

COMPUTER SCIENCE AND SOCIAL MEDIA IMPACTS ON MENTAL HEALTH

1. Amit Srivastava, Assistant Professor, National P.G. College, Lucknow, amit__sri_in@yahoo.com
2. Harshita Singh, Undergraduate (BCA), National P.G. College, Lucknow, harshita2911singh@gmail.com
3. Poorvi Srivastava, Undergraduate (BCA), National P.G. College, Lucknow, poorvisrivastava06@gmail.com

KEYWORDS

SOCIAL
MEDIA,
MENTAL
HEALTH,
SOCIAL
MEDIA
EFFECTS,
MACHINE
LEARNING
APPLICATION
AND MENTAL
HEALTH.

ABSTRACT

This research paper examines the complex connection betwixt using social media and outcomes of mental health, discussing how modern digital settings affect people's psychological well-being. It highlights the advantages and disadvantages of social media use after the extensive analysis. About 60% of the global population are on one or other social media platforms and this stat is increasing with each passing year. Our study examines the impact of social comparison, online support groups, and cyberbullying on mental health. We look for patterns and correlations by using a mixed methods approach that includes questionnaire and content analysis on a range of demographic groups. We also applied various algorithms on the data gathered through survey. Throughout the research process, ethical considerations are crucial for maintaining participant confidentiality and protecting the participants' well-being. This work appends to our understanding of the intricate nexus between use of social media and mental health by providing evidence-based tactics and implications

for future research initiatives aimed at enhancing digital well-being.

1. INTRODUCTION

In this contemporary world, nobody is ignorant about various social media platforms. Even the toddlers and preschoolers know how to swipe up to jump on next Instagram reel or YouTube shorts. It is indisputable that there is a huge impact of social media on our daily lives in the modern world. The exponential increase in social media use has changed how we connect, communicate, and get information. It has become increasingly important to study the correlation between social media and mental health as the platforms are evolving constantly. Given the significant influence this relationship can have on people's well-being; it is not only timely but also crucial to comprehend its ramifications.

Mental health, a cornerstone of overall wellness that refers to a person's emotional, psychological and social well-being is closely related to the digital environments we live in. Mental health disorders like depressive and anxiety disorders is growing every year due to various factors. The never-ending scroll, constant connectivity, and carefully chosen information create an environment where the distinction between online and offline life is blurred. The introduction of machine learning algorithms and other technological aspects into social media platforms raises new questions about how to understand the psychological repercussions of our online interactions.

It is critical to understand that the experience with social media and mental health differs from person to person. Individual resilience, coping strategies, and offline support networks are just a few examples of the variables that greatly influence how people are affected by their online interaction.

For this, we have conducted a small online survey questionnaire among our acquaintances using google forms to better comprehend and address the complex relationship between mental health and social media.

2. THE ONLINE SURVEY

Our survey form consists of questions like-

- Age and Gender
- Frequency of using social media?
- Average time spent on social media per day?
- Have you ever experienced cyberbullying or negative interactions on social media?
- How would you rate your overall mental well-being?
- Have you ever felt pressured to present an idealized version of your life on social media?
- Have you ever participated in online support communities related to mental health?

and few others. [Survey Form Link](#)

Total of 110 responses were received in 22 days from December 27, 2023 to January 8, 2024. Out of which 61.8% were female while 38.2% were male. 63.6% were married while 31.8% were unmarried. 4.5% of the participants preferred not to say about their relationship status.

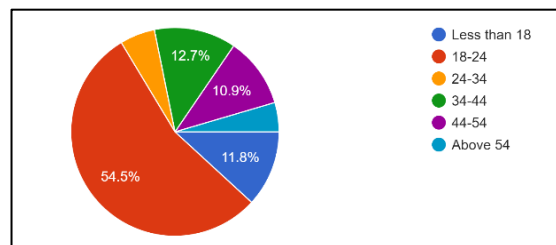


FIGURE 1 AGE GROUP DISTRIBUTION OF PARTICIPANTS

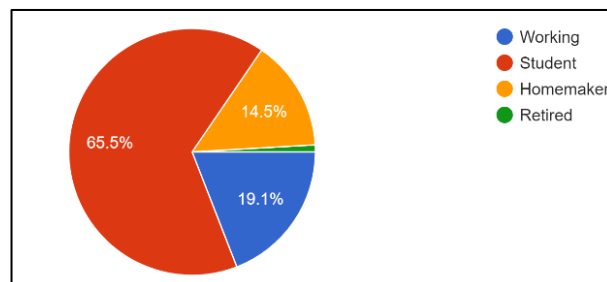


FIGURE 2 CURRENT WORKING STATUS OF PARTICIPANTS

3. SOCIAL MEDIA IMPACTS

The various social media platforms used nowadays are Facebook, Instagram, Snapchat, LinkedIn, and others like Discord, Telegram. We are not considering WhatsApp here since it is a chatting platform and more personal. While Instagram emerged as the most preferred platform, it is noteworthy that the age group 18-24 showed a higher inclination toward Instagram while other higher age groups preferred Facebook, suggesting a generational shift in platform preferences.

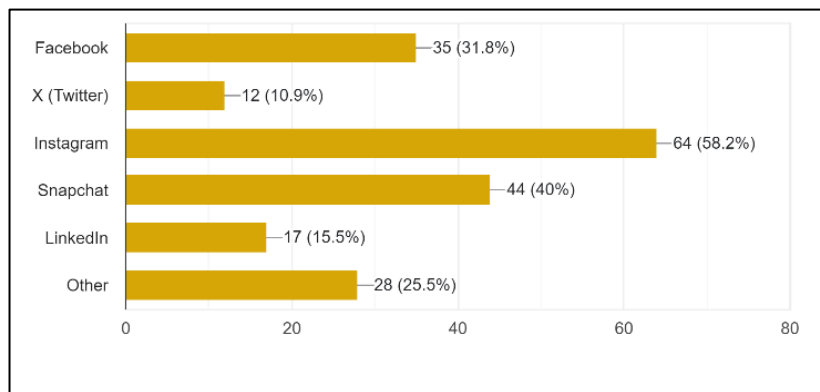


FIGURE 3 VARIOUS SOCIAL MEDIA PLATFORMS

The impact of social media on mental health is a complex and multifaceted issue. While social media platforms offer various benefits, such as connecting people globally and providing a space for self-expression, they pose potential risks to mental well-being. Here are some ways in which social media can affect the mental health of individuals:

3.1 SOCIAL COMPARISON

Exposure to well-polished and idealized representations of others' lives on social media can cause social comparison, potentially resulting in feelings of inadequacy, low self-esteem, and increased stress. 41.8% of the respondents rarely, 24.5% occasionally, 11.8% frequently while 21.8% of the respondents claimed that they never engage in social media comparison while using social media.

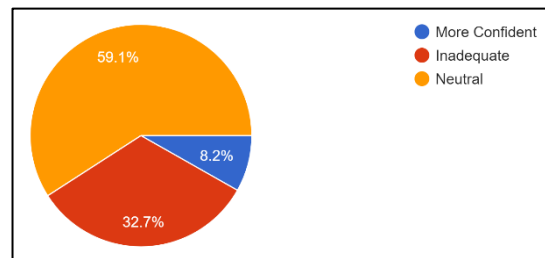


FIGURE 4: PEOPLE'S FEELING AFTER

3.2 CYBERBULLYING AND NEGATIVE SOCIAL FEEDBACK

Social media platforms can become hotbeds for cyberbullying, which can have serious consequences on the mental health of victims. Online threats, harassment and humiliation, and can contribute to anxiety and depression. Negative comments, criticism, or online conflicts can adversely affect mental well-being, causing stress, anxiety, and even depression. 80.9% of the respondents hardly experienced cyberbullying or negative interactions on social media. Since this survey covered limited people, majorly possessing private accounts. Various famous personalities, celebrities, social media influencers were not part of it who usually handle public accounts. They frequently face backlashes and trolling on their actions and posts. Had they been part of this survey, the statistics would have been other way round.

3.3 FEAR OF MISSING OUT (FOMO)

Constant updates on social media about others' activities may contribute to a fear of missing out (FOMO). This fear can lead to feelings of loneliness, isolation, and a sense of not measuring up to peers. 35.5% of the respondents experienced FOMO at least once in their lives.

3.4 ADDICTION AND DISTRACTION

Excessive use of social media, leading to addiction, can negatively impact mental health by reducing real-world social interactions, disrupting sleep patterns, and contributing to feelings of isolation. 17.3% of the people agreed that they are addicted to social media while 33.6% people sometimes and 49.1% of the respondents felt they are not addicted to social media.

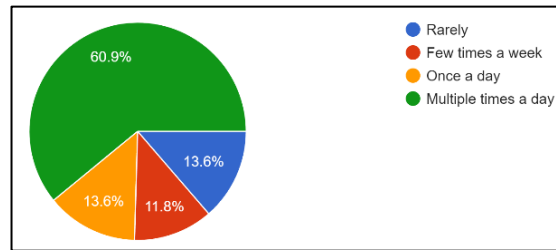


FIGURE 5 FREQUENCY OF USING SOCIAL

3.5 BODY IMAGE CONCERN

Exposure to idealized body images on social media can contribute to body dissatisfaction and related mental health issues, especially among individuals prone to or struggling with eating disorders. 41.9% of the participants have felt pressured to present an idealized version of their lives on social media.

3.6 PRIVACY CONCERNS

Worries about personal data privacy, online security, and the potential misuse of information can contribute to heightened stress and anxiety.

3.7 POSITIVE EFFECTS

Talking about positive side, social media can also serve as a platform for emotional support, community building, and sharing of mental health resources. Online support communities can provide a sense of belonging and understanding.

Impact on Mental health	No. Of Respondents
Very Positively	2
Positively	15
Neutral	66
Negatively	23
Very Negatively	4

TABLE 1 POSITIVE EFFECTS

3.8 IMPACT ON SLEEP PATTERNS

Excessive use of social media, especially before bedtime, can contribute to sleep disturbances, affecting overall mental well-being. About 50.9% of the respondents believe that social media has more or less affected their sleep pattern.

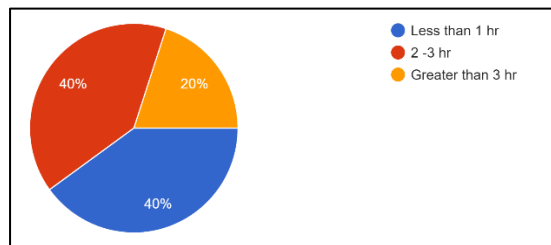


FIGURE 6 DURATION OF USING

3.9 FILTER BUBBLES AND ECHO CHAMBERS

Social media algorithms may develop filter bubbles, where ones are exposed to information and viewpoints that go down well with their preconceived notions. This can contribute to polarization and reinforce biased perspectives, impacting mental health by limiting exposure to diverse viewpoints. 96.3% of the respondents believe that people and their lives are not exactly same as they pose it on social media while 46.4% participants doubted that their life is not the same as it is apparent on social media.

4. FLIP SIDE OF THE COIN

While social media often faces criticism for its potential negative effects on mental health, it also has several positive impacts.

The participants of the survey, on the other hand, also believe that social media platforms can serve as valuable sources of emotional support and connection, allowing individuals to maintain relationships and stay connected with friends and family, especially in today's globalized world. Sharing personal experiences, achievements, and positive moments on social media can foster a sense of accomplishment and self-worth. Moreover, online communities provide lobby for people with similar interests or shortcomings to seek support and understanding. Educational content and mental health

resources are easily accessible, promoting awareness and offering coping strategies. When used mindfully, social media can contribute positively to mental well-being by fostering a sense of community, promoting self-expression, and facilitating the exchange of supportive information.

5. APPLICATION OF MACHINE LEARNING ALGORITHMS

The size of the dataset is 17 columns and 110 entries collected from the survey so far. There are 88 samples in our training set after the train-test partition.

We have applied three machine learning algorithms on the dataset. These are Random Forest, Decision Tree and XG Boost.

Algorithms	Accuracy	Precision		Recall	
		0	1	0	1
Random Forest	64%	0.72	0.25	0.81	0.17
Decision Tree Classifier	55%	0.69	0.17	0.69	0.17
XG Boost	73%	0.78	0.50	0.88	0.33

TABLE 2 COMPARATIVE ANALYSIS OF DIFFERENT

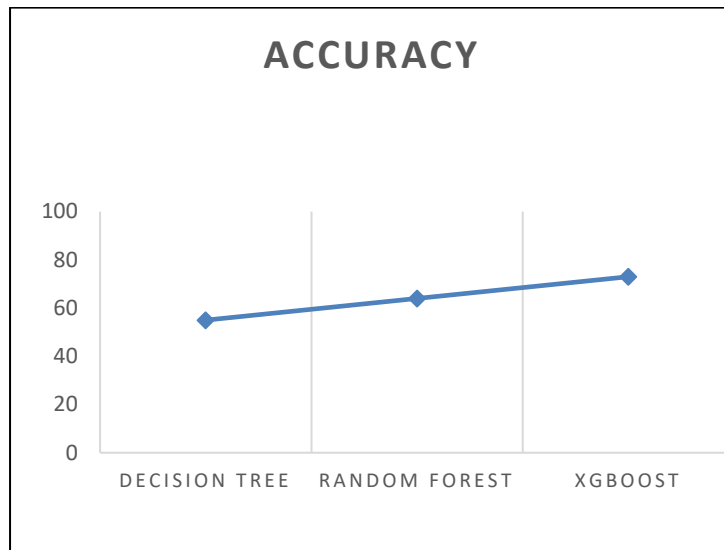


FIGURE 7 ACCURACY CHART

We can observe that XG Boost is most accurate among all the three and can be used for prediction.

XG Boost-According to the classification report, the model has a reasonably high F1-score and performs well for Class 0 in terms of precision and recall. In contrast, the precision, recall, and F1-score for Class 1 are lower, indicating that the model has difficulty accurately identifying occurrences of Class 1. While accuracy serves as a gauge of general correctness, a more thorough assessment of imbalanced datasets must take into account additional metrics like as precision, recall, and F1-score.

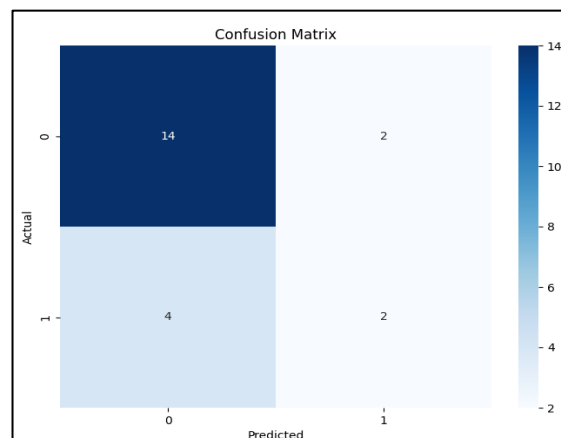


FIGURE 8 CONFUSION MATRIX FOR

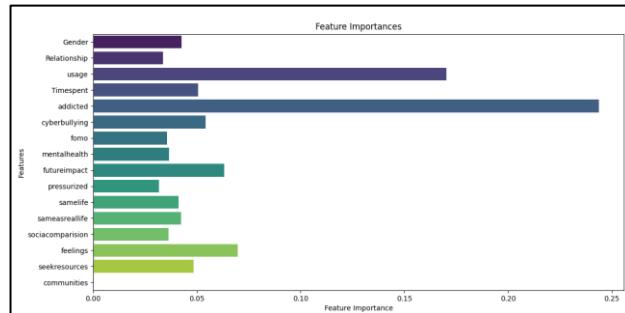


FIGURE 9 COMPARATIVE WEIGHTAGE OF

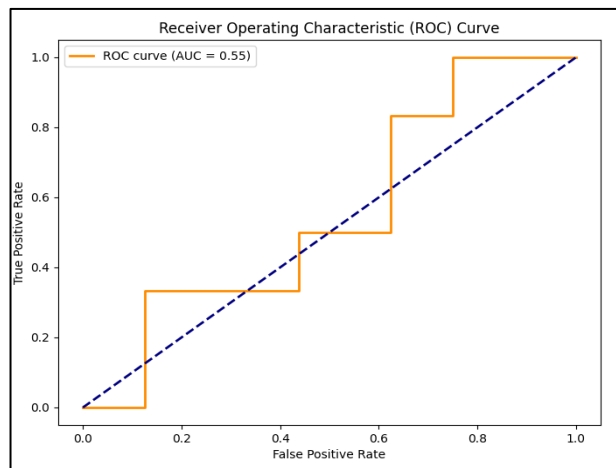


FIGURE 10 ROC CURVE FOR XG BOOST

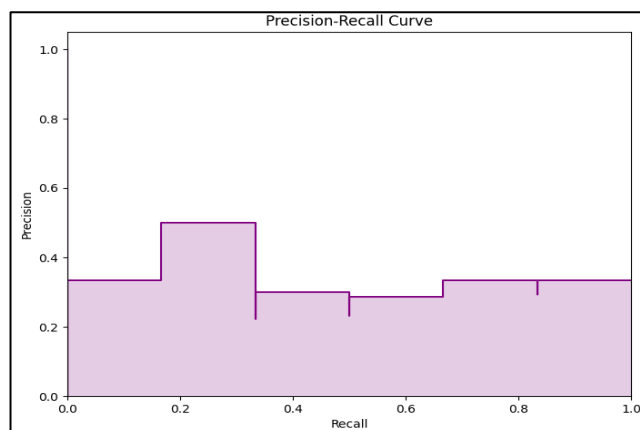


FIGURE 11: PRECISION-RECALL CURVE

6. CONCLUSION AND FUTURE SCOPE

Among all the participants of the survey, 81.8% rated their overall mental well-being “Good” while 10% “Excellent” and 8.2% “Poor”. In the realm of mental health, individuals face a crucial choice between seeking support online or offline. The digital era provides anonymity and immediate resources through online platforms, while face-to-face interactions with mental health professionals offer a more traditional yet vital avenue. Even with more transparency, societal stigma is still a powerful barrier. Merely 29.1% of the respondents proactively look for mental resources or assistance on the internet, and 9.1% have engaged in mental health-related online networks. It is imperative to eradicate this stigma in order to create settings where people are empowered to put their mental health first without worrying about being judged. Although this study offers a quick overview of current trends, more research and analysis are encouraged. The recognized shortcomings highlight the need for more study in this developing topic. Ultimately, this research aims to inform ongoing discussions surrounding the digital age's influence on mental health, paving the way for future examinations and actions that put people's safety online first.

7. ACKNOWLEDGEMENT

We extend our heartfelt thanks to our mentor Mr. Amit Srivastava, Assistant Professor for his invaluable guidance. Special appreciation to our college, National Post Graduate College for providing this opportunity to us. Gratitude to our active participants of our survey without whom this research paper would have never seen the light of the day. Finally, thanks to our friends and families for their unwavering support.

8. REFERENCES

- Boulianne, S. (2019). Revolution in the making? Social media effects across the globe. *Information, communication & society*, 22(1), 39-54.
- Valkenburg, P. M. (2017). Understanding self-effects in social media. *Human communication research*, 43(4), 477-490.

-
- Karim, F., Oyewande, A. A., Abdalla, L. F., Ehsanullah, R. C., & Khan, S. (2020). Social media use and its connection to mental health: a systematic review. *Cureus, 12*(6).
 - Mayfield, A. (2008). What is social media.
 - Asur, S., & Huberman, B. A. (2010, August). Predicting the future with social media. In *2010 IEEE/WIC/ACM international conference on web intelligence and intelligent agent technology* (Vol. 1, pp. 492-499). IEEE.
 - Taprial, V., & Kanwar, P. (2012). *Understanding social media*. Bookboon.
 - Pantic, I. (2014). Online social networking and mental health. *Cyberpsychology, Behavior, and Social Networking, 17*(10), 652-657.
 - Coyne, S. M., Rogers, A. A., Zurcher, J. D., Stockdale, L., & Booth, M. (2020). Does time spent using social media impact mental health?: An eight year longitudinal study. *Computers in human behavior, 104*, 106160.
 - Berryman, C., Ferguson, C. J., & Negy, C. (2018). Social media use and mental health among young adults. *Psychiatric quarterly, 89*, 307-314.
 - Greenblatt, M., Becerra, R. M., & Serafetinides, E. A. (1982). Social networks and mental health: on overview. *The American journal of psychiatry, 139*(8), 977-984.
 - Hajli, M. N. (2014). A study of the impact of social media on consumers. *International journal of market research, 56*(3), 387-404.
 - Amedie, J. (2015). The impact of social media on society.
 - Ortiz-Ospina, E., & Roser, M. (2023). The rise of social media. *Our world in data*.
 - Siddiqui, S., & Singh, T. (2016). Social media its impact with positive and negative aspects. *International journal of computer applications technology and research, 5*(2), 71-75.
 - https://en.wikipedia.org/wiki/Social_media
 - <https://www.britannica.com/topic/social-media>
 - <https://www.merriam-webster.com/dictionary/social%20media>
 - Moroney, E., Lee, S. S., Ebbert, A. M., & Luthar, S. S. (2023). Digital media use frequency, online behaviors, and risk for negative mental health in adolescents in high-achieving schools. *Clinical Child Psychology and Psychiatry, 28*(1), 237-254.
 - Sujarwoto, Saputri, R. A. M., & Yumarni, T. (2023). Social media addiction and mental health among university students during the COVID-19 pandemic in Indonesia. *International journal of mental health and addiction, 21*(1), 96-110.

-
- Naslund, J. A., Bondre, A., Torous, J., & Aschbrenner, K. A. (2020). Social media and mental health: benefits, risks, and opportunities for research and practice. *Journal of technology in behavioral science*, 5, 245-257.
 - Chancellor, S., & De Choudhury, M. (2020). Methods in predictive techniques for mental health status on social media: a critical review. *NPJ digital medicine*, 3(1), 43.
 - Abi-Jaoude, E., Naylor, K. T., & Pignatiello, A. (2020). Smartphones, social media use and youth mental health. *Cmaj*, 192(6), E136-E141.
 - Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents. *International journal of adolescence and youth*, 25(1), 79-93.
 - Hou, F., Bi, F., Jiao, R., Luo, D., & Song, K. (2020). Gender differences of depression and anxiety among social media users during the COVID-19 outbreak in China: a cross-sectional study. *BMC public health*, 20, 1-11.
 - Kross, E., Verduyn, P., Sheppes, G., Costello, C. K., Jonides, J., & Ybarra, O. (2021). Social media and well-being: Pitfalls, progress, and next steps. *Trends in cognitive sciences*, 25(1), 55-66.
 - Giumetti, G. W., & Kowalski, R. M. (2022). Cyberbullying via social media and well-being. *Current Opinion in Psychology*, 45, 101314.
 - Orben, A. (2020). Teenagers, screens and social media: a narrative review of reviews and key studies. *Social psychiatry and psychiatric epidemiology*, 55(4), 407-414.
 - Jiloha, R. C. (2020). COVID-19 and mental health. *Epidemiology International (E-ISSN: 2455-7048)*, 5(1), 7-9.
 - D'Alfonso, S. (2020). AI in mental health. *Current Opinion in Psychology*, 36, 112-117.
 - Health, T. L. G. (2020). Mental health matters. *The Lancet. Global Health*, 8(11), e1352.