

Trapped in the Feed: The Psychology of Social Media Addiction, Algorithms, and Fear of Missing Out (FoMO)

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Abstract

Social media has now become the most crucial part of our life which has multiple advantages, such as connecting with old friends, sharing personal experiences, creating a good social circle, and accessing knowledgeable information. However, excessive use can result in social media addiction. This research paper aims to determine the psychology behind social media addiction and its factors, how the psychological behaviors can lead to social media addiction, the role of dopamine, how social media algorithms uplift social media addiction, and the relationship between FoMO (Fear of missing out) and social media addiction. This paper also emphasizes that how social media algorithms manipulate user's behavior and opinions by fostering mindless scrolling that hold user on these platforms for longer duration. It discusses FoMO and its psychological and behavioral outcomes. This research paper aims to highlight the gaps by exploring time distortion during nonsocial media tasks, the popularity of viral fake news and how cross-cultural difference and geopolitics push user towards social media addiction. This paper explores the existing work which includes surveys and other theoretical background by defining the relationship between psychological factors behind social media addiction, the role of algorithms and FoMO and concludes with the suggestion for interventions to downsize social media addiction.

Keywords: Social media, social media addiction, algorithms, FoMO, fake news

INTRODUCTION

The traditional media in earlier times like newspapers, magazines, and broadcast radio were the major sources of information but when technology evolved, the internet came into the picture which

brought a new era of digital media. The evolution continued with the advancement of social media platforms which have become a part of our daily lives present a framework that defines social media by using seven functional building blocks: identity, conversations, sharing, presence, relationships, reputation, and groups [1]. Social media fosters to make new friends whether they are geographically far away without any time constraints and remain in contact with existing friends thus made better social life, but overblown use can be trouble to psychological and mental well-being. Nowadays, people spend their hours on social media platforms and these companies are constantly trapping our minds to be addicted to social media. Social media addiction was defined as the excessive and compulsive use of social networking platforms that feature the components of behavioral addiction including, overwhelming concerns with the social

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Received Date: October 29, 2024

Accepted Date: November 01, 2024

Published Date: November 06, 2024

Citation: Kanika Sharama, Vanshika Yadav, Shilpi Saxena, Jolly Pandey, Ashish Singh, Mritunjay Kr. Ranjan. Trapped in the Feed: The Psychology of Social Media Addiction, Algorithms, and Fear of Missing Out (FoMO). *OmniScience: A Multi-disciplinary Journal*. 2024; 14(3): 8–19p.
DOI: <https://doi.org/10.37591/osmj.v14i03.181454>

media platforms, inability to quit using, and spending a large amount of time on these sites to a level that impairs individuals' social and occupational role [2].

Dopamine is a naturally occurring type of neurotransmitter which is released by our brain. It is known to have multiple vital roles in the body and especially the brain, but it typically seen as a "Pleasure Chemical" that depicts why humans feel pleasure (Figure 1) [3]. The optimum level of dopamine is beneficial but frequently low or high can develop problems like addiction towards something. When people check their phones for notifications and updates or scroll reels provide temporary pleasure which causes the release of dopamine. Social media addiction works in a similar way to drug addiction [4]. Consuming drugs initially provides pleasure, but with time more drugs are needed for the same level of happiness. Similarly, social media rewards like notifications and likes initially bring happiness, but the excitement falls over time that leads to a need for more usage. It comes through a term referred to as Variable Reward Schedules. Variable rewards are surprising, which creates a sense of satisfaction and excitement. The natural tendency of our brain system is to seek patterns and predictability which release dopamine. Social media platforms are designed to be addictive. Major social media companies hire engineers who operate addictive algorithms to swallow as much of our time and engagement as possible. According to Arthur Samuel, machine learning is defined as the field of study that gives computers the ability to learn without being explicitly programmed. Machine learning is used to guide machines on how to manage data more efficiently. Machine learning depends on various algorithms to cluster (group) the raw data with similar patterns. Social media platforms deal with very large amounts of raw data of users which get structured through algorithms. The different machine learning methods gather data through different types of tasks the user performs, such as liking, commenting and sharing a post. They identify our personality, beliefs, desires, and even our current state of mind by these patterns [5]. Social media companies analyze user data to observe patterns and sell it to advertisers to generate their ad revenue. It provides advertisers with a platform to sell their products. They even sell the user data to political parties to manipulate our beliefs or to form a strong one-sided opinion. Social media algorithms repeatedly display the modern and best-edited life aspects of others which form a sense of comparison from others which is unhealthy and can gradually lead to FoMO (Fear of missing out). FoMO is an individual's typical worries and concerns about missing experiences that others might have that came from interactions and content sharing on social media platforms. The FoMO concept originally came into the picture for offline real-world context but afterward with ease of internet access it widespread throughout social media. The significance of FoMO is intentionally formed by social media algorithms for the use of social media more and more [6]. Users with high sense of FoMO especially teenagers tend to use social media more as they do not want to miss out any current trend and to build a perfect self-image for others to seek their attention which expands a firm urge to remain regularly involved on these platforms. It can even lead to addiction-like behaviors for fetching quick rewards of fame and views that deliver a fake sense of satisfaction only for a short period of time. But that can lead to anxiety, isolation, and depression if they do not get those temporary rewards [7]. Currently, it is considered that the high level of FoMO is personified by the behavior like the fear that others gaining more rewarding life experiences than me, the anxiety that they are having more fun than me, that I will miss out any planned or random event, the need to constantly check the activities by friends and to be updated with their lives, the need to have a smartphone within the reach to easily accessing incoming information [8].

OBJECTIVE

- To study the psychological behaviors that trigger social media addiction and their impacts on mental health.
- To study the psychology behind social media algorithm in decision-making.
- To study FoMO and its psychological and behavioral outcomes.

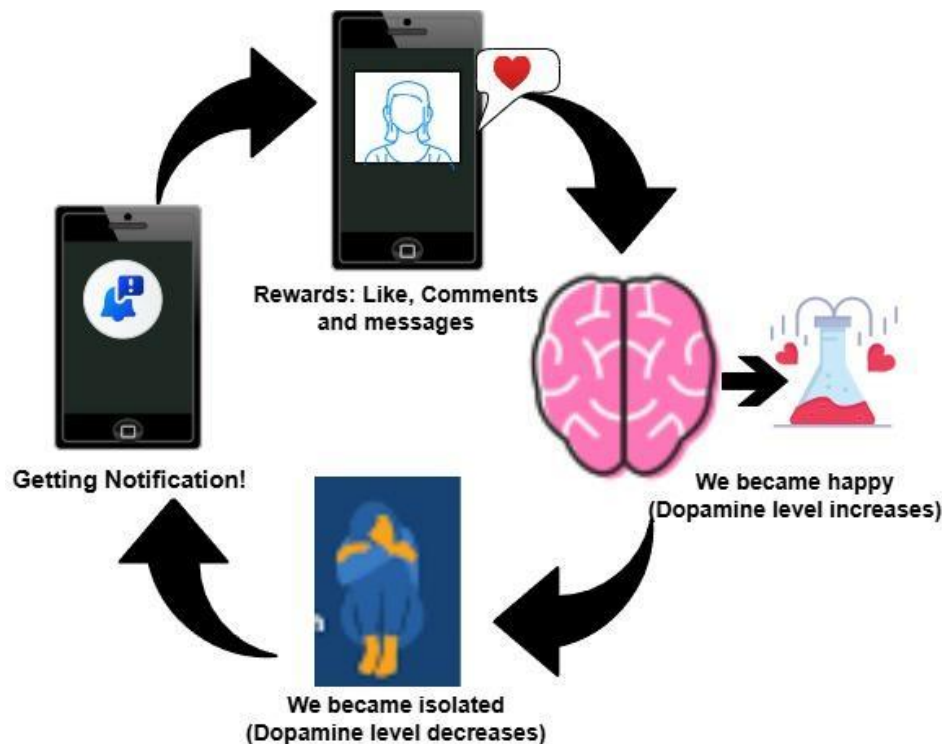


Figure 1. Dopamine cycle.

Related Study

A "related study"; for the title Trapped in the Feed: The topics that may be included in the Psychology of Social Media Addiction, Algorithms, and Fear of Missing Out (FoMO) are aspects of addiction of social media, the impact of content curation algorithms, and FoMO. These papers examine how these factors thus affect mental health, the behaviour of users and wellbeing, an insight to the psychological effects of social media use (Table 1).

Problem Statement

Social media addiction has appeared to be one of the most problematic concerns affecting multiple psychological and behavioral issues like anxiety, depression and emotional well-being of millions of people. Despite vast analysis on this topic, still there are several gaps left. The current body of research aims to determine the necessity to further analyze that how psychological behaviors are affected by major factors, such as time distortion during social media use, increasing popularity of fake news and advertisements on these platforms. Besides, there are lot of cross-cultural studies that analyze how geopolitical and cultural aspects shape psychological attachment toward social media Figure 2.

FoMO is a rising phenomenon which is closely related to social media addiction. Yet, there is uncertainty whether social media addiction triggers FoMO or vice-versa. Also, the relationship between personality traits, coping mechanism, and emotional well-being demands further exploration. This research aims to address these gaps by analyzing psychological behaviors that push social media addiction, the role of algorithms in strengthening addictive behaviors and the relationship between FoMO and social media addiction by designing interventions that reduce social media addiction and FoMO while improving emotional well-being.

THEORETICAL BACKGROUND

In the context of this research paper, students from 274 US universities were chosen to study the existence of time distortion during non-social media tasks. They have varying levels of addiction which are categorized into at-risk and low or no risk. Students were over 18 and it was conducted in

the computer lab with no time element, i.e. clock but it was the major key part of the survey but not revealed to the students. Student's age, gender, GPA, Facebook use and personality were recorded. It took 29 min to complete the survey. At-risk group had higher time distortion, but no/low-risk group had lower time distortion. The study indicates the at-risk group tends to feel more time had passed than it does i.e. show more time distortion [9–15].

Table 1. Research on the causes, results, and future work directions regarding social media addiction.

Citation	Causes of Social Media Addiction	Result	Future Work
[9]	Time distortion is a risk factor for social media addiction, where individuals overestimate time, believing it has passed, even when not using social media.	Social media addiction is primarily driven by a disturbed perception of time, leading to difficulty in disconnecting from social media platforms.	Future research should explore the actual time distortion experienced while using social media or when it is restricted, as this could potentially aid in related fields.
[10]	Machine learning algorithms cluster large data, analyze user behavior, opinions, and habits, distinguishing legitimate and spammers, identifying preferences, and displaying relevant content.	ML algorithms can manipulate our opinions, increase screen time on social media, and trigger FoMO, leading to anxiety, mental health issues, and isolation from the real world.	Future research should explore brand interactions, chatbot-AI interaction, viral fake news prevention, and social media advertising and sales growth.
[11]	The Stressor-Strain-Outcome framework is used to analyze psychological behavior influenced by social media, highlighting exhibitionism and voyeurism, which involve displaying perfect self-image and accessing personal life.	Exhibitionism, more than Voyeurism, significantly contributes to FoMO, causing anxiety due to the need for more attention from social media.	Future work should explore causal relationship methods and experiments globally, analyzing social media and smartphone addiction in conjunction with various countries.
[12]	Theories suggest that social media addiction is caused by high anxiety, seeking comfort, maintaining relationships, and seeking attention, with excessive use of pleasurable content potentially escalating addiction.	Social media ease of access and speedy and pleasurable rewards are the central cause of social media addiction. They become fully dependent to maintain their social status when it is part of their social circle.	Future research should explore the influence of social, cultural, and technological factors on psychological aspects like attachment style, the role of cultural environment, and geopolitics stress in social media addiction.
[13]	Teenagers often experience FoMO on social updates, leading to addiction due to false satisfaction and anxiety, low self-esteem, and stress.	Social media can boost mood, but excessive use due to FoMO can lead to excessive stress, depression, and emotional issues in individuals with high FoMO.	Future research should explore the link between social media addiction and FoMO, explore interventions to reduce FoMO, and explore potential factors like personality traits and copying mechanisms.
[14]	Social media usage can lead to FoMO, sleep problems, and insomnia, causing disturbed sleep schedules, tiredness, and difficulty falling asleep.	FoMO, or false moodiness, can lead to overuse and temporary false satisfaction, and is closely linked to an individual's self-perception.	Future research should explore the initial development of FoMO, its control, and whether FoMO leads to social media addiction or vice versa.

Social media platforms deal with a very enormous amount of unstructured data. Machine learning algorithms are designed to make it structured by understanding this large amount of data. By using Machine Learning, it analyzes user behavior, opinions mining, regular habits, and even predicts many things based on habits and behavior. It also differentiates between legitimate user and spammers. This analysis enables them to identify our likes and dislikes and shows us posts, reels, and even accounts that match our likes. It can even analysis our current state of mood by observing our activities. After behavior analysis, Machine Learning algorithm can trap us by showing repetitive content in loops which leads to mindless scrolling. The data gathered through machine learning can be used to manipulate our political and religious opinions [5].

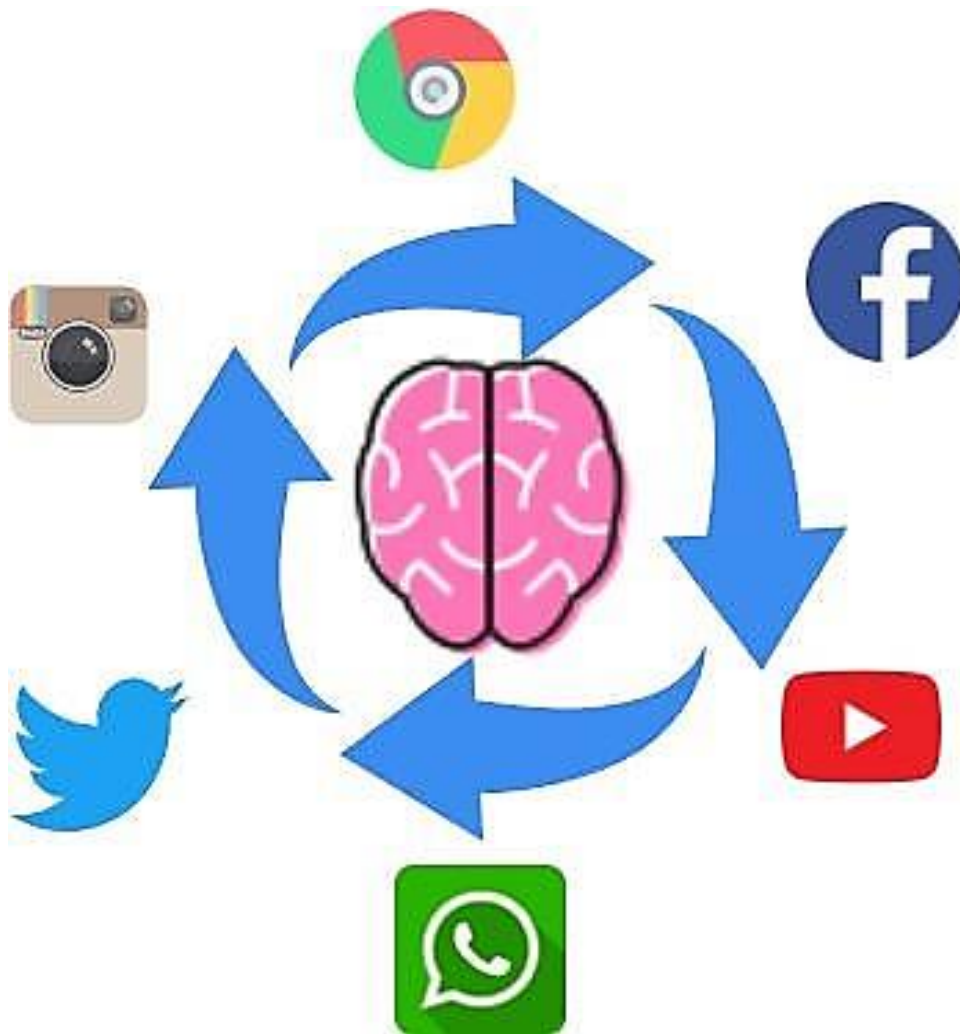


Figure 2. Social media influence on cognitive processes.

Social media has adverse impact of using social media for employees during work hours which increases the tendency of FoMO among them. The study aims to determine the rising use of social media among working professionals by developing questionnaires for them with five-point scale (“strongly agreed” to “strongly disagree”). The research determines that social media can even affect employee’s opinions and productivity. The results analyzed 57.5% suffered from FoMO, 50.4% had social media addiction, 31.9% had reduced productivity and 39.6% procrastinated. The age, gender, and income did not affect the results [16].

There is an analysis from which 472 teenagers in northern Italy examines FoMO, social media stress, social media addiction, and emotional instability. They were asked reliable questions from which researchers found that FoMO is the left out feeling on social media which raises the social media addiction and it also influences mental health or emotional instability which implies teenagers are not being able to convey their feelings or they trapped or confused in their own emotions and unable to deal with this, which causes insecurities about themselves and they are afraid of being left out [17].

The survey selected 419 individuals from the US and categorized them into different groups according to their age ranges. Various surveys were used by researchers to identify FoMO, self-esteem, social media addiction, sleep quality, and loneliness. It aims to determine the individual’s perception of their social life and how it is impacted through social media addiction. The survey

identifies higher age group had high social media addiction and low age group had high FoMO and less satisfied in their social life. They had disturbed sleep schedules and low self-esteem. Gender made no difference in FoMO [14].

METHODOLOGY

The Overview and Framework refers to these patterns by using the behavioral addiction model and outlines the frameworks features, as well as the reinforcement processes within the platform that activate dopamine and elicit continued usage. FoMO is explained through psychological research within the framework, as does how social media algorithms crank up this sensation by way of the personalization of content and connectivity. The Mathematical Modelling of Social Media Addiction uses an algebraic engagement function Equation (i) to measure user interaction; this allows the addictive potential of algorithmic content to be documented once personalized [18]. They provide a cogent plan of how to analyze the processes involved in the development of social media addiction in Equation (i).

$$E(u, a) = \sum_{t=1}^T w_i \cdot f_i(u, a) \quad (i)$$

where,

- $E(u,a)$: Engagement level for user u based on algorithm a .
- T : Total number of interactions observed.
- w_i : Weight assigned to each engagement factor i .
- f_i : Individual function capturing interaction type, frequency, and response patterns.

Reinforcement Learning Mechanism

Model the algorithm's reinforcement learning Equation (ii):

$$Q(s, a) = r + \gamma \max_{a'} Q(s', a') \quad (ii)$$

where

- $Q(s,a)$: Quality of action an in states.
- r : Reward, here aligned with user engagement.
- γ : Discount factor, determining the impact of future states.
- By maximizing Q , algorithms continually adapt, focusing on content that raises engagement.

Formulas for Measuring FoMO and Social Media Addiction

- *FoMO Index*: Quantify FoMO Equation (iii) as follows:

$$\text{FoMO Score} = \frac{\sum_{i=1}^n S_i}{n} \quad (iii)$$

- S_i : Response score for each item on the FoMO scale.
- n : Total number of items.

Addiction Likelihood Formula Equation (iv):

$$A = \beta_0 + \beta_1 \cdot E + \beta_2 \cdot F \quad (iv)$$

where

- A : Predicted addiction likelihood.
- $\beta_0, \beta_1, \beta_2$: Regression coefficients.
- E : Engagement score.
- F : FoMO score.

Terminology Used

- *Engagement Threshold*: A level of interaction or response that maintains addiction.

- *Reinforcement Loop*: Mechanism through which algorithms modify content for higher engagement.
- *Attention Economy*: Framework where social media platforms monetize user attention, often linked to addiction patterns.

This methodology offers a structured approach, combining theory, terminology, and quantitative methods to examine the psychological and algorithmic underpinnings of social media addiction and FoMO.

System Architecture

Figure 3 depicts how social media firms boost interaction and dependency through highly optimized algorithmic platforms. Powered by Deep Dive loosely structured into three categories: Algorithm Layer and Feedback Mechanism User Interaction: A package for the customers where they get interacted with content feeds notification and profile activities to give a set of data points in terms of user preference and behavior. From here this data goes through to the Algorithm Layer where Behavior Tracking and Content Recommendations, etc. exist. The patterns of user engagement are used to forecast the general levels of engagement, after which the algorithms develop recommendations based on the patterns. It re-emphasises consumption of FoMO and other potential addictive behaviors by monitoring the ways you engage with every post, adverts, and notices. Feedback Mechanism: This package continues to log user responses and then passes them back as an input to the component known as Algorithm Adjustment. There is then another loop that uses the feedback received to enhance the content recommendation and engagement techniques. When these layers are combined, the result is an effective system, which responds well to user behavior and enhances the cycle of involvement, as well as sustaining dependency on technology for social media.

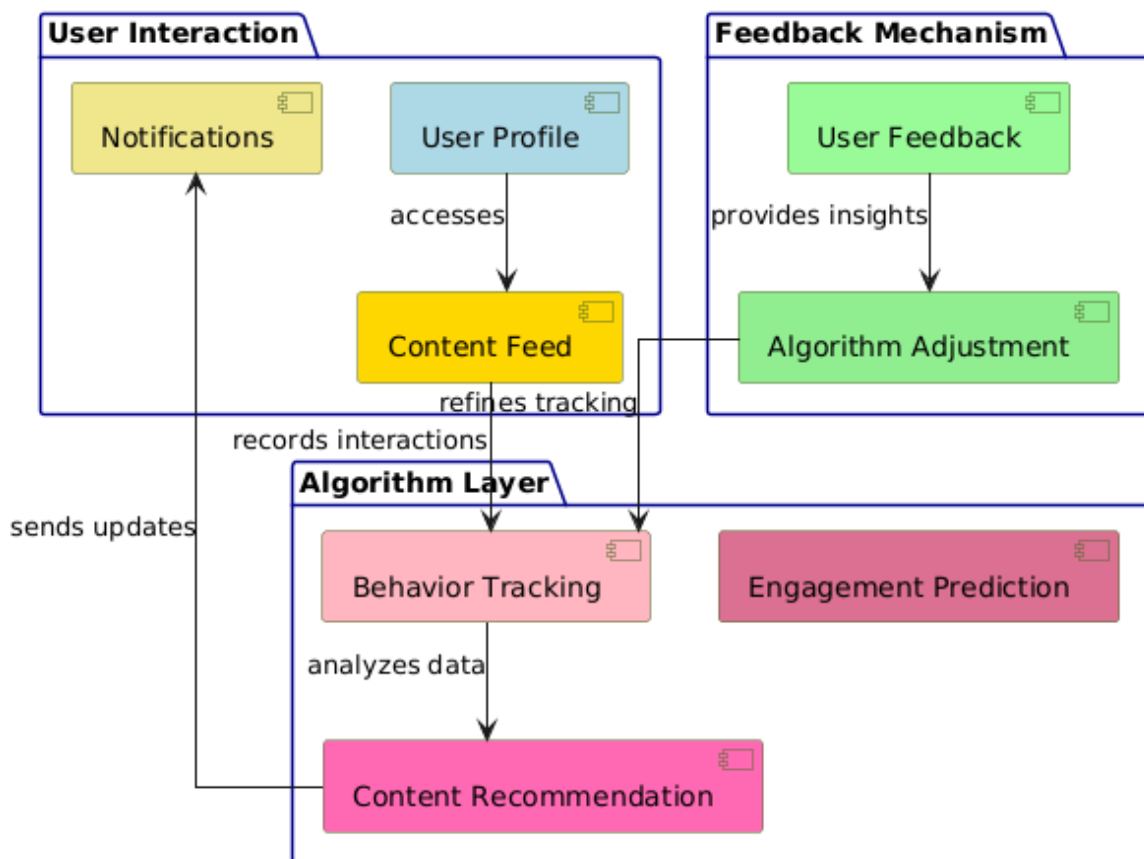


Figure 3. Social media interaction and feedback loop framework.

```

if (UserData U is valid and complete) then
  if (User has enabled notifications) then
    NotificationPreference ←
    GetUserNotificationSettings(U)
  else
    NotificationPreference ← "Off"
  end if
else
  Return "User data invalid"
end if
ContentFeed ← []
EngagementScore ← 0
for (ContentItem c in ContentPool C) do
  if (c matches User's interests and preferences)
  then
    Add c to ContentFeed
  end if
end for
(ContentFeed is not empty) then
  for (ContentItem c in ContentFeed) do
    Engagement ← PredictEngagement(c, U)
    if (Engagement > EngagementThreshold) then
      Add c to RecommendedContent R
      EngagementScore += Engagement
    end if
  end for
else
  Return "No matching content"
end if
Feedback ← GetUserFeedback(U, R)
UpdateAlgorithm(Feedback)
StoreToBlockchain(U, EngagementScore)
SendToUser(R)

```

Figure 4. Algorithm approach.

In Figure 4, social media platforms' algorithm models the conversion of user engagement using content recommendation both negatively, directly by controlling value destruction feedback loops. It first checks the user's data to ensure the user has all requirements, for example, the user can set up notifications or not. This information is then used by the system to filter content from an apparently general pool which may be of interest to the user due to the user's preference as well as activity on the site taking them to a "personalized feed" of sorts. Then in the prediction for each of the item of content the rate of level of engagement with relation to certain threshold value will be used to type of contents that are likely to engage the user will be selected. It is possible to create recommendations to save those high engagement content pieces and all the prediction sums for each user to a total engagement value. If the user interacts with this recommended content that information is used to fine tune in the recommendation process so it can learn what and when users need other things. All engagement data is finally stored on a blockchain which adds an extra layer of transparency and security. These three steps are the cycle which allows optimizing the delivery of the content, rising the engagement and heavy FoMO based interaction supported by data reliability through blockchain integration for the secured tracking feedback.

Simulation Parameters

The Table 3 also gives an overview of the social media engagement metrics. The site currently has thousands of users, and only seven and a half thousand users are active. Of all the users, the mean

number of daily interactions are 3.2, in addition to 500 recommended content items per day. Currently the engagement threshold is set at 0.5 which means to be classified as engaged, the user is expected to reach that figure which is half an amount. The click-through rate is 25% while the user retention rate stands at 70%, this demonstrates how many users continue to use the platform at different times after initial sign-up. In addition, 60% of the users are driven by the FoMO, which draws attention to this factor as a factor driving user interactions.

Table 2. Social media engagement metrics.

Parameter	Value
Total Users	10,000
Active Users	7,500
Average Daily Engagement	3.2 interactions/user
Content Items Recommended	500
Engagement Threshold	0.5 (50%)
Click-Through Rate (CTR)	25%
User Retention Rate	70%
Percentage of FoMO-driven Engagement	60%

RESULT ANALYSIS

Table 3 provides fundamental data across interactions on social media platforms and the efficacy of algorithms. We recorded 24,000 engagements, 32% of those that could have happened. Among them, 10,000 interactions are to recommended content representing 40% of total engagements (Figure 2). I found that user engagement with feedback systems is nearly 15% with a feedback response rate of 1,500, meaning 15% of users who responded to the feedback were engaged with feedback systems. It can predict or recommend content with 85% accuracy, suggesting that the algorithm is able to provide users with relevant content [19].

Table 3. Social media interaction and algorithm performance metrics.

Metric	Value	Percentage
Total Engagements	24,000	32%
Recommended Content Interactions	10,000	40%
Feedback Response Rate	1,500	15%
Algorithm Accuracy	85%	85%

The Figure 5(a–d) are graphs of trends in user engagement and feedback on a social media platform over time, and by content type. Total engagements in graphs (a) and (b) steadily upwards over the span of 10 days, reaching nearly 25,000 by day 10 and increase in user interactions. Figure 5(c) presents interactions by content type and it shows that the strongest level of interaction was with the video content at about 4,000 interactions followed by images at 3000 and text at 2500, reflecting the importance of video. Controlling for a large amount of potential noise from burst transmission, Figure 5(d) shows feedback response rate starting at 10% on day 1 and steadily increasing to approximately 35% by day 10, a positive trend in user feedback. They collectively reveal how user engagement expands, what content they chose to be interested in, and how feedback interests are increasing over time [20].

CONCLUSIONS

This research paper explores the psychological factors behind social media addiction and how psychological and behavioral issues triggers excessive use of social media and the role of social media algorithms to manipulate our opinions and to fuel the sense of FoMO. Release of dopamine hormone is one of the major factors behind social media addiction which provide short-term pleasures like reels, posts, likes, comments, and notifications that create a cycle like drug addiction. This research

paper explains that social media addiction is interrelated to psychological behaviors, social media machine learning algorithms and FoMO. All these factors contribute equally to isolation, lower self-esteem, mindless scrolling, reducing productivity, and depression. Especially in teenagers there is high level of FoMO which makes them insecure day by day. Social media addiction also disturbs time distortion and sleeping schedules. People now have become slaves of social media platforms. This research paper concludes with social media is an asset for our society, but its abnormal usage can become a curse to our society especially for youth.

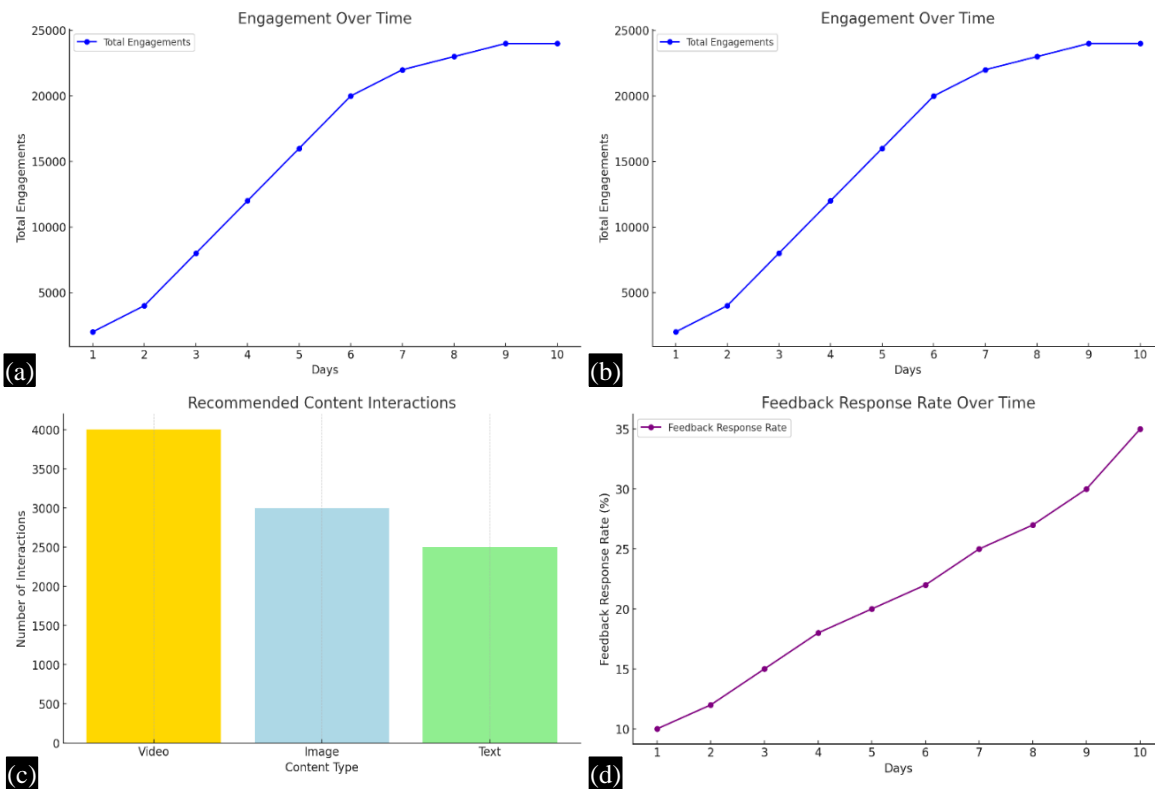


Figure 5(a-d). Social media user engagement and feedback analysis.

Future Work

The future scope of the research paper addresses the limitations of multiple prominent areas to understanding social media addiction. It also explores time distortion during social media use and nonuse and analyzes the consequences on psychological behaviors and mental well-being. Machine learning algorithms of social media platforms boost mindless scrolling which is very similar to drug addiction. It can even manipulate the behaviors and opinions of users by showing content in repetitive loop or raising issues like viral fake news. The relationship between social media addiction and FoMO should be examined in-depth in the context of diverse cross-culture and geopolitics. The paper also emphasizes comprehensive analysis on the relationship between emotional health, personality traits, and social media addiction. Future research calls for more intelligent intervention techniques to reduce social media addiction, to crack the hidden power of social media algorithms, enhance emotional well-being, and to get out of this trap of FoMO. Furthermore, detailed research should be conducted to analyze the contribution of social media advertisement, interaction between user and chatbots and AI tools in social media addiction by exploiting user mental health and behavior.

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