Improving Machine Learning Algorithms in Social Media Marketing
(Technical Topic)

Social Media Rise and Mental Health Decline
(STS Topic)

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On my honor as a University student, I have neither given
nor received unauthorized aid on this assignment as
defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction:

The rise of social media has made it an inescapable social convention that must be abided by in our modern society. It allows for us to connect with loved ones over pictures, internet memes, and viral humorous content; however, as it becomes a more and more prevalent tool in society, we must come to critique it for its benefits and harms. As it rises as a form of business and goes beyond just a medium through which we can engage with others, its power is something that is necessary to be acknowledged and dissected. The technical aspect of this paper will cover how machine learning is integral to the growth of social media marketing. It aims to understand how different social media algorithms are able to continuously engage their users and market content to them. The STS research portion aims to find a link between what social factors connect the rise of social media with the decline of mental health in our society. Using Actor Network Theory, the paper will connect these human and non-human parts to further our understanding of how they shape each other.

Technical Project: Understanding and improving machine learning algorithms in social media marketing

Social media has become an integral part of everyday life for almost everyone on the plant. It serves as a medium for news, entertainment, and in an increasingly prevalent way, a form of business marketing. Beyond online commerce chains like Amazon, other popular social media platforms like Instagram, Tiktok, and even Facebook have shopping features that are integrated into their general feed. As of 2022, the social media app market was valued at $49.09 billion and influence spending leaped to $4.4 billion (Forbes, 2023). As social media platforms change the landscape of e-commerce and bring forth new ways to enhance marketing and product sales, it is important to recognize how this is being done. Algorithms are built into social

media to improve not just the performance of the app but also grow user engagement and assure that users stay on the application for a maximum amount of time. Machine learning figures out better forms of marketing on social media by implementing algorithms to analyze extensive user data, such as content relevance, post popularity, and user behavior (Senthil Arasu et al., 2020). These trends, although not obvious to human marketers, can greatly impact the ways in which products are marketed to niche users, which in turn influences their sales and revenue.

One specific type of algorithmic work that is executed to yield better results in terms of social media marketing is search engine optimization (SEO). This is a way to maximize visibility of the content that is being marketed to people. By aiming to attract more consumers of niche content, businesses are able to grow their client base and earn more revenue (Erdmann et al., 2022). Keeping this in mind we are able to acknowledge that there are a variety of ways in which content can be marketed using machine learning. Comparing two of the most prominent social media applications on the market, Tiktok and Instagram, in my technical project I plan to assess their tactics on how they use machine learning to benefit their sales. Tiktok's algorithm is designed to understand user preferences quickly, utilizing factors such as watch time, engagement, and content relevance to curate a personalized feed (Klug et al., 2021). On the other hand, Instagram, with its diverse range of content formats, employs an algorithm that takes into account user behavior, interests, and engagement patterns (Agung et al., 2019). Analyzing this research on both of these successful applications will allow me to understand the value that each of their algorithms has. Finally, using research presented by Wu (et al., 2023) and other research on the use of artificial intelligence on marketing strategies, I hope to be able to determine which application is more adept for e-commerce, understand the success of both applications, and the way in which both algorithms can be improved upon to better fit spending trends.

<u>STS Topic:</u> Social Media Rise and Mental Health Decline

The rise of social media is undoubtedly connected to the decline in mental health. As social media becomes a commodity to have for personal as well as financial gain, it simultaneously puts a hostile affect on the mental health of those who engage with it. This STS research paper aims to uncover the social factors that contributed to the rise in use of social media and the declining mental health rates. Using the STS framework of Actor Network Theory (ANT), I plan to identify how social media usage and mental health have a mutual relationship where each have a strong impact on the state of the other. This framework is an appropriate one for the topic since ANT focuses on the connections made between human and non-human entities, which in this case is the mental health of humans and their usage of social media, respectively (Dankert, 2012). A very niche aspect of this that would be addressed with further research is the role that machine learning plays in the non-human aspect of ANT.

Despite social media platforms always having an addicting quality, it has been in recent years with their take off in terms of Influencer marketing and business that has made them so successful. Especially after the advent of the Coronavirus pandemic where most of the world was locked inside with little opportunity to have social engagement did these platforms innovate new ways to make them more addicting. In a study conducted on the relations among social media addiction, self-esteem, and life satisfaction in university students, it was reported that "As for relations, addictive use of social media had a negative association with self-esteem, and the latter had a positive association with satisfaction with life. Furthermore, path analysis showed that self-esteem mediated the effect of social media addiction on satisfaction with life." (Hawi, 2017). Social media inundates users with new content that oftentimes promotes exaggerated ideals and notions. This includes things like unrealistic body ideals or constantly changing trends that are

impossible to keep up with. Since many users of these applications are young adults who do not have a strong sense of self and also have grown up around these shifting social media trends, they are more vulnerable to fall trap to the unhealthy cycle of social media. Due to their limited capacity for self-regulation and their vulnerability to peer pressure, adolescents may not evade the potentially adverse effects of social media use, and consequently, they are at greater risk of developing mental disorders (Keles et al., 2020). Here it is identified that young adolescents of this age depend on social media as a way of connecting with their peers and forming their sense of self. This leads to social media being an unwavering part of modern young adulthood, assering the rise and popularity of social media usage. ANT would say that this relationship is cyclical, as mental health is dependent on social media content and social media is reliant on the mental health of its users.

Conclusion:

The technical portion of this paper aims to identify the algorithms used by social media applications Tiktok and Instagram to further their user engagement and also their marketing. Then, compared with prominent research on marketing strategies using artificial intelligence, I hope to be able to identify the most effective aspects of both. A deep analysis of all there is needed to validate any findings and assertions. The STS research portion of this paper looks into the connections between the rise of social media and decreasing mental health using the Actor Network Theory STS framework. It seeks out how both have evolved into what they have become now and how they continue to shape each other.

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