A Quantitative Study Using SPSS on the Role of Machine Learning in Personalizing Media Streaming Platforms: Insights from Rangsit University Students

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Abstract

In this research, we examine the impact that machine learning (ML) can have on personalizing media streaming services. We consider how personalization strategies bargain user engagement with ethical issues like privacy and trust. While ML-driven recommendations increase user engagement and user satisfaction but are not explored how they affect long-term trust and data security remains underexplored. This study investigates these dynamics utilizing a quantitative survey of 101 students at Rangsit University, along with a quantitative analysis of usability, trust, and AI-driven personalization of the platform. The findings indicate that both platform resilience, in terms of reliability ($B = 0.455$, $p < 0.001$) and personalization effectiveness ($B = 0.304$, $p = 0.001$) are influenced by trust and privacy concerns of users. However, without transparency and data control, the influence of platform usability on trust was not significantly pronounced ($B = 0.068$, $p = 0.431$). Regression model reveals that 52.6% variance in trust, usability, and platform complexity ($R^2 = 0.526$, $F(3, 97) = 35.947$, $p < 0.001$), indicating that ethical AI design is inevitably required. This shows the importance of the trustworthy and responsible use of ML: the implementations that are transparent and do not compromise on responsibility. This study demonstrates a practical approach by tackling the fine line between personalization and the concerns of the users, in the case of Gen Z, this study provides developers, platform providers, and marketers with the possibility of optimizing the ML- driven personalization for a privacy - conscious user.

Keywords: *Machine Learning, AI Personalization, Trust, Privacy, Ethical AI, User Engagement, Deep Learning, Platform Usability, Media Streaming*

1. Introduction

Recently, content personalization in media streaming services has been extensively implemented with the adoption of machine learning (ML). Numerous companies, such as Netflix, TikTok, and Mobile Legends, utilize ML algorithms to analyze user behavior and recommend them accordingly. Even though these advancements positively influence user satisfaction, they also create demands for data privacy, transparency, and algorithmic bias(Nisar, 2024). Existing research on ML-driven personalization mainly concentrates on how the algorithms can be improved without adequately addressing the ethical considerations. Furthermore, it has not fully understood how ML-driven personalization affects user trust and long-term engagement(Piduru, 2023).

However, a great hole exists in academic literature regarding the relationship between user satisfaction and ethical concern amid the face of growing industry investment in personalization. While previous studies have discussed previous works on the effectiveness of ML-based recommendations in eliciting user engagement (Lamkhede et al., 2023; Ullah et al., 2024), they have not looked at how to consider user privacy concerns and trust into the user experience. Privacy concerns are becoming an issue when it comes to users' willingness to engage with streaming platforms (Nazlı Şahin, 2024; Nyamadi & Turel, 2024), and research indicates that users are becoming more and more careful at data collection practices. On the other hand, there has been little exploration of how various ML-driven personalization techniques trade off with respect to personalization and privacy, as few prior studies have systematically examined how different

personalization techniques affect trust (Wu et al., 2024). Additionally, although some research has investigated the involvement of ML in short-term user engagement, only a limited research has examined ML's consequences for long-term trust and user retention(Barry et al., 2024a).

The purpose of this study is to fill the gap by examining the impact of such ML-driven personalization strategies on trust, privacy perception, and the user interface of platforms. This research analyzes user experiences across various streaming services in order to figure out whether the degree of personalization enhances or deteriorates user engagement for a customer, thus resulting in churn. Answers to these questions will be beneficial for developers, policymakers, and streaming platforms seeking to improve their ML strategy without compromising ethical and transparent personalization practices.

2. Literature Review

The application of machine learning (ML) in media streaming platforms has revolutionized content delivery to users, significantly enhancing engagement and satisfaction. By utilizing advanced algorithms, platforms such as Netflix, TikTok, and Mobile Legends customize user experiences through the analysis of user behavior, preferences, and interactions.

Machine learning enables streaming services to tailor content recommendations based on individual preferences, thereby enhancing user engagement and satisfaction. Netflix's recommendation system, for instance, analyzes users' viewing histories, ratings, and preferences to offer highly personalized suggestions. (Piduru, 2023). Retaining long-term users is another critical area for streaming platforms. While personalized content is a powerful tool for attracting and retaining users, it must be complemented by innovative strategies, such as continuous algorithm refinement and leveraging real-time user engagement. (Lamkhede et al., 2023). For instance, Netflix continuously refines its recommendation algorithms to ensure relevance, while TikTok leverages real-time user engagement to keep its audience hooked.(Ullah et al., 2024). Mobile Legends tailors its gameplay to individual preferences, promoting loyalty through immersive and competitive experiences.

The differences in ML implementation across platforms underscore the need for tailored strategies. For instance, while Netflix appeals to users seeking curated, on-demand content, TikTok thrives on spontaneity and viral trends. Mobile Legends, on the other hand, builds community and competition among gamers, fostering long-term engagement (Khan, 2024).

The integration of ML in media streaming presents both opportunities and challenges for various stakeholders. Developers and data scientists are responsible for creating algorithms that balance personalization with ethical considerations. Marketers can leverage insights from user behavior to design targeted campaigns, while platform providers must prioritize transparency and data security to build trust. As the ultimate beneficiaries, end users expect personalized experiences that respect their privacy and adhere to ethical standards (de Zilwa, 2023). The literature underscores the transformative impact of ML on media streaming platforms. ML enhances user satisfaction and retention by delivering personalized, engaging, optimized experiences (Peter, 2024). However, ethical concerns regarding privacy and trust remain significant barriers. Platforms must adopt transparent and responsible practices to address these challenges, ensuring that personalization aligns with user expectations and ethical standards (Barry et al., 2024b). Streaming services can maintain their competitive edge through such measures while fostering long-term user loyalty (Nyamadi & Turel, 2024).

3. Objectives

This research analyzes the relationships between ML-driven recommendations, user perceptions of usability, and ethical considerations to offer actionable insights for industry practitioners and academia.

The objectives are as follows:

(1) Describe the methods for testing the role of ML-based personalization on user engagement. Evaluate how algorithmic suggested content recommendations influence user activity and retention on streaming platforms, like Netflix, TikTok, or Mobile Legends.
(2) We will discuss my evaluation of how privacy concerns affect trust received by multilinear systems – how user perceptions to the security of data, transparency of algorithm, and consent mechanisms affect trust in streaming platforms.
(3) We aim to understand how platform usability affects user experience by investigating whether components of UI design, ease of wayfinding, and interactions with AI-driven recommendations play a part in shedding light on fast user satisfaction as well as user trust.
(4) This study compares the ML based personalization across various streaming platforms by identifying differences in ML implementations as well as user response across different platforms to highlight best practices for the recommendation algorithm optimization.
(5) In the context of the findings, this research will offer actionable recommendations for (a) industry stakeholders and (b) academia on how to implement suitable personalization while balancing ethical and privacy-conscious practices (and vice versa). Furthermore, it will contribute to supporting academic debates on the responsible deployment of AI in the field of digital media.

This study will first clearly define the following variables: ML-driven personalization, user engagement, trust, privacy concerns, and platform usability. This will provide practical insights on how to improve the media streaming experience along the lines of the ethical and privacy considerations.

4. Materials and Methods

The current investigation employs a quantitative research design in order to explore how machine learning (ML) affects personalized media streaming, user engagement, privacy concerns, and retention on platforms such as Netflix, TikTok, and Mobile Legends. A descriptive and explanatory framework is employed to examine the current practices in AI-driven personalization and to examine the relationship between personalization, user experience, and privacy concerns.

The quantitative approach enables the use of numerical data, allowing for the objective analysis of trends and patterns in responses. This design enhances the study's credibility and replicability, providing insights into the impact of AI-based recommendations on user satisfaction and trust.

4.1 Research Questions and Hypotheses

This study sought to answer the following research questions:

(1) How does personalization through machine learning hit media engagement and user interaction?
(2) What are the implications of user concerns regarding privacy on trust in ML systems?
(3) Will more personalized experiences create user stickiness across platforms?
(4) How do the ML-based techniques used in Netflix, TikTok, Mobile Legends, and other applications compare with each other?

According to these inquiries, the subsequent hypotheses will be evaluated:

H1: Machine learning-based personalization encourages user activity.
H2: Increasing privacy worries has an adverse effect on the trust of users toward streaming services.
H3: There is a positive correlation between user retention and ML-based personalization.
H4: There is variation in the effectiveness of ML customization across Netflix, TikTok, and Mobile Legends.

4.2 Methods of Collection of Data

The research design incorporates a pre-designed survey instrument for obtaining numerical information. The survey consists of three different sections.

- Demographic Questions: The research uses quantitative survey methodology to collect data from 101 international college students studying at Rangsit University. The survey focuses on their experiences with personalization conducted by AI and trust levels and privacy issues, as well as platform usability of streaming services.

- Media Usage Questions: The survey incorporates questions regarding media streaming platforms, allowing users to select their primary platform and report their weekly usage lengths to establish participant streaming patterns.
- User Experience Questions: The survey contains 20 questions distributed through Likert scales to measure users' opinions regarding system usability together with AI customization and privacy reliability, and data protection standards. The survey scale contains responses that span from "Strongly Agree" to "Strongly Disagree".

While user engagement can be evaluated by usage frequency, session length, and activity undertaken by a user, such as likes and comments, personalization can be monitored through user-agreement questions regarding the relevancy and contentment of recommendations on the part of the user. When it comes to privacy and trust, challenges that arise are determined by questions concerning data security, openness, and trust in algorithms. In conclusion, retention intent can be determined by determining the possibility that users will continue to make use of the service and will promote it to other individuals. This would demonstrate the level of dedication that users have to the platform.

This study will use a convenience sampling method targeting university students and young professionals who frequently engage with media streaming platforms. The survey will initially collect responses from 60 participants, with a target maximum of 200 respondents to enhance the study's statistical validity. We plan to collect an additional 20 responses if the initial data does not satisfy the standards for a normal distribution. Users of Netflix, TikTok, and Mobile Legends will be specifically targeted for the survey to obtain comparative information.

The survey will be conducted both online and offline. The online distribution will occur through social networking sites using QR codes and links to Google Forms, while hard copies will be handed out during university functions and at places of employment. Voluntary participation will be strictly employed, and each respondent will provide informed consent before the survey is completed.

The data gathered in this study will be thoroughly evaluated using a statistical software application called SPSS. The subsequent methodologies will be employed to get valid conclusions from the data:

- Descriptive Statistics: The demographic attributes of the individuals will be summarized. Engagement, the sense of customization, and privacy concerns will be assessed. The principal statistical measures characterizing these variables will encompass mean, standard deviation, and frequency distribution.
- Correlation Analysis: To determine interdependencies, derive the variables of interest, which are personalization, engagement, privacy, and trust.
- Linear Regression: To identify how one or more independent variables-personalization or trust, for example-operate in their effects upon dependent variables like engagement versus privacy, hence explaining cause-and-effect relationships. The combination of such methods will yield a deep understanding of the data and allow for the identification of patterns, trends, and interdependencies that are vital for the research findings.

Different methodologies will be applied for the validity and reliability of research. Construct validity, for example, will be tested by constructing survey questions that are relevant to the research objectives and adequately measure the constructs under investigation, such as customization, trust, and usability; this means that survey actually measures what it is supposed to measure. The reliability of the survey will be assessed by calculating the Cronbach's alpha using Excel to test for the consistency of responses in the Likert scale questions, meaning that similar items will get dependable responses from the respondents. Lastly, sample adequacy will be obtained by capturing pilot responses from 60 participants, though up to 200 responses may be captured if a normal distribution needs to be justified for the sample.

This study will employ the ethical standards. Informed consent denotes the provision of an explanation regarding a research endeavor to participants, together with a solicitation to proceed with the process. Anonymity and confidentiality are maintained by refraining from the collection of personal identifiers, safeguarding the privacy of all responses. Voluntary participation allows responders to withdraw at any point without consequences. Ultimately, the data security protocol will securely archive all obtained information and utilize it exclusively for educational purposes. This study offers significant insights into the

function of machine learning in personalizing media streaming; however, it is subject to certain constraints. Sample bias may compromise the generalizability of findings due to the utilization of convenience sampling methods. Self-reported data may add social desirability bias, hence affecting the accuracy of responses. Platform-specific factors, including variations in machine learning implementation across different platforms, may restrict the validity of comparisons between platforms. Furthermore, time limitations inherent in the cross-sectional design hinder the examination of long-term customization patterns and trends in user behavior.

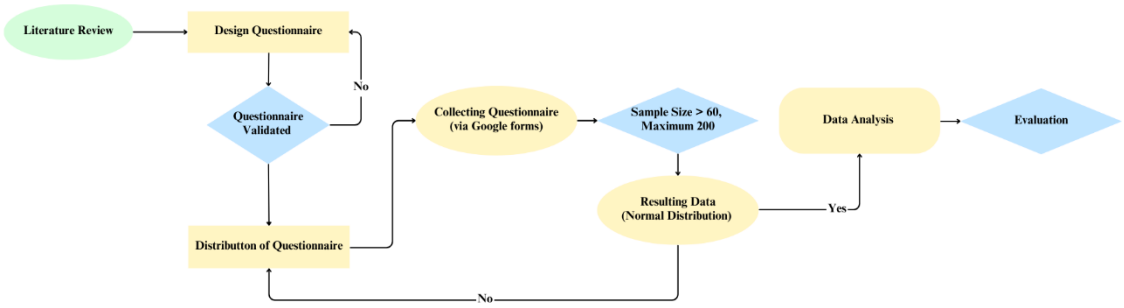

Figure 1 Flow chart diagram for research methodology

5. Results and Discussion

5.1 Demographics Statistics

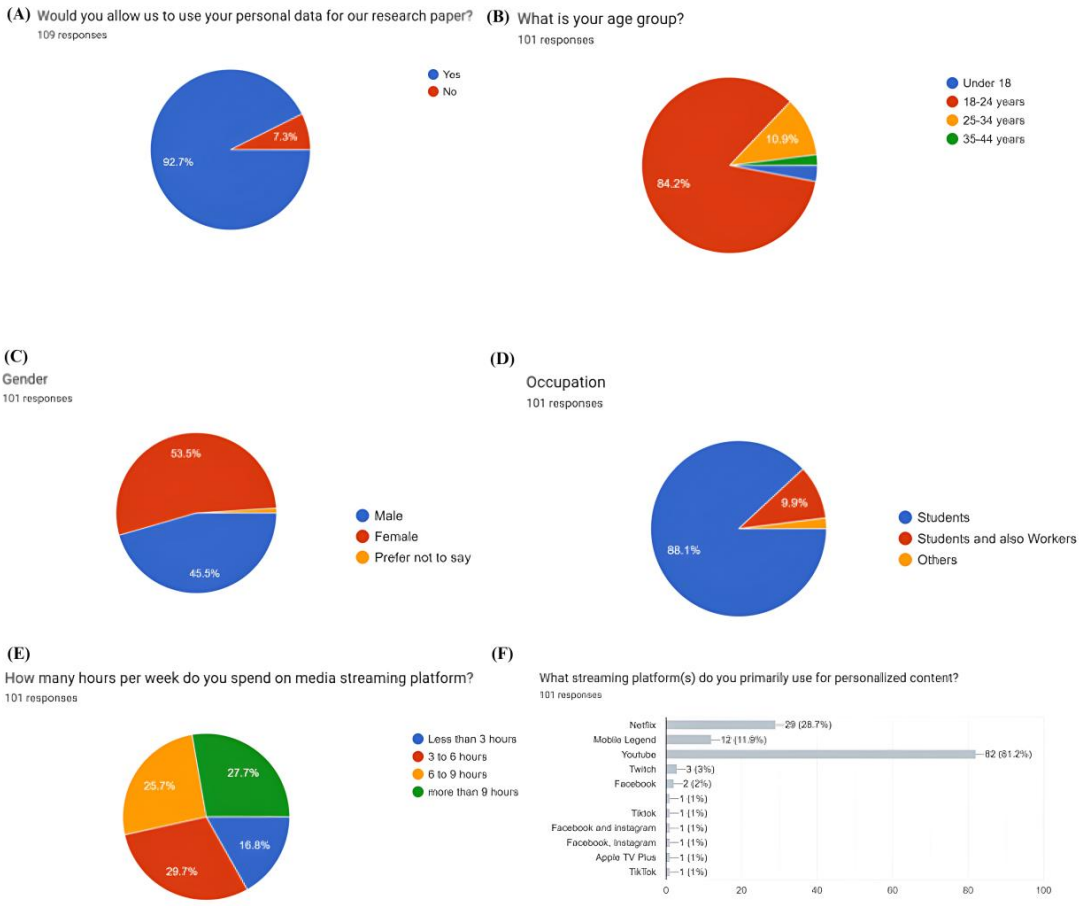

Figure 2 Survey demographics and streaming platform preferences among respondents

For our survey, we gathered 101 responses from the participant and key demographic trends in users' media streaming preferences. The majority of respondents (84.2%) were in the age group between 18 and 24 years, which clearly points to the role of young adults as first consumers of streaming services. Disaggregated by gender, gender was relatively distributed with 53.5% female, 45.5% male, and 1% non-disclosure. (78.8%) were students, and (9.9%) were simultaneously students and employed.

The streaming habits were varied, as 29.7% stated that they watch for 3 to 6 hours per week, 27.7% that they watch for 6 to 9 hours per week, and 25.7% watched for less than 3 hours. The most popular platform among them was YouTube (81.2%), followed by Netflix (28.7%), Mobile Legends (11.9%), Twitch (2%), and Facebook (2%). These results indicate that YouTube is the place where people prefer to consume content while indicating that high quality and personalized recommendations are key factors for platform choice.

H1 is supported by the data: machine learning-based personalization encourages user activity, as confirmed by the survey results regarding how platforms are selected and engaged with.

5.2 Correlation and Regression Analysis

Table 1. Inter-item Correlation Matrix

Inter-Item Correlation Matrix				
	Platform Usability	Trust & Privacy	Deep Learning Models	Trust Usability & Platform Complexity
Platform Usability	1.000	.668	.441	.518
Trust And Privacy	.668	1.000	.532	.675
Deep Learning Models	.441	.532	1.000	.579
Trust Usability & Platform Complexity	.518	.675	.579	1.000

The inter-item correlation matrix for platform usability, trust and privacy, deep learning models, and platform complexity is presented in Table 1. Correlating with the strongest was privacy and trust (r = 0.675) or trust, utility, and platform complexity (r = 0.675), focusing on privacy matters than trustworthiness. Trust and privacy were modulated with a moderate level of correlation (r = 0.532) with deep learning models as well, as algorithmic transparency has an effect on user trust.

Table 2. Descriptive Statistics

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Platform Usability	101	1.25	5.00	3.4455	.71467	.106	.240
Trust And Privacy	101	1.33	5.00	3.3102	.66334	.504	.240
Deep Learning Models	101	1.67	5.00	3.3647	.63321	.402	.240
Trust Usability and Platform Complexity	101	1.00	5.00	3.3185	.64597	.381	.240
Valid N (list wise)	101						

Table 2 describes mean measures of score, suggesting a moderate amount of concordance across all measures. The mean (M) values of platform usability were the highest (M = 3.45, SD = 0.71), followed by deep learning models (M = 3.36, SD = 0.63), trust, platform usability, trust, and privacy (M = 3.32, SD = 0.65), and finally trust and privacy (M = 3.31, SD = 0.66). Responses were symmetric and closer to the normal distribution because the skewness values were near zero.

These results partially support H2: Increasing privacy worries is negatively correlated with trust of the users towards the existing streaming services. Despite the influence of privacy on user trust, there is a correlation between trust and privacy and other usability- related factors, suggesting a high sensitivity of trust to privacy.

5.3 Linear Regression Analysis

Table 3. Multiple Regression Analysis

Model Summary					
Model	Change Statistics				
	R Square Change	F Change	df1	df2	Sig. F Change
1	.526[a]	35.947	3	97	.000
a. Predictors: (Constant), Deep Learning Models, Platform Usability, Trust and Privacy					

A multiple regression analysis (Table 3) suggested that the independent variables of trust, privacy, platform usability, and deep learning model can account for 52.6% of the variance in trust, usability, and platform complexity ($R = 0.526$, $F(3, 97) = 35.947$, $p < 0.001$).

Table 4. Results of Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.559	.279		2.001	.048
	Platform Usability	.068	.086	.075	.791	.431
	Trust And_Privacy	.455	.098	.467	4.649	.000
	Deep Learning Models	.304	.085	.298	3.572	.001
a. Dependent Variable: Trust_Usability_N_Platform_Complexity						

In Table 4, the regression coefficients are presented in further detail to help determine the contribution of each variable. Among all other factors, trust and privacy had the strongest impact ($B = 0.455$, $p < 0.001$), first of all, because privacy concerns are the main aspects of forming user trust toward streaming platforms. The results also indicated that AI-driven personalization strategies have a statistically significant effect ($B = 0.304$, $p = 0.001$) on users' perceptions of platform complexity and usability.

Nevertheless, the use of a platform did not significantly affect the model ($B = 0.068$, $p = 0.431$). However, this goes against the norm of usability increasing trust and engagement. One possible reason is that interface design is still an important factor, but users have more transparency and control over their data. It would also appear less critical for younger users (whose mean age was 23 and who form the majority of our sample) since they may be used to different platforms or different interface designs.

Fourth, these results confirm H3: The user retention is positively related to ML-based personalization, as personalization greatly impacts trust and engagement. But for H4: Further study is needed to explore the variation in the effectiveness of ML customization across platforms such as Netflix, TikTok, and Mobile Legends, as platform usability is not statistically significant.

5.4 Visual Representations and Simplified Findings

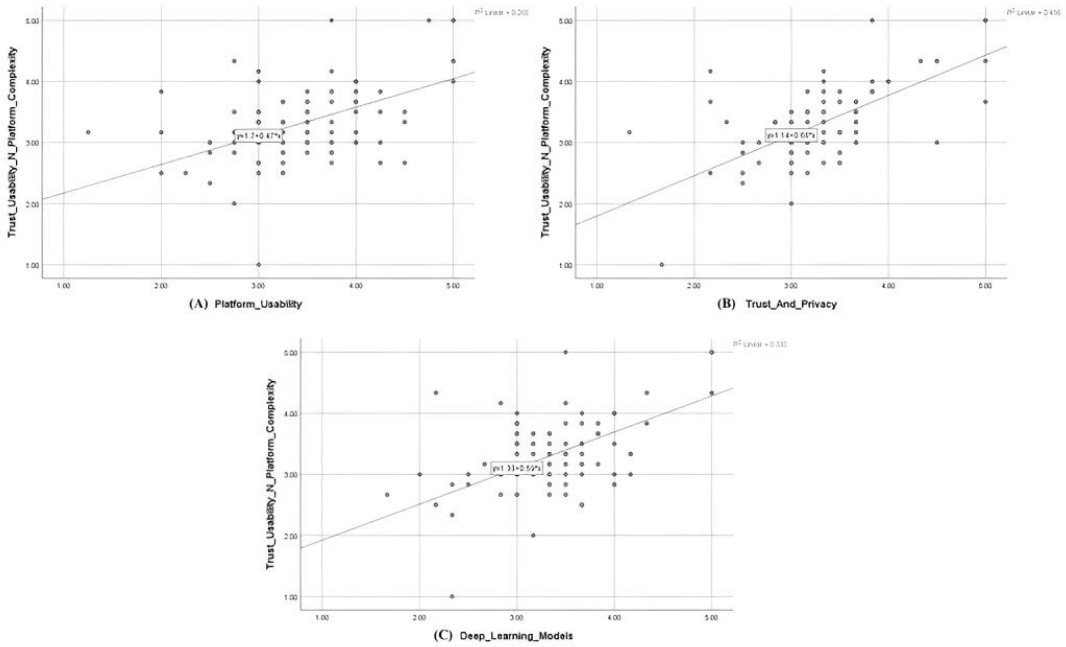

Figure 4 Scatter plots showing the relationships of (A) platform usability, (B) trust and privacy, and (C) deep learning models with trust, usability, and platform complexity

Histograms and scatter plots illustrating the variations of the variables are presented in Figures 3 and 4. This indicates that the responses conform to bell-shaped distributions represent normality, which supports the reliability of the findings. Positive correlations between platform usability, trust, and privacy and trust, usability, and platform complexity shown by scatter plots have R^2 values of 0.268, 0.456, and 0.335, respectively, as evidenced by deep learning models analyzing trust, usability, and platform complexity.

6. Conclusion

Based on our findings, machine learning turns out to be an essential base for the construction of user experience interfaces for media streaming platforms. User retention features on the platform contain usability elements that merge with privacy considerations and trust elements. The application of deep learning models results in improved personalization and increased engagement based on B = 0.304 with p = 0.001 but achieving platform reliability depends on trust and privacy concerns at B = 0.455 and $p < 0.001$. The analysis demonstrates users put more value on platform transparency since B = 0.068, while p-score equals 0.431, although trust in platforms shows an insignificant link.

Platforms such as TikTok, Netflix, and Mobile Legends are using Machine Learning to deliver personalized content and therefore have experienced huge privacy issues. The research results indicate that users primarily build trust when secure operating practices of platforms include clear descriptions of their technological mechanisms. Organizations risk trust betrayal from users because they neglect critical related issues despite running their recommendation algorithms with superior effectiveness.

Research indicates that users of streaming platforms between 18 and 24 years old represent the highest demographic segment based on statistical data about platform subscriptions. Customers become permanently happy when platform providers master their audience preferences for content diversity alongside transparent practices for artificial intelligence use.

Algorithm developers who specialize in machine learning should merge improvements in personalization features with accessible methods for transparently displaying the ethical processing of data. When employing demographic research, companies must develop marketing strategies focused on preserving privacy for consumers who prioritize privacy protection. Platform providers should establish transparent data guidelines so users trust them, although they aim for maximum client interaction. The main benefit end users obtain from personalized content should be accompanied by stronger tools that help them to manage their privacy choices.

Based on these results, future work is needed on adaptive personalization models under the user consent mechanisms and higher privacy controls. They can take up cross-platform comparisons in other studies to find out how far the stream services separate the engagement and ethical AI practices.

AI should be extended into the field of personalization by AI and also try to build trust by clearly stating how they are utilizing AI. This approach will help ensure that they have a longer life and there are no users who are blackmailed into employing their services for many years. In the future, user-friendly media viewing will be the bread and butter of responsible machine learning as well as protecting total privacy. Today, in the context of the data-sensitive online environment, only those platforms that have good practices of AI for users will also deal with privacy issues and will not be able to keep people interested.

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