

Analysis of Algorithmic Content Curation for user Engagement and Information Diversity on Social Media

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Abstract. The ubiquity of social networking sites (SNS) has transformed the way individuals connect and communicate in the digital age. This research investigates the impact of algorithmic content curation on user engagement and information diversity within a popular social networking platform. The proposed system uses a mixed-methods approach, combining quantitative analysis of user interactions with qualitative insights gathered through user surveys and interviews. The study focused on a sample of 1,000 active users, tracking their interactions with content over a six-month period. Additionally, qualitative data was collected through in-depth interviews with a subset of users to understand their perceptions and experiences related to algorithmic content recommendations. Key findings indicate a significant correlation between algorithmic content curation and user engagement metrics. However, the study also reveals a potential downside in terms of information homogenization, as users tend to be exposed to a narrower range of content aligned with their existing preferences. This phenomenon raises concerns about the potential formation of echo chambers and the impact on the diversity of opinions and information dissemination. The implications of these findings extend to the design of algorithmic recommendation systems on social networking sites and their broader societal effects. As social media platforms play an increasingly central role in shaping public discourse, understanding and addressing the challenges posed by algorithmic content curation is crucial for fostering a more informed and diverse digital public sphere. This research contributes to the growing body of literature on the social dynamics of online platforms and provides valuable insights for both scholars and practitioners seeking to balance personalized content recommendations with the need for diverse and inclusive online spaces.

Keywords: Social Media, Content Curation, user engagement metrics, user surveys

1 Introduction

In recent years, the advent of social networking sites (SNS) has fundamentally transformed the landscape of Interpersonal communication and information dissemination. Platforms such as Facebook, Twitter, and Instagram have become integral components of the modern social fabric, reshaping how individuals connect, share, and consume information. Understanding the dynamics of social networking sites is paramount as these platforms wield substantial influence over public opinion, online communities, and individual behaviors.

The proliferation of social networking sites has introduced a myriad of opportunities and challenges, raising important questions about their societal impact. As individuals increasingly turn to these platforms for social interactions and information consumption, it becomes imperative to scrutinize the mechanisms that govern content dissemination and user engagement. At the forefront of this inquiry lies the role of algorithmic content curation, an omnipresent feature in most social networking sites.

The research problem at the core of this study revolves around the consequences of algorithmic content curation on user engagement and the diversity of information encountered by users. Specifically, we aim to investigate how algorithm-driven recommendation systems influence the content users are exposed to, and subsequently, the nature of their engagement with that content. This study seeks to unpack the intricate interplay between user preferences, algorithmic curation, and the potential implications for the diversity of information within these online ecosystems.

This paper is structured to provide a comprehensive exploration of the research question outlined above. Following the introduction, the subsequent sections are organized as follows:

Literature Review: A thorough examination of existing research on social networking sites, algorithmic content curation, and their effects on user behavior. This section aims to establish a foundation for the current study by synthesizing relevant theories and empirical findings.

Methodology: An elucidation of the research design, data collection methods, and tools used to investigate the research question. This section will detail the quantitative and qualitative approaches employed to analyze user interactions and gather insights from users themselves.

Data Analysis: Presentation and interpretation of the findings derived from the analysis of user interactions and qualitative data. This section aims to unveil patterns, correlations, and insights into the impact of algorithmic content curation on user engagement.

Discussion: An exploration of the implications of the research findings, contextualized within the broader landscape of social networking sites. This section will also address the limitations of the study and propose directions for future research.

2 Literature Survey

[1] The paper concentrates on gauging the existing landscape of the real time classification of the user generated content from social media. The analysis investigates the parameters of training and testing the data, that is required for testing the data, also discusses the normalization techniques, machine learning techniques, and their classification performance is compared. The review focused on 15 classification algorithms of 25 studies between 2014 and 2018. The classification algorithm included classification algorithms, including Support Vector Machine, Bayesian Classifiers, Decision trees and emerging neural network approaches. It recognizes the extensive use of domain-specific collection of data through APIs and the frequent practice of comparing algorithms by using datasets that have been published earlier. It emphasizes the common occurrence of collection of domain-specific data through APIs and the standard process of gauging the data that is published already in prior. The study infers that the conventional text mining methods are appropriate for analyzing real time data in social media, because of the consistent techniques noted in data normalization and processing. [2] The fundamental idea guiding the development and implementation of the Acropolis virtual environment is to encourage and boost the engagement of the citizens in the formulation of the user-curated chronicles deep and long-lasting news stories. The existing issue involves gauging 2 important aspects namely the ability of an environment such as Acropolis to give authority to the citizens and secondly, to investigate how the tools can be employed to aid the work of the professional curators. [3] In the earlier days, the only means to access the social media platforms like facebook, and ecommerce website like Amazon and eBay were through desktop computers, however with the rise of mobile technology, these services are now extensively utilized on mobile devices. To adopt to this transition, a solution has been orchestrated to allow the users to access publications and a curated cancer mutation database directly on their mobile devices, complete with daily automated updates. This recognizes the upcoming trend of mobile usage and offers comfortable access to valuable information for the users dynamically.

[4] Blogs are an essential criterion of Web 2.0; they were commonly called Read-Write Web, enabling users to craft online journals and share valuable foresights on an extensive range of topics across the globe. As platforms of blogging have acquired a soaringly high popularity, users have the liberty to opine their ideas, and express their opinions without any reservations, share personal experiences, and present their unique perspectives. With the given limited time constraints, it is challenging to extract important information. The paper suggests a novel approach that will automate the process of fetching data from blog posts in accordance with the preference of the

user, users' knowledge experience. The proposed content curation method amalgamates efficient searching and rating algorithms within a structured blog model, thus tacking the gaps present in the existing systems and highlighting key blog characteristics. [5] It becomes highly important for the users to not only utilize the information through social news websites but also provide to their ranking; this has been proposed as the crowd sourced curation of news and information has become extensively common. The proposed work brings in a new dataset that includes activity logs that has documented all activities of 309 Reddit users over a year. Employing this new data, the paper depicts the browsing behavior and voting behavior of the participants in the study. The results depict that extensively high number of users vote on articles without reading them, and 73% of posts being rated without viewing the content. The voting could be upvoting or downvoting. Further, the paper also shows that what is attributed to voting behavior is because of traces of cognitive fatigue of the users while browsing. [6] This paper brings to light the eating disorders, their occurrence in society, and the influence of social media, particularly Twitter, on ED-related discussions. It highlights a method called EDBase, that is employed to create a thorough ED lexicon for automatic content analysis. By collecting ED-focused tweets and training an ED word embedding model, the method extends the lexicon utilizing a novel hierarchical density-based algorithm. The resulting EDBase includes 3794 high-quality ED terms and outweighs existing methods, promising significant impact in health data science and healthcare communities.

[7] attempts to explore the possibility of extracting important information from social media data using Social Network Analysis (SNA). The authors use centrality and graphical visualizations to map the interconnections with nodes in a social network to identify the network dynamics. Even though manually the interconnections can be identified in smaller networks, humongous size of online social media brings in the challenge of scaling up the manual process and underlines the need of automated tools to extract the data and interconnections. The paper proposes techniques to explore and carry out comparative analysis of various SNA tools based on their features and limitations. [8], the authors have carried out a detailed literature survey on understanding the impact of social media on information spreading and relationship analyzing. Through this study, the authors have outlined a commonly adapted pipeline for developing applications based on social media along with suitable data analytics. The concepts like sentiment analysis, network analysis, time series analysis etc. are explored. The major goal of this study is to identify the impact of such social media-based applications in three categories such as healthcare, disaster management and business. The paper also suggests the possible directions of research work in incorporating emerging techniques with social media-based applications. In [9], the authors have proposed to utilize the behavioral data generated from social media to enhance the user engagement in various sectors. The domain chosen in this paper is the libraries, archives, and Museums (LAM). Social media content analysis leads to understanding behavioral patterns of users across the globe and this can be analyzed to understand the expectations of the end users who come to explore LAMs. Two aspects can be improvised from this data - the contents that need to be exhibited in LAMs as well as the online content developed for social media platforms where LAMs project their presence can be fine-tuned.

[10] explores the advantages of machine learning in doing predictive analysis of social media data. Over the period, social media sites have evolved into large data repositories. A thorough analysis of this social media data can generate useful information about the user trends, user behavior, connections etc. The authors are taking advantage of machine learning models to explore and analyze social media data identify potential challenges and limitations from user behavior patterns. Authors point to future directions of predictive analysis into privacy concerns and data quality.[11] discusses the concept of content curation in social media platforms and its impacts. Even though the idea of content curation is to enhance the user experience by introducing personalized user experience, many times, content curation leads to polarization of user behavior. In a social media network, network connectivity and content quality are important aspects and when considering those parameters along with content curation, the impact of content curation reduces. The authors also put an effort to discuss the impact of content filtering and attempts to map a relation between level of content filtering with polarization of user behavior. [12] discusses on content curation algorithms used in online social media, its impact on misinformation, formation of echo chambers etc. among online users. The initial part of the study focuses on understanding the impact of such opaque newsfeed curation algorithms exist and second part analyzes the impact with the help of agent-based modelling. The authors successfully contributed to the understanding of the impact of newsfeed content curation on misinformation among online social media and developed a model to study the impact of such

algorithms using agent-based modelling. As an example, authors have verified their claim with real time twitter data. [13] analyzes the social media platform to come up with relationship between various nodes in a graph. Graphs are used in a variety of domains to visualize the interconnection between the entities. By analyzing the social media platform and the behavior pattern, authors have identified relationships and constraints between vertices of the graph. This acquired knowledge can be applied to a variety domains like physics, chemistry etc.

In [14], the authors have analyzed the evolution of social media in shaping / influencing the behavior of users by the content shared by other users. The work focuses on understanding the influence of social media in shaping the behavior of youths. To achieve this understanding, authors have conducted quantitative and qualitative surveys among users on the impact of social media and mobile phones. The result of the survey largely revolved around the understanding that social media has both positive and negative impacts and it heavily depends on the content being shared. Content curation or content filtering can be explored for balancing the impact.[15] reveals the impact of covid 19 on social media marketing across the globe. To develop a relationship between covid 19 and social media marketing, authors have extracted research articles on a similar line from Scopus and conducted bibliometric analysis using Biblioshiny which is an R-based software package. The study generated observations like countries which generated most of the documents of the similar behavior, countries which cited those documents mostly etc. The authors of [16] worked on understanding and suggesting social media as an evolving marketplace. The work aims in establishing the scope of social media as a marketplace and how an online user can extract maximum benefits from such an online mark scenario.

3 Social Media Analytics

Social media analytics involves the process of collecting, analyzing, and interpreting data from social media platforms to derive insights for strategic decision making. The process typically consists of several stages. Here's an overview of the key stages in social media analytics:

Define Objectives and Goals: Clearly articulate the objectives and goals of your social media analytics initiative. What specific insights are you seeking? Whether it's improving brand awareness, understanding audience sentiment, or measuring campaign effectiveness, defining goals is crucial.

Data Collection: Gather relevant data from social media platforms. This includes data from owned channels (e.g., brand profiles), earned media (mentions, shares, retweets), and paid media (advertising metrics). Social media APIs (Application Programming Interfaces) are often used to collect data programmatically as shown in fig 1

Data Processing and Cleaning: Process the raw data to make it usable for analysis. This stage involves cleaning the data, handling missing values, and ensuring consistency. Social media data can be vast and noisy, so preprocessing is essential for accurate analysis.

Data Storage: Organize and store the processed data efficiently. Depending on the volume of data, businesses might use databases, data warehouses, or big data technologies to store and manage social media data.

Data Analysis: Utilize statistical and analytical methods to derive meaningful insights. Common analyses include sentiment analysis, trend identification, audience segmentation, and content performance analysis. Advanced analytics techniques, such as machine learning, can also be applied for predictive modeling.

Visualization: Present the social media in a visual manner. Due to this we can easily remember as a picture in our mind. charts, graphs are used to represent a social media.

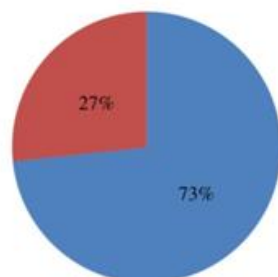


Fig. 1. Social Networks as E-learning Tool

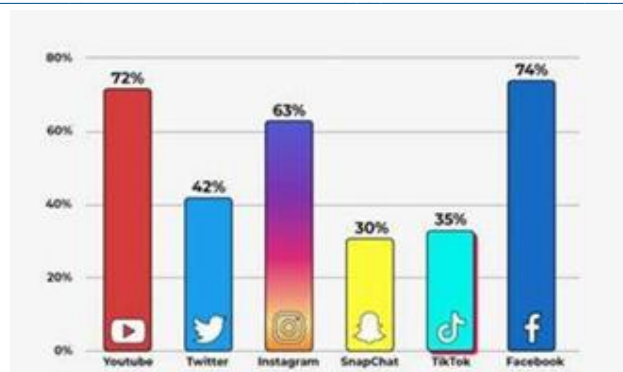


Fig. 2. Percentage of people using Social Media on a daily basis

By navigating through these stages systematically, organizations can harness the power of social media analytics to gain actionable insights and make informed decisions in the ever-evolving landscape of digital communication. Along with the benefits, there are implications also posed by social media use. Studies proved that health of youth gets affected by excessive use of social media mentioned in fig 2. Sentiment analysis of Youth-generated Content reveals that posts and comments to discern emotional states and well-being. Similar to mental health, there are educational implications also exists such as social media used in educational purpose like placements etc., social media is used for Skills Development as it can investigate how youth uses and utilizes social media and how it effects the youth. Social media influences youth behavior and this can be both positive or negative. The study examines challenges posed by social media such as cyberbullying, misinformation, and privacy concerns affecting youth in the digital space shown in fig 3.



Fig. 3. Social Media platforms and its usage

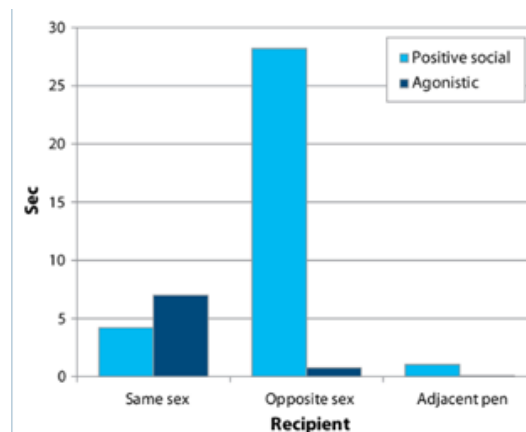


Fig. 4. Strategic Leveraging of Social Media Platforms

4 Strategic Leveraging of Social Media Platforms for Education and Career Development

Detailed analysis observed the fact that social media helps in educational arena as well as it enhances career opportunities. The study brought light to the following aspects where social media plays a vital role as shown in fig 4.

Educational Resources: Social media platforms offer a plethora of educational materials, from online courses to informative content, providing accessible and flexible learning opportunities for youth.

Information Sharing: The rapid sharing of information on social media allows youth to stay informed about current knowledge-sharing culture.

Career Opportunities: Social media serves as a powerful professional connection, discover job opportunities, and showcase their skills and achievements.

Creative Expression: Social media platforms provide a creative outlet for youth to express themselves through art, music, writing, and other forms of self-expression, fostering a vibrant online artistic community.

Community Building: Youth can form and participate in online communities centered around shared interests, hobbies, or causes, fostering a sense of community and mutual support.

Activism and Advocacy: Social media platforms amplify youth voices in social and political causes, providing a platform for activism, raising awareness, and mobilizing support for important issues.

Skill Development: Participation in online communities and engagement with diverse content on social media contribute to the development of digital, communication, and collaboration skills among youth.

Entrepreneurship Opportunities: Social media platforms offer a cost-effective means for young entrepreneurs to market their products or services, reach a wide audience, and establish their brand presence.

Cultural Exchange: Youth can engage in cross-cultural exchanges and connect with peers globally, fostering cultural understanding, tolerance, and building international friendships.

Real-Time Communication: Social media facilitates instant communication, allowing youth to stay in touch with peers, family, and colleagues, overcoming the limitations of time and distance.

Collaboration: Young people can collaborate on projects and initiatives seamlessly, breaking down geographical barriers through online platforms, leading to innovative and collective efforts.

Self-Expression: Social media provides a platform for individuals to express their thoughts, opinions, and emotions freely, encouraging a diverse range of voices and perspectives.

Mental Health Support: Online communities on social media can serve as safe spaces where young individuals facing mental health challenges find understanding, empathy, and valuable support.

Access to News and Updates: Social media platforms deliver real-time news updates, ensuring that youth are well-informed about current events and developments in various fields.

Language Skills Improvement: Engaging with diverse content on social media contributes to language skills improvement, as individuals interact with a variety of linguistic expressions and styles.

Learning Opportunities: Social media platforms often host webinars, workshops, and tutorials, providing additional learning opportunities for youth, promoting continuous skill development and knowledge acquisition.

Volunteerism and Charity: Social media enables the organization and promotion of volunteer activities and charitable initiatives, encouraging youth to actively participate in giving back to their communities.

Social Awareness: Youth staying connected to social media stay informed about social issues, fostering awareness, encouraging discussions, and inspiring action for positive change in society.

5 Detrimental Effects of Social Media on Youth Well-being

The second aspect of the study focuses on identifying the detrimental effects of social media on the well-being of youth. The study put forth the following aspects:

Cyberbullying: Social media platforms can be breeding grounds for cyberbullying, where individuals face harassment, threats, and embarrassment, leading to serious emotional consequences as depicted in fig 6.

Privacy Concerns: Users may inadvertently share sensitive personal information, risking identity theft or unauthorized access to private details, highlighting the ongoing challenge of privacy in the digital age.

Negative Impact on Mental Health: Excessive use of social media has been linked to mental health issues such as anxiety, depression, and low self-esteem, with constant comparison and societal pressure contributing to these problems as shown in fig 5.

Addiction and Time Management: Social media addiction is a real concern, negatively affecting time management, productivity, and real-life social interactions, raising questions about the balance between online and offline activities.

Fake news: The people who are spreading fake news will face severe consequences, which will influence to public opinion

Distraction due to social media: Excessive use of social media can act as a distraction for students, impacting academic performance and focus, leading to concerns about the effects on education.

Pressure and Social Comparison: As of now, people were busy in their own lives some are treating social media as the pressure

Reduced Physical Activity: Due to excessive use of social media they are not having physical exercise and due to this they were facing severe consequences

Effects the sleep: The use of social media will decrease the sleep and it effects the health and it decreases the energy levels

Destroy the relationships: Due to excessive use of social media it leads to decrease in communication and it destroy the relationships.

Normalization of Shallow Relationships: The prevalence of online connections may normalize shallow relationships, with emphasis on quantity over quality, potentially impacting the depth of personal connections.

Online Identity Issues: Social media encourages the creation of curated online identities, sometimes leading to a disparity between one's online persona and real-life self, raising questions about authenticity.

Distorted Body Image: Exposure to idealized body images on social media can contribute to body dissatisfaction and the development of unrealistic beauty standards among young people.

Addictive-behavior: These are designed to be addictive, with features such as notifications and likes, which are potentially leading to addictive behavior.

Pressure to Conform: Social media can exert pressure on youth to conform to societal norms and trends, potentially stifling individuality and creativity.

Privacy and Security Risks: They are privacy and security risks in social media which is hacking and morphing of photos using ai.



Fig. 5. Negative influence on mental well-being

6 Results

The study reveals the relation of growth of social media content and the various cyber challenges user community faces.

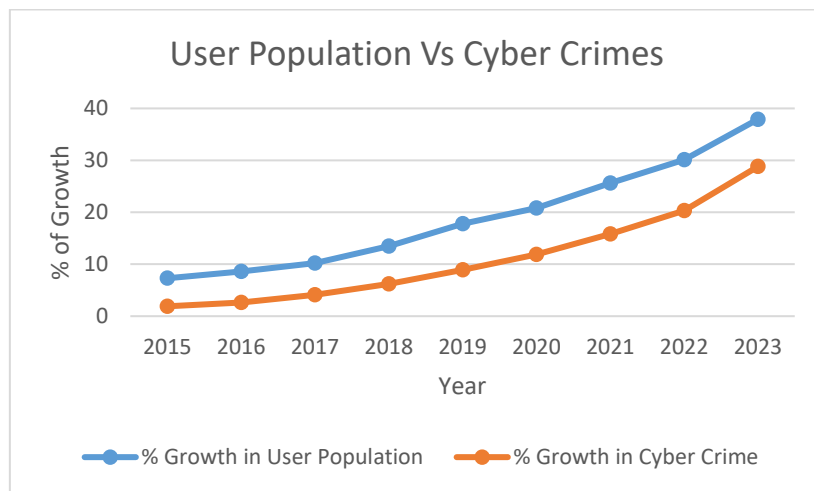


Fig. 5. Social Media User Population Vs Cyber Crimes through Social Media

Fig. 6 shows the growth of users exposed to various social media platforms and the growth of cyber-crimes related to social media.

7 Conclusion

In conclusion, this research has delved into the big digital data. Through a meticulous examination of various challenges and opportunities, it is identified the pivotal role of analytics in deciphering user behaviors, sentiments, and trends within the dynamic social media landscape. The integration of visualization techniques has proven to be instrumental in transforming raw data into actionable intelligence, offering stakeholders a comprehensive understanding of complex social networks and content dynamics. However, as the navigation of the evolving landscape of social media goes deeper, it is imperative to acknowledge the ongoing challenges, including issues of privacy, algorithmic bias, and the rapid evolution of platforms and user behaviors. The study contributes not only to the advancement of social media analytics methodologies but also underscores the ethical considerations essential in this domain. Striking a balance between data utilization and user privacy remains a paramount concern, demanding continual vigilance and adherence to evolving regulations. The insights gained from this research can inform the development of more robust analytics frameworks, ensuring that decision-makers possess the tools needed to navigate the ever-expanding and evolving digital space. Future research endeavors may explore enhanced algorithms, novel visualization techniques, and interdisciplinary approaches to further refine the understanding of social media dynamics. In essence, this research underscores the significance of social media analytics in informing strategic decision-making processes, crisis management, and communication strategies.

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