

THE ROLE OF ARTIFICIAL INTELLIGENCE IN PERSONALIZING SOCIAL MEDIA INTERACTIONS: IMPLICATIONS FOR CONSUMER ENGAGEMENT

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Abstract

This study explores the pivotal role artificial intelligence (AI) plays in shaping personalized experiences on social media, with the aim of deepening user engagement. Drawing from real-world examples, we examine how leading companies like Starbucks, Sephora, and Spotify have embraced AI to tailor content and interactions, with the research is taking place in numerous brands and companies like Starbucks, Sephora, Spotify, and Hilton Hotels & Resorts. the researchs also reaches social media Tiktok and Instagram, as well AI related systems like Llama 2. This research uses Qualitative Research with types of research including Descriptive Studies, Literacy Studies, and Case Studies. Data analysis was carried out using thematic analysis techniques, where the collected data were identified and categorized based on key themes. Websites and apps can use AI to recommend content, products, or services based on the user's past behaviour or search history.

Keywords: Artificial Intelligence, Personalized Content, Social Media, Consumer Engagement

Abstrak

Penelitian ini mengeksplorasi peran penting Kecerdasan Buatan (AI) dalam membentuk pengalaman personalisasi di social media, dengan tujuan memperdalam keterlibatan pengguna. Digambarkan dari contoh dunia nyata, kami menguji bagaimana perusahaan seperti Starbucks, Sephora, dan Spotify telah menggunakan AI untuk menyesuaikan konten dan interaksi. Penelitian ini bertempat di beberapa perusahaan seperti Starbucks, Sephora, Spotify, dan Hilton Hotels & Resorts. Penelitian ini juga menjangkau media sosial Tiktok dan Instagram, begitupun sistem yang berkaitan dengan AI seperti Lllama 2. Penelitian ini menggunakan metode kualitatif dengan tipe penelitian studi deskriptif, studi literatur, studi kasus, fenomenologi, etnografi, naratif, dan metode campuran. Analisis data menggunakan teknik analisis tematik, dimana data yang dikumpulkan sudah diidentifikasi dan dikategorikan berdasarkan dari kata kunci. Website dan aplikasi dapat menggunakan AI untuk merekomendasikan konten, produk, dan layanan berdasarkan riwayat pengguna sebelumnya.

Kata kunci: : Kecerdasan Buatan, Personalisasi Konten, Media Sosial, Keterlibatan Pengguna

INTRODUCTION

The rapid advancement of digital technology has fundamentally transformed the way people communicate, access information, and engage with businesses. In the contemporary digital era, billions of individuals worldwide have access to the internet through smartphones and other connected devices, making social media platforms an inseparable part of daily life. Platforms such as Instagram, TikTok, X (formerly Twitter), Facebook, and YouTube have evolved beyond communication channels into complex ecosystems where users consume content, interact with brands, and influence purchasing decisions. According to Kaplan and Haenlein (2010), social media represents a group of internet-based applications built on Web 2.0 technologies that facilitate the creation and exchange of user-generated content. The increasing popularity of social media has significantly altered consumer behavior and reshaped marketing strategies across industries.

As social media usage continues to grow, users are exposed to an overwhelming volume of information and content every day. Thousands of videos, images, posts, and advertisements are uploaded every second, creating an increasingly competitive environment for content creators and businesses seeking audience attention. This phenomenon has generated a major challenge for organizations: how to stand out in crowded digital spaces while simultaneously maintaining meaningful engagement with consumers. Traditional marketing approaches often fail to address the diverse preferences and expectations of modern consumers, particularly Millennials and Generation Z, who demand personalized experiences and authentic interactions (Djafarova & Bowes, 2021).

In response to these challenges, Artificial Intelligence (AI) has emerged as one of the most influential technologies in digital marketing and social media management. AI refers to computational systems capable of performing tasks that typically require human intelligence, including learning, reasoning, problem-solving, prediction, and decision-making (Russell & Norvig, 2021). Recent developments in machine learning, natural language processing, computer vision, and predictive analytics have enabled AI systems to analyze massive amounts of user-generated data and deliver highly personalized experiences. As a result, AI has become an essential component of social media platforms and marketing strategies aimed at enhancing customer engagement.

The integration of AI into social media platforms has transformed how users discover content and how brands communicate with consumers. Rather than presenting identical content to every user, AI algorithms analyze behavioral data such as browsing history, viewing duration, likes, shares, comments, search patterns, geographic location, and purchasing behavior. These data are then used to create personalized content recommendations that align with individual preferences. According to Gao and Liu (2022), AI-driven personalization significantly improves customer experiences by delivering relevant content at the right time, thereby enhancing customer satisfaction and engagement.

The concept of personalization has become increasingly important in contemporary marketing because consumers are more likely to engage with content that reflects their

interests and needs. Personalized recommendations on TikTok, Instagram, YouTube, and other platforms are designed to increase user retention and encourage continuous interaction. For example, TikTok's "For You Page" utilizes sophisticated machine-learning algorithms that analyze user behavior in real time and recommend videos based on engagement patterns rather than solely relying on social connections (Kaye, Chen, & Zeng, 2022). This approach allows content creators to reach broader audiences while enabling users to discover content that closely matches their interests.

Instagram employs a different personalization strategy by integrating multiple AI-powered recommendation systems across its feed, stories, reels, and explore page. Instagram's algorithm considers factors such as relationship strength, engagement history, content relevance, and user activity to determine which content should be prioritized (Mosseri, 2023). While TikTok focuses heavily on content discovery through behavioral prediction, Instagram combines social relationships and behavioral data to personalize user experiences. Consequently, both platforms demonstrate distinct approaches to AI-driven consumer engagement.

The growing use of AI in social media has also revolutionized business practices. Organizations increasingly rely on AI-powered tools such as chatbots, recommendation engines, virtual assistants, predictive analytics systems, and sentiment analysis software to enhance customer interactions. Chatbots, for instance, provide immediate responses to customer inquiries, reducing waiting times and improving service efficiency. Virtual assistants can guide customers through purchasing processes, while recommendation systems suggest products based on previous behavior and preferences. These technologies enable businesses to provide personalized services at scale, thereby strengthening customer relationships and increasing operational effectiveness (Davenport, Guha, Grewal, & Bressgott, 2020).

Research conducted by Wu and Monfort (2022) demonstrates that AI implementation in marketing positively affects organizational performance through increased sales growth, enhanced customer satisfaction, improved service quality, and greater profitability. Similarly, Ljepava (2022) argues that AI-powered customer segmentation allows organizations to better understand consumer needs and develop highly targeted marketing campaigns. By analyzing customer data, businesses can identify behavioral patterns, predict future preferences, and deliver customized messages that resonate with specific audience segments.

One notable example of AI-driven consumer engagement can be observed in the e-commerce sector. Companies such as Amazon utilize AI algorithms to recommend products based on customer browsing and purchasing histories. Likewise, Netflix employs recommendation systems that personalize viewing suggestions according to user preferences and previous interactions. These examples illustrate how AI personalization contributes to increased user satisfaction and loyalty by reducing information overload and facilitating decision-making processes (Huang & Rust, 2021).

In social media marketing, AI has become a critical tool for brands seeking to build deeper connections with consumers. AI-powered analytics can evaluate audience sentiment,

identify trending topics, and determine optimal posting times to maximize engagement. Brands can also use generative AI technologies to create personalized content, advertisements, and responses tailored to specific customer groups. Such capabilities enable organizations to deliver more relevant and engaging experiences while maintaining consistency across multiple communication channels.

Despite its benefits, the implementation of AI in social media personalization is not without challenges. One significant concern involves privacy and data protection. AI systems rely heavily on user data to generate personalized recommendations, raising questions about data collection practices and consumer consent. According to Zuboff (2019), the increasing use of personal data for commercial purposes has contributed to what she describes as "surveillance capitalism," where user behavior becomes a valuable resource for economic gain. Consequently, organizations must balance personalization objectives with ethical considerations and regulatory requirements.

Another challenge relates to algorithmic bias. AI systems learn from historical data, which may contain existing biases and inequalities. If not properly monitored, algorithms can reinforce stereotypes, exclude certain groups, or produce discriminatory outcomes (O'Neil, 2016). In social media environments, algorithmic bias may influence content visibility, advertising exposure, and audience reach. Therefore, transparency and fairness remain critical considerations in AI implementation.

Technical limitations also represent barriers to effective AI adoption. Developing sophisticated AI systems requires substantial investments in infrastructure, expertise, and data management capabilities. Small and medium-sized enterprises often face difficulties implementing advanced AI solutions due to limited financial and technological resources. Furthermore, rapid technological changes require organizations to continuously update their systems and employee competencies to remain competitive (Davenport et al., 2020).

Consumer trust constitutes another important factor influencing AI effectiveness. While many users appreciate personalized experiences, some express concerns regarding excessive automation and reduced human interaction. Research suggests that consumers are more likely to accept AI-driven services when they perceive them as useful, transparent, and trustworthy (Huang & Rust, 2021). Therefore, organizations must ensure that AI applications complement rather than replace meaningful human engagement.

The experiences of Millennials and Generation Z provide valuable insights into AI-driven social media interactions. These generations are digital natives who have grown up with internet technologies and social media platforms. Their familiarity with digital environments makes them particularly receptive to personalized content and AI-powered services. However, they also demonstrate heightened awareness regarding privacy, authenticity, and ethical considerations. Consequently, brands targeting these demographics must develop AI strategies that prioritize relevance, transparency, and user empowerment.

From a user experience perspective, AI personalization enhances convenience by reducing information overload and presenting relevant content. Personalized

recommendations can improve satisfaction, increase engagement, and foster stronger emotional connections between consumers and brands. Nevertheless, excessive personalization may create "filter bubbles," where users are exposed only to information that aligns with their existing preferences, limiting exposure to diverse perspectives (Pariser, 2011). Therefore, balancing personalization with content diversity remains an important challenge for platform developers.

Overall, Artificial Intelligence has become a transformative force in social media ecosystems by enabling highly personalized interactions and enhancing consumer engagement. Through recommendation algorithms, predictive analytics, chatbots, and content optimization tools, AI helps organizations deliver more relevant experiences while strengthening customer relationships. The comparison between TikTok and Instagram demonstrates that different platforms employ distinct AI strategies to achieve similar objectives: maximizing user engagement and satisfaction. Although challenges related to privacy, ethics, algorithmic bias, and consumer trust persist, the potential benefits of AI-driven personalization continue to drive its widespread adoption across industries.

As AI technologies continue to evolve, their influence on social media interactions and consumer behavior is expected to expand further. Future developments in generative AI, emotional intelligence systems, and predictive personalization may create even more sophisticated forms of engagement. Consequently, understanding the role of AI in personalizing social media interactions has become increasingly important for researchers, businesses, policymakers, and consumers seeking to navigate the complexities of the digital age.

METHOD

This study employs a qualitative approach using a case study method to gain a deeper understanding of the role of Artificial Intelligence (AI) in enhancing consumer engagement through personalized social media interactions. A qualitative approach is appropriate because it allows researchers to explore complex social phenomena in depth and understand how individuals and organizations experience and interpret AI-driven personalization in real-life contexts (Creswell & Poth, 2018). The research combines descriptive studies, literature studies, and case studies to provide a comprehensive analysis of AI applications in social media engagement.

Data collection was conducted through multiple sources to ensure rich and contextual information. Primary data were obtained through interviews with brand representatives, influencers, and public figures who actively utilize AI-based tools in social media strategies. These interviews explored how AI is used to personalize content, improve audience engagement, and support marketing communication. Secondary data were collected from scholarly articles, reports, and digital documentation related to AI, social media algorithms, and consumer engagement theories. Particular attention was given to platforms such as Instagram and TikTok, where AI algorithms play a significant role in shaping user experiences and content recommendations.

The study also draws on the “Uses and Gratifications” theory, which explains how users actively select media to satisfy specific needs such as entertainment, information, and social interaction (Katz, Blumler, & Gurevitch, 1974). In the context of AI-driven personalization, social media algorithms analyze user behavior and preferences to deliver content that aligns with individual gratifications and experiences. To ensure the validity of the findings, this study applies data triangulation by comparing information obtained from interviews, observations, and documentation. Triangulation helps increase the consistency and credibility of the data by verifying findings across different sources and methods (Lincoln & Guba, 1985). Through this approach, the research is expected to provide meaningful insights into how AI contributes to more personalized and engaging social media interactions.

RESULTS AND DISCUSSION

This research was carried out based on the author’s experience. This includes various perspective especially on social media and Personalized Content. Tiktok AI algorithm has features or signals for users from its own use, for example, people often watch about the sports, the FYP will be full of sports videos, or those who often like comments and share about cooking, then the content of the FYP also contains about what cooks. However, watch time also influences. watching the short one more often, then the FYP itself with the form of a short video will appear. Even though they don't related on TikTok, videos will still gone viral because the algorithm is in accordance with TikTok standards. And Ai on TikTok can immediately find out what the user wants, such as, if he sees a beautiful bag in a video, and he presses for a long time the bag will appear the name, with the price of the bag. Although people, on TikTok can know it, and TikTok provides videos of the person who is tagged or the item tagged in the video. Or the TikTok AI can search for songs just by typing or recording the sound that we hear or the TikTok AI hears, then TikTok will display the video and music. From Instagram, Instagram is not as extensive information as tiktok, Instagram pages are called explorers different from tiktok whose name is fyp. Instagram will only show things that are already connected. More to social interaction in cyberspace. Algorithm of TikTok and Instagram often changes every day. And the two media has their own standards.

Figure 1. Graph of Tiktok Global Engagement, sources: sproutsocial

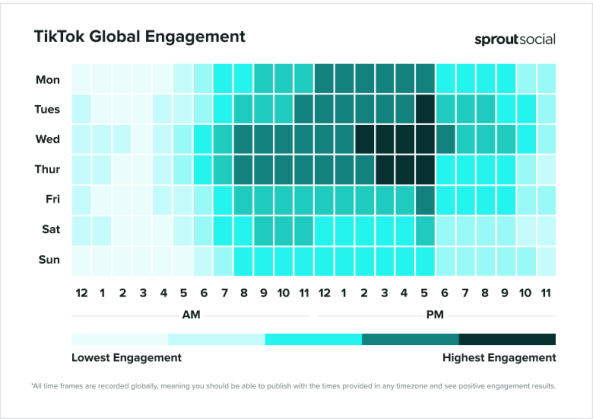


Image above shows the graphs on the best times to post a content. At specific hours, some are having a highest engagement as can be seen on the tones. According to sproutsocial, The best times to post on TikTok, in general, are Tuesdays, Wednesdays and Thursdays between 2 and 5 p.m. However, every audience is different. It's best to look at the follower's activity and see the audiences is most active.

DISCUSSION

Real Cases of the Capability of Artificial Intelligence in Consumer Engaging

Artificial Intelligence shows to be very handy when it comes to engage more consumer for the better and improved. It really highlights the capabilities of Artificial Intelligence so that the personalized content will not because it proves how it can be adaptive based on the user experience itself. Starbucks, a global coffeehouse chain recognized for its signature roasts and commitment to customer satisfaction, has emerged as a frontrunner in the AI revolution within the marketing sector. By leveraging big data and predictive analytics, Starbucks has its own AI called "Deep Brew". In an interview for Yahoo Finance Live, the former COO of Starbucks, Roz Brewer, stated that the tech-enabled future of the coffee chain is focused on growing drive-thru stores. This includes customizable menu boards that leverage AI to suggest items based on factors. Factors such as the weather, time of day, store inventory, popularity, community preferences and the customer's purchase history. Deep Brew was especially instrumental in drive thrus during COVID world last year. With it, they could personalise the recommendations appearing on the screen at different stores with a drive-thru. Every store in every country has its distinctive personality, on top of other factors like week day, time of day, temperature, amount of traffic, etc., explains Brian.

In the competitive beauty industry Sephora stands out for its innovative use of artificial intelligence to personalize customer interactions across social media platforms as well as its mobile app and website. Visual AI tools like Sephora Virtual Artist allow users to try on makeup virtually via augmented reality through Instagram and Facebook Messenger recommend products and offer beauty advice based on data. This personalization results in higher engagement time and increased customer satisfaction.

On the other hand, Spotify a global leader in music streaming has built its brand on delivering deeply personalized created by artificial intelligence. One of the most powerful ways Spotify applies AI is through the creation and the distribution of personalized social media content which enhances user engagement and promotes organic brand advocacy. Each year Spotify Wrapped summarizes user's music habits with visually engaging, AI-generated graphics and copy, the content is formatted for easy sharing across Instagram stories, TikTok, Twitter (X) and Facebook encouraging users to post their music identities with pride. By using AI to turn data into personalized, shareable storytelling, Spotify has created successful annual digital campaigns, demonstrating the power of AI in personalizing social media interactions and enhancing engagement on massive scale.

The AI That Knows You Better: TikTok vs. Instagram

In nowadays social media, there's this feature called "Algorithm". Basically it controls everything on what we everyday see as usual in social media. Algorithms dictate much of what appears in our feeds, shaping our online experiences in ways we don't always realize. They decide which posts are worth showing to us, what content we find engaging, and even how long we stay on a platform. Algorithms themselves can be interpreted as a system, in the context of social media, algorithms are interpreted as how the system of a social media works, for example as explained by Domingos (2015) in "The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World", is a series of mathematical instructions used to personalize the user experience. This algorithm analyzes user activity data to predict and display relevant content based on the user's preferences and previous behavior. (P. Domingos, The master algorithm: how the quest for the ultimate learning machine will remake our world. New York: Basic Books, 2015). There are many algorithms behind any large social media platform. One set of algorithms processes content. Another set of algorithms propagates it, that is, helps determine who sees what. The set of content processing algorithms is relatively fluid as new types of content become prominent and new algorithmic capabilities emerge. The set of content propagation algorithms is relatively stable.

Speaking of algorithm differences, various social media is not always having the same system, this is due to the adjustment of how related social media can use their features based on the segment, like Instagram and Tiktok. The comparison between TikTok and Instagram's algorithms opens up a deeper understanding of how these two social media platforms operate and deliver content to their users. While both use algorithms to tailor the appearance of content to the user's interests, there are significant differences in how they work and their impact on the user experience. TikTok's algorithm has a unique and innovative reputation for delivering relevant and engaging content to users. Through the "For You" page, TikTok presents personalized videos based on preferences and user activity history. No two "For You" pages are the same, as content recommendations have been carefully selected for each user. Factors that affect the appearance of content on this page include new accounts followed by users, hashtags, sounds, effects, and trending topics. TikTok's algorithm gives each video an equal chance to go viral, regardless of the popularity of the content creator. This is what makes TikTok a fair and promising platform for marketers to reach and engage a wide audience. (Bishqemi & Crowley, 2022). Instagram offers a diverse range of features, many of which double as advertising opportunities. These include standard photo and video posts in users' feeds, ephemeral Stories that vanish after 24 hours, the Explore page for discovering new content, short-form Reels (up to 90 seconds), live video streams, integrated Shopping tools, and curated Guides that resemble blog-style collections.

Behind the scenes, Instagram relies on multiple algorithms to determine what content appears where. These systems shape everything from the order of posts in a user's feed to the suggestions shown on the Explore page. The platform personalizes content for each user by analyzing their interactions such as likes, comments, profile views, and weighing factors like content relevance and how recently something was posted. The result is a

tailored experience that reflects each user's interests and social connections. On the other hand, TikTok-specific features such as lip syncing, visual effects, and the ability to edit videos in various ways add uniqueness to the content shared. Additionally, TikTok allows content creators to enable downloads and share content with other users. This feature encourages collaboration between users and creates more active interaction among the TikTok community (Shakariza & Darm alim, 2021). Overall, the comparison between TikTok's and Instagram's algorithms reveals different approaches to serving content to users. TikTok emphasizes strong personalization and provides an equal opportunity for every video to go viral. Meanwhile, Instagram focuses more on displaying relevant content based on users' interests and enriching their experience with different types of visual content. Understanding these differences can provide insights for marketers and users on how best to leverage these two platforms in achieving marketing goals and enjoying content that suits their interests.

Personalized content: point of view based on user experience

Personalizing content on the TikTok platform has created a unique user experience through the For You Page (FYP) feature. This artificial intelligence (AI)-based recommendation system is designed to learn user preferences in real-time, so that it is able to present content that is relevant to their interests. TikTok's algorithm uses viewing data, interactions, and usage patterns as the main parameters, providing a convenient and enjoyable platform browsing experience. This advantage is one of the main attractions of TikTok in creating deep engagement with its audience. The success of this content personalization is reflected in research findings that show that users who receive recommendations according to preferences tend to spend longer on the app. (Usman & Rahman, 2023).

The role of AI can be seen in personalizing content. It helps on several cases such as analyzing vast amounts of data about individual consumers and use that information to create customized content that speaks directly to their interests and needs. AI can be used to automate the process of analyzing customer data and creating customized content, saving businesses time and resources while improving the overall customer experience. The goal of AI in content personalization is to create a more relevant and engaging experience for customers, which can lead to increased customer satisfaction, loyalty, and ultimately, higher profits for businesses.

TikTok AI algorithm has features or signals for users from its own use, for example if people often watch about the ball, the FYP, also known as "For You Page", will be full of football videos, or those who often like comments and share about cooking, then the content of the "FYP" also contains about what cooks. However, watch time also affects, if watch the short one more often, then a short video will appear in the FYP itself. And even though they don't follow each other on TikTok, videos will still be FYP/booming because the algorithm is in accordance with TikTok standards. And AI on TikTok too, can immediately find what the user wants, such as, if he sees a beautiful bag in a video, and he presses for a long time the bag will appear the name, price of the bag. Although people, on TikTok can know it, and TikTok provides videos of the person who is tagged

or the item tagged in the video. Or the TikTok AI can search for songs just by typing or recording the sound that we hear or the TikTok AI hears, then TikTok will display the video and music. And also if you want to be creative, you can turn videos or photos into cartoon animations, because that's one of the features on TikTok so that the videos are booming. For example, a video that uses AI is a video that is a photo of an ordinary human, and becomes a mermaid, because it is turned by AI into a moving animation. It's different from Instagram, Instagram is not as extensive information as tiktok, Instagram pages are called explorers different from tiktok whose name is FYP. Instagram will only show things that are already connected. More to social interaction in cyberspace. For example, if you follow your favorite artist, then that artist will often appear in your explorer, either a photo or a video. And also if you become a follower of your friend, and your friend posts whatever it is, it will always be on the Instagram page because you often interact with your friends. And also in the "Direct Message" feature, AI translate English and Meta AI have been provided, so that when you don't understand your friend's DM questions, you can immediately search for them without the need for other applications.

The use of AI in content personalization for instagram and tiktok is very useful in this era, because the algorithm of TikTok and Instagram often changes every day. And the two media have their own standards. So a content creator needs AI to help him deal with that problem, for example so that the video content stays fyp on tikto, or how to add active followers on Instagram, all of that can be asked to AI. Or if you want to start creating content, you need to determine personal branding. So AI is needed so that ignorance becomes knowledge. And the AI in the 2 application itself can help the content creator as well, to better get the work he wants, for example from trending songs or filters for videos or photos.

AI Personalization: business field

Today, many businesses are putting customers at the center of their strategies, which is why AI-powered personalization is becoming more common. By using artificial intelligence, companies can better understand people's preferences, behaviors, and needs. This allows them to deliver content, recommendations, and services that feel more personal and relevant. As a result, AI-driven personalization is reshaping how brands connect with their audiences, helping build stronger engagement, loyalty, and long-term success.

Two main innovations are delivering the next steps of personalized content, the first being visual recognition technology and the secong being AI recommendation systems. Visual content such as like images, videos, and graphics, has the unique ability to gathering attention and quickly speak out ideas. At the same time, AI recommendation systems use smart algorithms to learn related to user behavior and suggested content that matches individual's interests. Combined, these technologies are organizing a new standard for how businesses create meaningful and personalized experiences.

However, even AI its own cost for its development. This is based on how AI works on its function. In 2025, AI costs can range from a few hundred dollars a month for basic tools to millions for custom enterprise solutions. AI pricing shifts based on use case,

infrastructure, vendor, and how fast your adoption scales are, and many businesses underestimate the full cost by 500% to 1,000% when moving from pilot to production.

The scope and complexity of an AI project are primary cost drivers. Simple applications, like basic chatbots, can be developed with minimal resources, while complex systems such as real-time object detectors or large-scale predictive models usually requires substantial investments in specialized hardware, extensive data processing, and expert personnel. Llama 2 (Large Language Model Meta AI), that helps to understand and respond to human inputs and develop human-like text, on its development, training the models required over 3.3 million GPU hours, which translates to roughly \$4 to \$6 million in compute costs alone, assuming market rates of \$1.20 to \$2.00 per hour for NVIDIA A100 GPUs. That figure doesn't include the cost of engineering, tuning, or deployment, just infrastructure and power use.

Quality data is the life source of AI. Collecting, cleaning, and labeling data can consume around 15-25% of an AI project's budget. Then there's talent and development effort, whereas Building AI solutions demands highly specialized skills. Outsourcing offers lower upfront investment and access to specialized expertise. Development costs range from \$6,000 to \$300,000+ with US-based AI consultants billing \$200 to \$350 per hour. This option limits deep system integration but offers flexibility and lower overhead. AI workloads require substantial computing resources, whether run in the cloud or on-premises, making infrastructure one of the biggest cost drivers. A single NVIDIA H100 GPU, commonly used for training large models, sells for around \$30K. For teams opting for the cloud, rental rates range from \$1.53 to \$2.63 per hour depending on provider and setup.

Once deployed, AI systems need continuous monitoring, retraining, and security updates. Industry studies suggest annual maintenance consumes from 10% up to 30% of the original development budget, it is also depending on the system's complexity. Key maintenance activities include model monitoring and retraining, system updates, integration management, and performance optimization. AI solutions are sold under various pricing models, this includes used-based pricing, subscription and license models, tiered and volume pricing, and one-time development costs or ongoing fees. Then there's AI vendor. AI vendor pricing varies widely based on usage, included features, support, and integration flexibility. Without clear comparisons, teams risk making decisions based on price alone rather than the actual value delivered.

There are three categories of AI providers, OpenAI, Cloud AI services and Open-source. OpenAI's pricing structure is notably flexible, offering both subscription and usage-based options, this can be exemplified in ChatGPT plus on its subscription costs \$20 per month, and Google Cloud Vision costs First 1,000 units/month free, with approximately \$1.50 per 1,000 units thereafter (tiered). As for cloud AI services, it offers a range of AI services with varied pricing models. These services typically fall into two categories: pre-built AI APIs and custom/general AI platforms. This can be seen as an example in with the provider AWS, as the pricing model classifies as pay-as-you-go and provisioned throughput.

Investing in personalization is good for brands. Research from McKinsey found that brands that excel at personalization deliver five to eight times the marketing ROI and boost their sales by more than 10% over companies that don't personalize. Personalization can be an overwhelming and time-consuming task, but it's made simpler through artificial intelligence. In fact, it's never been easier to understand consumers and create personalized offers with AI.

Hilton Hotels & Resorts (formerly known as Hilton Hotels), a global brand of full-service hotels and resorts, uses a robot concierge named Connie to make guests' experiences as personal and enjoyable as possible. The two-foot-tall robot stands in the lobby to greet guests and answer questions. With its natural language processing ability, Connie can learn about guests and provide personalized recommendations of places to visit and restaurants to try. Macy's, a major department store chain, known for extensive range of products including clothing, home goods, and accessories, uses IBM Watson AI technology to power its smartphone-based assistant Macy's On Call. When a customer enters the store, they can start chatting with a digital assistant on their phone. The chatbot asks questions to direct the customer's shopping experience and provide recommendations and directions to items around the store. If the bot senses the customer is getting frustrated, it will alert a human associate to intercept the customer as soon as possible.

AI Personalization: obstacles for its implementation

Artificial Intelligence (AI) plays a vital role in content personalization. With the ability to analyze large volumes of data at high speed, AI can identify patterns and trends that are invisible to humans. For example, machine learning algorithms can learn user preferences based on browsing history, clicks, and other interactions, then use this information to deliver the most relevant and engaging content. Content personalization also carries significant business implications. By delivering relevant content, companies can boost conversion rates and drive sales. For instance, personalized product recommendations on e-commerce sites often encourage users to make a purchase. In marketing, personalization enhances campaign effectiveness by ensuring the right message reaches the right audience at just the right moment.

AI has the power to fundamentally reshape how content is personalized. One of its key strengths lies in data analysis. By gathering and examining user data, AI can uncover behavioral patterns and preferences that help tailor content to individual needs. For example, machine learning algorithms can study a person's browsing history and clicks to understand their interests, then suggest articles or videos that match what they're likely to enjoy. AI also leverages Natural Language Processing (NLP) to understand both the content and context behind the words users write or speak. By grasping the meaning and intent behind language, AI can deliver content that's not just relevant, but deeply contextual. For example, an AI-powered chatbot might recommend products based on a user's conversation, while a search engine can offer more accurate results by interpreting the nuances of a user's question.

Other findings suggest that personalizing messages through AI contributes greatly to increasing audience engagement. By analyzing user preference data, AI is able to deliver relevant messages in real time. This technology, for example, is applied to chatbots used by e-commerce or banking companies. These bots can provide specific product or service recommendations based on customer needs identified from previous interactions. These personalities increase customer satisfaction and trust in digital platforms, which in turn has the potential to drive long-term loyalty.

AI opens up significant opportunities in communication by bringing efficiency through content automation. This technology allows organizations to produce different types of communication materials, such as news articles, marketing emails, and analytical reports, at scale without sacrificing quality. In the world of journalism, for example, algorithms such as Wordsmith and Heliograph have been used to automatically compile news reports based on available data, such as sports match results or financial statistics. This efficiency not only speeds up the process of information distribution but also allows organizations to focus on other strategic aspects, such as building deeper narratives or reaching new audiences.

In addition to personalization, AI also offers opportunities to improve inter-platform communication capabilities. AI-based integration technology allows messages to be tailored to the format and preferences of the audience on each communication channel. For example, content created for social media can be automatically adapted into short videos, infographics, or long-form text posts according to the platform's audience. Another example, virtual assistants such as Siri, Google Assistant, and Alexa have enabled users to communicate through voice commands, providing direct and practical access to information. Using machine learning algorithms, AI can understand individual preferences, then tailor communication content to meet personalized needs. This creates a more relevant and personalized experience, such as in the use of chatbots for customer service. IEEE (Institute of Electrical and Electronics Engineer) shows that AI personalization in interpersonal communication not only improves user satisfaction, but can also increase users' emotional attachment to a particular platform or brand. This opens up new opportunities in building long-term relationships between businesses and customers through AI-mediated interactions.

Has been mentioned before, AI is a powerful tool in providing unique, personalized experiences for customers. These examples show that AI can be used in a huge variety of situations across all industries. In the media industry, The New York Times uses AI to deliver personalized articles to its readers. By analyzing behavioral data, such as which articles are read, how much time is spent on the site, and how users interact with content, The New York Times can present articles that are relevant and engaging for each individual. This not only boosts reader engagement but also helps the company retain its subscribers. In the field of education, online learning platforms like Coursera and Udacity use AI to offer personalized course recommendations. By analyzing student learning data such as courses taken, time spent studying, and exam results these platforms can suggest courses that align with each learner's interests and educational needs. This helps students reach their learning goals more efficiently and effectively.

However, on its development for personalizing, AI often finds its own challenges, this can be based on various aspects, both inside and outside. One of the biggest challenges in content personalization is protecting user privacy and data security. The main challenge in the application of AI for communication is algorithmic bias. This bias arises from the data used to train AI models, where unrepresentative or biased data can produce discriminatory or inaccurate outputs. When personal information is used to tailor content, it has to be handled with care to ensure it's not misused or exposed. Regulations like the GDPR in the European Union require companies to take strict measures to safeguard user data. While these rules are essential for building trust, they also present real challenges for businesses trying to implement personalized experiences responsibly.

This can be exemplified at Noble (2018) Noble, S. U. (2018). *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York University Press. In its book *Algorithms of Oppression* reveals how search algorithms can reinforce racial and gender stereotypes. In communication, biases like this can undermine the credibility of the message and affect audience acceptance. For example, if a chatbot is biased in understanding a particular language or context, this can result in a poor user experience, especially for minority groups. Therefore, it is important to ensure that training data for AI models reflects diversity and inclusivity. Another significant challenge is data privacy. The use of AI in communication personalization often involves collecting and analyzing large amounts of user data. While this allows for more relevant and personalized messages, it also poses a risk of privacy breaches. For example, the Cambridge Analytica case shows how user data can be used without permission for non-transparent purposes. In AI-driven communication cases, this challenge is increasingly complex because users are often unaware of the extent to which their data is being used by algorithms. Regulations such as GDPR in Europe seek to address this issue, but their implementation still faces obstacles, especially in countries with less stringent data regulations.

Data accuracy and quality also determines a huge obstacle for AI personalization. This is because when AI accessed various information for its data for personalization, it can be much risky for those who input their personal data. And collecting data takes some huge effort and costs, this might be a challenge to middle to lower company for collecting data for AI personalization. As in the office field, data can also be risky, what caused the data can be hacked or misused are malware attacks, accidental data leaks, using personal device in the workplace, and strict regulation of data usage. AI also provides the solution of this problems such as AI's ability to quickly and accurately analyze large-scale data makes it a powerful tool for identifying unusual patterns or behaviors that could signal security threats. Beyond detection, AI can also automate various security processes—such as responding to incidents, monitoring networks in real time, and managing user access. By automating these tasks, companies can reduce the risk of human error and improve operational efficiency. However, these usage of AI must obeying the regulations of General Data Protection Regulation (GDPR).

Another important issue in the ethical aspect is the power of AI algorithms in influencing the content viewed by users. AI algorithms on social media are often designed to drive

user engagement by presenting content that matches their preferences. However, this can create a filter bubble or echo chamber, where users are only exposed to information that supports their own views. Study by Bakshy et al. (2015) Bakshy, E., Messing, S., & Adamic, L. A. (2015). Exposure to ideologically diverse news and opinion on Facebook Science, 348 (6239), 1130-1132 suggests that personalization algorithms in social media can reinforce ideological polarization by limiting users' exposure to diverse perspectives. This poses new challenges in facilitating cross-group dialogue and understanding in the era of AI-mediated communication.

CONCLUSION

Artificial Intelligence (AI) has become a crucial component in shaping personalized social media experiences and enhancing consumer engagement. Through the analysis of user behavior, preferences, interactions, and consumption patterns, AI enables social media platforms and businesses to deliver content that is timely, relevant, and tailored to individual needs. As a result, social media interactions evolve from passive browsing activities into meaningful experiences that foster stronger emotional connections between users and brands. Several leading companies have successfully implemented AI-driven personalization strategies to strengthen customer engagement. For example, Starbucks utilizes its proprietary AI platform, Deep Brew, to recommend menu items based on customer purchase history, preferences, and contextual factors such as local weather conditions. This personalized approach creates a more engaging and customer-centered experience. Similarly, Sephora employs Visual AI technology that allows customers to virtually try on cosmetic products, making the shopping process more interactive and enjoyable. Meanwhile, Spotify leverages AI to generate its highly popular “Spotify Wrapped” campaign, transforming users’ listening habits into personalized stories that are frequently shared across social media platforms.

Different social media platforms apply AI personalization in distinct ways. TikTok’s “For You Page” relies heavily on behavioral data and machine-learning algorithms to recommend content based on user engagement rather than creator popularity, giving every piece of content an opportunity to reach a broad audience. In contrast, Instagram combines user interests, engagement history, and social relationships to curate content that aligns with individual preferences. These approaches demonstrate how AI processes vast amounts of data to provide highly customized user experiences.

In the business sector, AI-powered personalization has transformed marketing and customer relationship management. By analyzing large datasets, AI enables organizations to create targeted advertisements, personalized recommendations, and predictive marketing strategies that improve customer satisfaction, loyalty, and conversion rates (Ebru et al., 2023). Furthermore, AI contributes significantly to User Experience (UX) design by predicting user preferences, recommending relevant products or content, and analyzing feedback to continuously improve digital services. However, successful implementation requires organizations to invest in technology, skilled professionals, and robust data privacy measures. Therefore, while AI personalization offers substantial

benefits, its effectiveness depends on continuous evaluation, ethical data management, and a balance between personalization and user privacy.

BIBLIOGRAPHY

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications.

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, 48(1), 24–42. <https://doi.org/10.1007/s11747-019-00696-0>

Djafarova, E., & Bowes, T. (2021). Instagram made me buy it: Generation Z impulse purchases in fashion industry. *Journal of Retailing and Consumer Services*, 59, Article 102345. <https://doi.org/10.1016/j.jretconser.2020.102345>

Gao, F., & Liu, Y. (2022). Artificial intelligence-enabled personalization and customer experience in digital marketing. *Journal of Interactive Marketing*, 58, 15–29.

Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30–50. <https://doi.org/10.1007/s11747-020-00749-9>

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, 53(1), 59–68. <https://doi.org/10.1016/j.bushor.2009.09.003>

Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *The Public Opinion Quarterly*, 37(4), 509–523. <https://doi.org/10.1086/268109>

Kaye, D. B. V., Chen, X., & Zeng, J. (2022). The co-evolution of two Chinese mobile short video apps: Parallel platformization of Douyin and TikTok. *Mobile Media & Communication*, 10(2), 229–253.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.

Ljepava, N. (2022). Artificial intelligence and customer segmentation in digital marketing. *International Journal of Market Research*, 64(4), 455–472.

Mosseri, A. (2023). *Understanding Instagram ranking and recommendation systems*. Meta Research Reports.

O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy*. Crown Publishing Group.

Pariser, E. (2011). *The filter bubble: What the Internet is hiding from you*. Penguin Press.

Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Wu, L., & Monfort, A. (2022). Artificial intelligence and organizational performance in digital marketing. *Marketing Intelligence & Planning*, 40(7), 847–863.

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications.

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.