

# Impact of Artificial Intelligence on Personal Engagement in Online Social Networking Platforms: A Socio-Technical Study

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**Abstract**—The integration of Artificial Intelligence (AI) systems into Online Social Networking (OSN) has developed a new era in the ways people communicate and interact by the use of OSNs. This paper focuses on the systems of OSNs, such as recommendation systems, and methods of natural language processing, computer vision and generative AI, and their influences on user activity in OSNs. This study takes a socio-technical approach, and views activity in OSNs as having behavioral, cognitive, emotional, and social dimensions. Previous studies focus on the duality of AI systems and user activity in OSNs, that is the positive aspects of user personalization and user activity forecasting, and the negative aspects such as bias in OSN systems, user inactivity, filter bubbles, and the control of users' emotional states. This paper demonstrates that there is a demand for presence of ethical AI systems in OSNs, and AI systems of design and implementation will focus on the users of OSNs.

**Index Terms**—Artificial Intelligence, Social Media, Engagement, Recommender Systems, NLP, Algorithmic Bias, User Behavior

## I. INTRODUCTION

The impact of AI on the development of online social networks (OSNs) has created different types of 'social' networks. Facebook and other networks that began as general communication utilities have become almost fully AI systems that filter, curate, recommend, and provide information to users based on their behaviors. It is written in the thesis that modern OSNs rely almost exclusively on behavioral data (clicks, likes, shares, views, time, and other varying interaction metrics), and as such, construct personalized feeds. These OSNs

have especially altered users from content seeking to passive, content awaiting users.

These changes have opened the following inquiries:

- In what ways do you think AI has changed the ways users interact with and/or engage on these platforms?
- In what ways do you think the personalization of feeds has enhanced or limited the freedom of users?
- In what ways do you think the personalization of feeds has changed the psyche of the users?

## II. LITERATURE REVIEW

### 2.1 AI in Social Media Ecosystems

Artificial Intelligence (AI) has become a critical component in the design of Online Social Networks (OSNs). Machine Learning (ML) and Deep Learning (DL) systems analyze data on a grand scale and forecast data user preferences in order to fine-tune engagement results. These systems are part of the recommendation systems, content moderation, and advertising systems.

As is argued in the thesis, AI has become an integral part of the design of Digital Interactions and the visibility of Digital Content.

### 2.2 Recommender Systems

The fast adaptation of Artificial Intelligence (AI) in online social networking tools has modified personal interaction systems approaching advanced recommender systems. Advanced systems such as Facebook, Instagram, X (formerly Twitter) and TikTok have AI systems that consider user behavior,

preferences, histories, and even the context of situations to generate and feed news to users. From a social and technical viewpoint, recommender systems focus on the balance of inter-human behavior and the mechanics of algorithms. These systems determine what users see, and more importantly, what users do, their interactions, and their online identities. Systems in literature indicate that systems boost content engagement, and relevance while optimizing user attention through feedback loops. On the flip side, systems have raised concerns and issues of users being trapped by content systems, that create feedback loops by increasingly showing users content of the users emotions, and interests, leading to a lack of content information. Furthermore, and due to AI systems learning through reinforcement systems, a dependency to these systems and excessively increased screen time are caused. Research in social systems has indicated that these outcomes are effects of the systems, and emerge from the balance of user adaptability, systems of engagement, and the incentive of the attention economy. AI systems are advanced, and enable users to enjoy greater user control and improve the user experience.

### 2.3 NLP and Content Moderation

NLP has become one of the most vital components of modern content moderation systems for online services. Because of the NLP's ability to automate the detection, classification, and filtration of harmful content, companies are more able to manage community content. Social media services apply various NLP methodologies, like sentiment analysis, named-entity recognition, and transformer-based models, to automate the detection of real-time harmful content, hate speech, spam, misinformation, and abusive speech. These automation models help social media companies implement community standards and moderation policies more consistently and swiftly. There are still problems that need to be solved, like context, cultural and linguistic biases, and manipulating NLP models by adversarial means. In spite of the problems with NLP moderation systems, the benefits of these systems is greater, when compared to, more conventional systems of moderation that are heavily reliant upon manual intervention.

### 2.4 Computer Vision in OSNs

Social Networking platforms rely on Computer Vision to automate the understanding of textual information. Vision enables image/video classification, face and object recognition, and augmented reality filtering. All of these helps boost user engagement. Platforms like Instagram, Snapchat, and TikTok build filtering and content personalization into the platform and use real-time content moderation to personalize more. Computer Vision aids in all of these. The benefits of Computer Vision overlooks all the problems due to building perma-surveillance software. Biometric data and unsolicited information due to surveillance will always be a major problem that Computer Vision creates. Solving problems caused by Computer Vision must always take priority. Balancing these will always be a major problem.

### 2.5 Generative AI

Generative AI constructs synthetic text, images, audio, and video. Its ability to produce creative and engaging content has caused its adoption in online social networking platforms such as Facebook, Instagram, TikTok, and X. Online social predictive text, AI-generated posts and captions as well as virtual influencers and companions produce digital media. Face-swapping, chat companions, digital influencers, and even AI posts and captions play into the online user's sense of entertainment and engagement. These systems change the way we communicate, the way we create, and the way we consume. These models generate outputs close enough to the real thing. The integration of generative AI into creative networks and chat companions poses many challenges. Manipulating identities, the blurred line and crisis of ethics and authenticity, as well as the onslaught of false information, all come as a result of the lax governance of synthetic media. Manipulating trust and the integrity of online systems, will draw the need for new governance, detection systems, and new accountability measures for creative online networks.

## III. CONCEPT OF PERSONAL ENGAGEMENT

Personal engagement in Online Social Networking platforms is a complicated term that describes the ways users interact with, interpret, and respond to the digital content available on the platform. The term encompasses a number of engagement categories. One

is behavioral engagement, which refers to observable engagement like making online posts, and liking, commenting, or sharing posts. Another category, cognitive engagement, refers to the degree of content consumption that involves perception and the mental effort that users apply to interpret the content. Emotional engagement refers to positive and negative feelings that users experience in regards to online interactions and the content, and social engagement refers to the engagement in online communities and networks and the sharing of one's identity. Each of these forms of engagement is affected by the personalized content that is made available to the user in order to optimize the level of engagement. This detrimental process is the work of an Artificial Intelligence system.

#### IV. PROBLEM STATEMENT

While AI recommendation systems are now commonplace across Online Social Networking platforms, their effect on user interactions beyond basic behavioral metrics is not well understood. Existing studies are largely quantitative, based on data such as clicks, likes, watch times, or shares. Studies have largely neglected qualitative metrics, such as emotional wellness, perceived autonomy, cognitive load, etc. This narrow focus ignores socio-psychological impacts on users. Furthermore, many users do not know how algorithms fill their content, leading to a lack of accountability and responsibility of these companies. This points to the need of using different research methods to study the same problem.

#### V. RESEARCH OBJECTIVES

##### 5.1 Primary Objectives

- To investigate the consequences that AI recommendation systems cause to user engagement.
- To interpret behavioral, cognitive, and emotional engagement patterns.
- To assess how personalization effects continuous engagement.

##### 5.2 Secondary Objectives

- To identify AI techniques used in OSNs.
- To assess user awareness of algorithmic systems.

- To evaluate content diversity and filter bubble effects.
- To propose a user-centered engagement framework.

#### VI. RESEARCH QUESTIONS

- What is the impact of AI on personal interaction in OSNs?
- Which effects of AI systems on engagement are behavioral, cognitive, and emotional?
- What is the level of user awareness regarding algorithmic suggestions?
- Are AI systems designed with the intention of creating long-term dependency?
- What is the effect of personalization on the variety of content?
- Do behavioral engagement patterns show variability across different online platforms?

#### VII. AI-ENGAGEMENT INTERACTION FRAMEWORK

AI-influenced user interaction on online social networking sites functions on an algorithmic learning feedback loop model. This engagement framework uses algorithms that analyze and log user activity, generating a personalized content suggestion. This, in turn, modifies user engagement in a way that the model continually improves its predictive content suggestion accuracy based on the logged user input on the suggestion. The cycle reinforces a particular type of engagement. Each suggestion offers users increasingly poor control over the information and or content that is available to the user. The framework operates on a predictive model powered by machine learning, element tracking, reinforced learning feedback systems, and immediate optimization of content delivery to the user.

#### VIII. PSYCHOLOGICAL IMPACT OF AI ENGAGEMENT SYSTEMS

AI systems on Online Social Networking platforms have a strong impact on user psychology. One of the strongest impacts is the social media phenomenon FOMO (Fear of Missing Out) where continuous updates leads to compulsive behavior. Another, and

perhaps one of the most dominant, impacts is habit forming feedback loops. Feedback loops are notoriously difficult to escape and operate through reinforced social validation via variable rewards. Lastly, self-esteem and emotional impact are greatly affected due to the habit of social comparison, the comparison of experiences, accomplishments, and musings. These psychological impacts are worsened by AI systems that are made to custom fit user feeds to maintain user attention and to personalize at the maximal levels of probable engagement and interaction on the platform.

## IX. DISCUSSION

AI systems integrated into Online Social Networking apps can boost user engagement and experience. Personalized content delivery is one such benefit. Algorithms help users with narrow content selection. Personalized delivery can also lead to user satisfaction. Higher user satisfaction can lead to higher user engagement. Algorithms can help with that engagement too. As the systems improve and get better at their jobs with better algorithms, they can also pose threats. Things like the narrowing of autonomy with engagement. There is also the issue of dependency on the app, misinformation, filter bubbles, and other side effects. AI systems can increase efficiency and productivity all at the cost of a user's well-being.

## X. ETHICAL CONSIDERATIONS

AI-use in Online Social Networks raises many ethical issues, like violating a user's trust and their freedom. Example issues involve opacity in how a user's feed is algorithmically determined and the violation of user privacy by extensive tracking and data collection. Algorithmic bias can reinforce stereotypes by having a wildly disparate content selection. AI-design that exploits a user by artificially manipulating their attention to maximize engagement is also an issue. Without informed consent and with so many ethical violations, the situation is ripe for Explainable AI.

## XI. CONCLUSION

AI is changing how we all connect on online social networking. AI is good at personalizing, predicting, and recommending. Despite these "benefits," real

challenges are created. Because of these challenges, user engagement is no longer a user-only thing. AI systems that are constantly interacting with users, manipulate users' engagement and how they respond to things on the platform. AI systems that do this include algorithms. Social networking platforms have a balance of user engagement and AI systems. Because of the balance that social networking platforms have, the user engagement evolves. Because of this rapid evolution, the social networking platform creators must provide engagement that includes ethical balances to ensure a user focused engagement.

## XII. FUTURE SCOPE

- Development of Explainable AI (XAI) for social media platforms
- Cross-cultural studies (especially Global South contexts)
- AI governance frameworks
- Ethical recommendation system design
- Real-time monitoring of algorithmic bias

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