it provides a structured approach to evaluate the feasibility of collaboration with FilMine by incorporating key factors we discussed above.



RECOMMENDATIONS

This approach allows Vidflix to benefit from FilMine's expertise while addressing risks like bias, privacy concerns, and system performance. By focusing on testing, transparency, and collaboration, Vidflix can meet its goals and ensure success in both the EU and U.S. markets.

If Vidflix and FilMine can reach a middle ground where Vidflix's objectives are met—such as ensuring system accuracy, addressing biases, complying with data regulations, and collaborating on system improvements—then partnering with FilMine is a viable choice. Their proven expertise, cost-effectiveness, and quick deployment offer significant advantages that can benefit Vidflix.

However, if FilMine is unwilling to address these concerns or fails to demonstrate accuracy and compliance, Vidflix should explore alternatives. These could include building an in-house recommendation system, which would provide greater control and customization, or partnering with another company that offers more transparency and collaboration.

This balanced approach ensures Vidflix prioritizes user satisfaction, data privacy, and long-term success while minimizing risks.

Q2. LEVERAGING DATASET TO ENHANCE VIDFLIX'S ANALYTICS

PROMPT

Assume Vidflix is a real-world movie and TV streaming platform. In addition to its current data (user preferences and viewing history), assume it also has access to additional data sources, such as demographics (age, gender, location), behavioral patterns (binge-watching habits, device usage), and external data (social media trends, reviews, and ratings).

Provide the following:

Assumed Data: Briefly describe the types of data Vidflix might collect and manage. **How It's Used:** Explain how these data types can enrich Vidflix's analytics, improve recommendations, refine customer segmentation, and enhance platform performance. Examples: Offer specific examples, referencing real-world cases. **Innovative Insights:** Suggest creative ways Vidflix could use this data to predict trends, optimize marketing, or tailor content for different audiences.

GAI RESPONSE

“Assumed Data”

Vidflix, as a streaming platform, can collect and manage a wide range of data:

1. **User Demographics:** Age, gender, location, income levels, household size, and subscription type.
2. **Behavioural Patterns:** Time spent on the platform, binge-watching habits, frequency of content consumption, favourite genres, and preferred devices (e.g., mobile, TV, or tablet).
3. **External Data:** Social media trends, reviews, ratings, search patterns, and mentions of popular shows or movies on platforms like Twitter, Instagram, and Reddit.

How It's Used

1. **Enrich Analytics:** By combining user preferences with demographic and behavioural data, Vidflix can identify patterns in content consumption across different user groups. For example, younger users might binge-watch fantasy series, while older viewers may prefer historical dramas.
2. **Improve Recommendations:** Behavioural patterns like binge-watching or late-night viewing habits can inform time-sensitive recommendations. For example, suggesting light-hearted sitcoms in the evening or intense thrillers on weekends.

3. **Refine Customer Segmentation:** Demographic and behavioural insights can refine personas like "Family Accounts" or "Geeks." For example, adding device usage could reveal mobile-first users versus those who prefer smart TVs.
 4. **Enhance Platform Performance:** External data on trending shows can guide Vidflix to highlight popular content on its homepage, improving user engagement and watch time.
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Examples

1. **Netflix:** Netflix tracks binge-watching patterns to suggest when to release new episodes, such as releasing an entire season at once for binge-watchers.
 2. **Amazon Prime Video:** Amazon uses demographic data to tailor recommendations, promoting kids' content for family accounts during weekends.
 3. **Spotify:** Spotify uses social media data to feature trending playlists and songs, an approach Vidflix could replicate by showcasing trending shows based on social mentions.
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Innovative Insights

1. **Predicting Trends:** Vidflix could use search data and social mentions to forecast the next breakout series or genre and invest in similar content.
2. **Optimizing Marketing:** Personalized marketing campaigns can target specific groups—for example, promoting romantic comedies to users who often watch similar genres in February for Valentine's Day.
3. **Localized Content Tailoring:** Use location data to suggest regional content (e.g., Hispanic shows in the U.S. or Bollywood movies in India) and highlight culturally relevant titles during local festivals or holidays.
4. **Content Retention Strategies:** If users frequently abandon certain genres halfway through, Vidflix could create shorter versions or highlight similarly themed but more engaging options."

CRITIQUE AND IMPROVEMENTS

SUGGESTION: ENHANCING PLATFORM PERFORMANCE.

Using external data on trending shows to guide Vidflix in highlighting popular content on its homepage is a practical strategy that can improve user engagement and watch time.

Feasibility:

Highlighting trending content is relatively straightforward with the right tools. Vidflix can aggregate data from social media platforms, search trends, and user reviews to identify popular shows. This ensures that the homepage remains dynamic and aligned with audience interests.

Comparison with Real-World Examples:

1. Netflix’s “Trending Now” Section

Netflix combines user behaviour and broader trends to keep its “Trending Now” section relevant and engaging. By analysing what users search for, watch, and discuss online, Netflix ensures its recommendations reflect both current popularity and user preferences.^[8]

2. Amazon Prime Video’s “Top Picks for You”

Amazon blends trending content with user-specific preferences, ensuring users see content they’re likely to enjoy while still reflecting popular trends.^[9]

Critique and Limitations:

1. Social media trends can be noisy or misleading, potentially highlighting irrelevant or controversial content.
2. Delays in processing external data may result in outdated recommendations.
3. Showing trending content without considering individual preferences may reduce user satisfaction.

Improvements:

1. Use tools to prioritize trending content with positive feedback and avoid shows trending for negative reasons.
2. Combine trending data with user preferences. For example, highlight trending shows within genres users already enjoy.
3. Tailor trends to specific regions, such as promoting Bollywood movies in India or Hispanic shows in certain U.S. areas.
4. Use dynamic time frames, like hourly updates during major events, to keep the homepage fresh and engaging.

SUGGESTION: OPTIMIZING MARKETING STRATEGY.

Personalized marketing campaigns, like promoting romantic comedies in February for Valentine’s Day, are a practical way to engage users and increase watch time.

Feasibility:

This approach is easy to implement since Vidflix already collects user data like viewing habits and genre preferences. Seasonal campaigns can effectively target specific user groups.

Real-World Examples:

1. Netflix:

Netflix sends personalized notifications about new seasons of favourite shows while also promoting trending titles on its homepage. This balance between individual preferences and popular content ensures wider appeal.^[10]

2. Amazon Prime Video:

Amazon integrates its ecosystem by showing ads for Prime Video romantic movies to users browsing romantic books. This cross-platform strategy increases campaign relevance.^[11]

Limitations:

1. Over-personalization may overwhelm users with too many targeted campaigns, causing frustration.
2. Using outdated user preferences could result in irrelevant recommendations.
3. Focusing only on niche audiences might miss users who enjoy broader content.

Improvements:

1. Let users opt in or out of specific campaigns, like Valentine's Day promotions, to avoid overwhelming them.
2. Put campaigns on real-time user behaviour, ensuring recommendations stay relevant.
3. Blend seasonal campaigns with general promotions, such as highlighting family-friendly titles alongside Valentine's specials.
4. Create interactive campaigns, like user polls for favourite romantic comedies, to boost engagement.

Q3. ASSOCIATION RULE, OPPORTUNITY AND RECOMMENDATION

The association rule "The Sandman → Squid Game & Stranger Things" indicates that users who watch The Sandman are likely to also watch Squid Game and Stranger Things. This highlights a strong relationship between these shows, reflecting user behaviour and preferences. It suggests that The Sandman appeals to similar audiences as the other two, potentially due to shared themes like gripping storylines, suspense, or fantasy-driven narratives.

This rule provides Vidflix with an opportunity to enhance its recommendation system and marketing initiatives. For example, Vidflix could create a collection titled “Thrillers You Can’t Miss,” showcasing these shows together and motivating viewers who start with one to explore the others. Furthermore, Vidflix could target fans of Squid Game and Stranger Things by recommending The Sandman to users who haven’t yet discovered it, boosting engagement across the platform.

In addition to improving recommendations, this insight can influence Vidflix’s decisions on acquiring new content. If these shows share elements like suspenseful storytelling or visually distinctive styles, Vidflix could focus on acquiring or developing similar series to appeal to fans of this genre. For instance, investing in shows with a mix of fantasy and drama could attract and retain a loyal audience. This approach would not only enhance viewer satisfaction but also solidify Vidflix’s position as a platform that deeply understands its audience’s preferences.

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