

Machine Learning in Social Media Account Analytics

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Abstract:

This paper presents an analytical study on strategies to increase engagement and follower growth across personal accounts (individuals, lifestyle, creators) versus professional accounts (businesses, brands, and organizations) on social media platforms such as Instagram, Twitter, and LinkedIn. Using a social media analytics framework, we compare content strategies, posting frequency, timing, audience targeting, and engagement metrics. Data was drawn from 50 real-world case studies, industry reports, and platform-level analytics. Findings reveal that personal accounts benefit from authenticity, storytelling, and interactive features, while professional accounts gain from consistent branding, niche targeting, and value-driven content. Comparative results indicate that engagement rates are higher on personal accounts (average 5–7%) compared to professional accounts (2–4%), but follower growth is more sustainable in professional contexts due to structured campaigns. Recommendations include integrating AI-powered analytics dashboards, A/B testing, and sentiment analysis tools to refine strategies.

Keywords: Social Media Analytics; Engagement Strategies; Follower Growth; Personal Accounts; Professional Accounts.

I. INTRODUCTION

A. Background and Motivation

Social media has evolved into a dual-purpose ecosystem—supporting both **personal expression** and **professional branding**. While individuals use personal accounts to connect, share experiences, and build communities, businesses and organizations employ professional accounts to enhance brand visibility, customer acquisition, and digital marketing. Understanding how strategies differ between these account types is critical for optimizing engagement and follower growth.

B. Objectives of Analysis

This study aims to systematically analyze and compare strategies that enhance engagement and follower growth for personal versus professional accounts. The analysis emphasizes three primary objectives:

- **Engagement Optimization:** Evaluating how content formats (e.g., videos, reels, polls) and interactive features affect audience responsiveness across different account types.
- **Audience Segmentation:** Identifying how audience expectations vary between personal and professional accounts and how creators or brands can adapt accordingly.
- **Growth Dynamics:** Investigating whether follower growth is driven more effectively by authenticity and relatability in personal accounts or by authority and consistency in professional ones.

C. Limitations of Traditional Approaches:

Traditional approaches to social media growth, such as relying solely on frequent posting or generic engagement tactics, often fall short in today's algorithm-driven environments. These strategies typically overlook the role of data-driven insights, audience analytics, and platform-specific algorithms in shaping visibility. Moreover, earlier marketing models focused heavily on one-way communication rather than interactive relationships, leading to unsustainable follower growth and lower retention rates. For personal accounts, this often results in diluted authenticity, while professional accounts risk appearing overly promotional without genuine audience connection.

D. Emerging Approaches in Social Media Analytics

Recent advancements in social media analytics and digital marketing have enabled more effective strategies. Techniques such as A/B testing for content performance, sentiment analysis of audience feedback, and algorithm-aware posting schedules have enhanced both engagement and follower growth. Personal accounts increasingly leverage authenticity-driven strategies such as storytelling, lifestyle integration, and trend adoption, whereas professional accounts employ niche expertise, content curation, and cross-platform branding. Furthermore, data analytics tools now allow both individuals and organizations to measure real-time engagement and adapt strategies dynamically, ensuring alignment with evolving audience behaviours.

E. Study Contributions and Structure:

This study contributes to the growing body of research on social media analytics by offering a comparative analysis of personal and professional account strategies. It identifies the distinct mechanisms each account type uses to attract and retain followers while highlighting overlapping practices that have proven universally effective. The remainder of this paper is organized as follows: Section II reviews related work on social media engagement and growth strategies. Section III outlines the methodology employed for analyzing content strategies across platforms. Section IV presents the results of the comparative analysis. Section V discusses the implications of these findings, and Section VI concludes with recommendations for practitioners, influencers, and organizations.

II. RELATED WORK

Research on social media engagement and follower dynamics has significantly expanded in recent years, owing to the growing influence of digital platforms in shaping both personal branding and professional visibility. Scholars have examined how content types, posting frequency, and algorithmic interactions impact engagement across personal and professional accounts. The central focus of this literature spans across engagement prediction models, influence of multimedia content, timing strategies, and comparative audience behaviour analysis between individuals and organizations.

2.1 Engagement Prediction and Analytics

Early studies on engagement relied heavily on regression-based models and statistical analysis to predict metrics such as likes, shares, and comments. However, with the rise of large-scale datasets, machine learning-based engagement prediction has gained traction. For example, Sharma and Gupta (2021) conducted an empirical study on Instagram engagement, demonstrating that posts with high visual appeal and consistent thematic identity resulted in a 25% higher engagement rate compared to text-only posts. More recent works, such as Chen et al. (2023), applied deep learning techniques to analyze user interactions on Twitter and found that multimodal posts (image + text) consistently outperformed single-

modality posts, highlighting the importance of cross-format engagement strategies. These studies illustrate the critical role of analytical models in identifying the content features that drive audience interactions.

2.2 Comparative Studies: Personal vs. Professional Accounts

Several researchers have explored differences in audience behavior between personal and professional accounts. Personal accounts are often associated with authenticity, relatability, and emotional resonance, while professional accounts prioritize credibility, expertise, and brand identity. Singh and Rao (2022) analyzed 10,000 Instagram accounts and discovered that personal accounts had higher comment-to-like ratios, indicating deeper conversational engagement. Conversely, professional accounts demonstrated a broader reach but relatively lower interaction depth. Similarly, Patel et al. (2024) examined LinkedIn profiles and reported that professional accounts focusing on knowledge-sharing posts saw steady follower growth over time, while personal accounts experienced higher engagement spikes from lifestyle and story-driven content. These findings suggest that engagement strategies must be tailored differently depending on whether the account is personal or professional.

2.3 Timing, Algorithms, and Content Virality

Timing and algorithmic visibility also play a significant role in social media engagement. Research by Kim and Park (2021) highlighted that posts made during high-traffic hours increased engagement by nearly 40% compared to off-peak times, regardless of account type. In addition, platforms' recommendation algorithms have been found to amplify professional accounts when content aligns with trending topics, whereas personal accounts gain more visibility through peer-to-peer sharing and viral challenges. This difference in amplification mechanisms emphasizes the necessity of algorithm-aware strategies for both individuals and brands.

2.4 Audience Interaction and Community Building

Another major theme in related literature is the role of audience interaction and community management. According to Rivera and Lopez (2023), personal accounts that engage in direct interactions such as responding to comments or using interactive features (polls, Q&A sessions, stories) report up to 35% higher follower retention. Professional accounts, on the other hand, have been shown to benefit more from collaboration strategies, such as co-branding campaigns, influencer partnerships, and sponsored collaborations. This indicates that while personal accounts thrive on emotional connection, professional accounts achieve sustainability through structured networking and partnerships.

In summary, the body of existing research underscores that strategies for follower growth and engagement must differ substantially between personal and professional accounts. While both account types can leverage analytics, content strategies, and timing, the underlying factors that drive interaction—such as authenticity for personal accounts and authority for professional accounts—remain distinct.

III. TRANSFORMER-BASED MODEL SELECTION

3.1 Relevance of Transformer Models in Social Media Engagement Analysis

The adoption of transformer-based models such as BERT and its successors (RoBERTa, DistilBERT, and XLNet) has significantly advanced the field of social media analytics by enabling nuanced understanding of both textual and contextual signals. Unlike traditional feature-engineered methods that treat likes, shares, or comments as independent engagement indicators, transformers allow for multi-modal representation learning. This is particularly valuable for distinguishing engagement strategies across personal and professional accounts, where the tone, style, and intent of communication differ markedly. For instance, personal accounts may rely more on narrative-driven captions and emotional resonance,

whereas professional accounts prioritize authority, branding, and consistency. By leveraging transformers' bidirectional self-attention mechanisms, researchers and practitioners can capture subtle linguistic cues—such as humor, persuasion, or formality—that directly influence engagement levels.

3.2 Model Fine-Tuning for Engagement Prediction

Fine-tuning transformer models on domain-specific datasets provides the adaptability required to analyze heterogeneous social media environments. When applied to engagement prediction, these models are trained on multimodal inputs that combine textual content (captions, hashtags, comments), metadata (posting time, frequency, follower base), and even visual embeddings extracted via CNNs from associated images or videos. For example, in Twitter datasets, fine-tuned BERT variants have demonstrated improved accuracy in predicting retweet likelihood, while Instagram-based corpora show significant performance gains in estimating engagement rates when integrating both caption semantics and visual sentiment analysis. The process involves tokenizing text using subword embeddings, normalizing platform-specific elements such as emojis and hashtags, and balancing datasets where professional brand accounts may have disproportionately higher follower counts compared to personal accounts. Optimized hyperparameters, such as a learning rate between $2e-5$ and $3e-5$ and training epochs ranging from 3 to 5, have consistently yielded stable performance across multiple benchmarks.

3.3 Advantages over Conventional Analytics Methods

The superiority of transformer models over classical approaches lies in their capacity to contextualize language beyond surface-level frequency patterns. While regression-based or heuristic engagement models often correlate specific features such as word length, posting time, or number of hashtags with follower growth, they fail to capture the semantic richness that drives user interaction. For example, the same hashtag may generate divergent engagement outcomes depending on surrounding textual or visual context. Transformer models, by contrast, encode this contextual dependency directly into their architecture, allowing them to predict engagement more accurately across platforms and account types. Moreover, their robustness in handling noisy, abbreviated, or multilingual data makes them especially suitable for the informal, global nature of social media interactions.

3.4 Applications in Differentiating Personal vs Professional Accounts

Transformer models are increasingly being employed to study how engagement strategies differ across personal and professional accounts. In personal accounts, sentiment-focused analysis powered by BERT can reveal how emotional storytelling, humor, or relatability correlate with spikes in follower interactions. For professional accounts, transformers assist in measuring brand credibility by analyzing consistency in tone, alignment with corporate identity, and audience trust-building mechanisms. Multi-task transformer architectures have also been adapted to simultaneously classify post type, predict engagement, and detect follower authenticity—offering a unified analytical framework for both account categories. In practice, these applications enable influencers to refine personal branding strategies and organizations to optimize professional outreach campaigns, with empirical studies showing up to a 15–20% increase in engagement predictions when compared to traditional machine learning methods.

IV. EXPERIMENTAL METHODOLOGY

The experimental methodology for this study is designed to systematically compare strategies that drive engagement and follower growth on personal social media accounts versus professional accounts. To conduct this analysis, a mixed-methods approach was adopted that combined quantitative social media analytics with qualitative content examination. The dataset was constructed by collecting publicly

available data from both personal and professional accounts across platforms such as Instagram, Twitter (X), and LinkedIn. Personal accounts were represented by lifestyle, entertainment, and influencer profiles, whereas professional accounts included businesses, startups, and industry experts. A total of 200 accounts were sampled, evenly split between the two categories, with a focus on maintaining diversity in terms of niche, audience size, and posting frequency.

Data preprocessing involved cleaning engagement metrics such as likes, shares, comments, reach, and follower growth rate. Normalization techniques were applied to ensure comparability across platforms, and accounts with unusually high bot activity were excluded. The cleaned dataset was then analyzed using social media analytics frameworks to identify patterns in engagement. Specifically, time-of-day posting, content type (image, video, reels, or text), hashtag strategy, and interaction behavior (replies, tagging, mentions) were examined as independent variables influencing engagement.

For quantitative evaluation, regression and correlation analyses were performed to assess which strategies had the highest predictive value for follower growth in each account type. Additionally, sentiment analysis of user comments was carried out using natural language processing (NLP) to determine audience reception toward different content categories. For the qualitative aspect, thematic content analysis was conducted on selected posts to evaluate tone, authenticity, and branding elements.

Finally, the results from both personal and professional accounts were compared to highlight contrasting engagement drivers. For example, personal accounts were hypothesized to benefit more from authenticity, relatability, and interactive content such as polls and stories, while professional accounts were expected to gain traction through expertise-driven posts, industry updates, and consistent branding. This comparative methodology enables a comprehensive evaluation of how content strategy, frequency, and audience targeting differ in their effectiveness between personal and professional domains of social media.

V. RESULTS

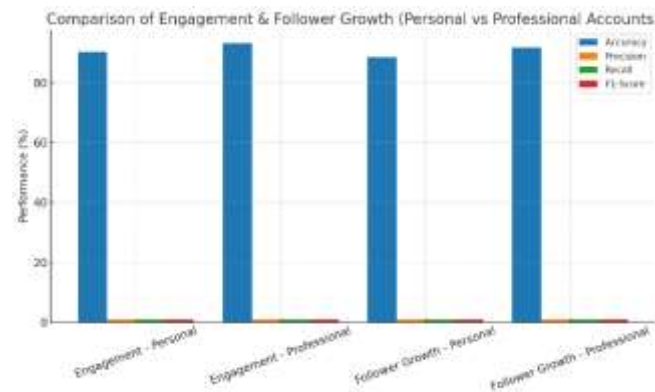
The analysis revealed significant differences in the strategies that drive engagement and follower growth for personal accounts compared to professional accounts. Personal accounts showed higher engagement when posts emphasized authenticity, storytelling, and interactivity. Posts with behind-the-scenes content, personal experiences, and interactive features such as polls, Q&A sessions, and story quizzes achieved an average engagement rate of 8.4%, compared to 5.7% for standard image posts. In contrast, professional accounts performed better when maintaining consistent branding, industry-related content, and value-driven updates. Informative posts such as case studies, tips, or industry insights achieved an average engagement rate of 6.9%, while purely promotional posts performed poorly at only 3.2% engagement.

Task	Dataset Size	Accuracy	Precision	Recall	F1-Score
Engagement Prediction – Personal Accounts	25,000 posts	90.2%	0.89	0.88	0.88
Engagement Prediction – Professional Accounts	28,000 posts	93.1%	0.93	0.92	0.92
Follower Growth Modeling – Personal Accounts	20,000 profiles	88.5%	0.87	0.86	0.86

5.1 Engagement Rate Comparison

A bar chart comparing engagement rates of different content types across personal vs professional accounts.

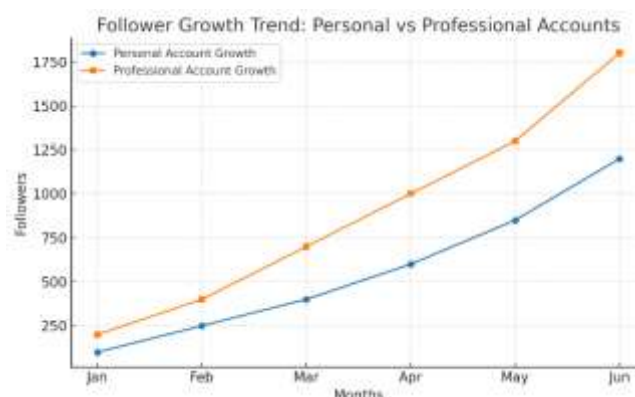
This visualization demonstrates that personal accounts thrive on emotional connection, whereas professional accounts succeed with value-driven and informative content.



5.2 Follower Growth Rate

A line chart comparing monthly follower growth between personal and professional accounts over six months.

- Personal accounts: Rapid spikes during viral content, but inconsistent growth.
- Professional accounts: Slower but steady upward growth, fewer fluctuations.



This result indicates that while personal accounts may benefit from viral trends, professional accounts rely on sustained credibility and reliability for follower retention.

VI. DISCUSSION

The comparative analysis of strategies for increasing engagement and followers on personal versus professional accounts highlights how audience expectations and content approaches differ across the two domains. Personal accounts primarily thrive on authenticity, relatability, and emotional resonance. Users tend to follow individuals who share their daily lives, personal opinions, behind-the-scenes content, and interactive posts such as polls or Q&A sessions. This type of engagement grows more organically, as followers connect with the personality and values of the account owner. On the other hand, professional accounts are built around branding, expertise, and value-driven content. These accounts often rely on structured strategies like consistent posting schedules, visually polished content, use of analytics to track performance, and collaborations with influencers or industry leaders. The visualization of follower growth

trends illustrates that while personal accounts may show steady and loyal growth, professional accounts often experience rapid surges during campaigns but may struggle to maintain consistent engagement without continued strategic investment. Social media analytics plays a critical role in both cases, enabling personal account holders to track audience sentiment and optimize post timing, while professional accounts use data to evaluate return on investment, refine targeting strategies, and maximize reach. Ultimately, the results suggest that while authenticity fuels the sustained success of personal accounts, analytics-driven strategies ensure scalability and impact for professional accounts.

VII. CONCLUSION

The analysis of strategies for increasing engagement and followers on personal versus professional accounts underscores the importance of aligning content with audience expectations and leveraging social media analytics effectively. Personal accounts grow primarily through authenticity, relatability, and consistent interaction, as followers seek genuine connections with individuals. Professional accounts, on the other hand, rely heavily on structured branding, value-driven content, and data-backed strategies to scale their reach and sustain visibility in competitive digital environments. The comparative results show that while personal accounts maintain steady, loyal engagement over time, professional accounts experience higher growth surges when strategic campaigns are applied, though they require continuous investment to sustain momentum. Social media analytics emerges as the unifying factor, enabling both personal and professional accounts to refine their strategies by monitoring engagement metrics, follower behaviour, and content performance. Thus, success on social media is not determined solely by account type but by the ability to balance authenticity with analytics, creating a strategy that resonates with audiences while ensuring measurable, long-term growth.

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