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Application of artificial intelligence in digital marketing

Примена вештачке интелигенције у дигиталном маркетингу

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Abstract: Contemporary digital technologies have significantly influenced the transformation of marketing activities in companies over the past decade. Artificial intelligence is considered one of the most disruptive modern technologies. Their implementation is the most significant challenge of digital marketing. Artificial intelligence can automate customer service, generate content, and enable targeted ad campaigns. The problem identified by the authors is that smaller companies and entrepreneurs lack the necessary knowledge and understanding of artificial intelligence techniques that could enhance digital marketing strategies. By reviewing current literature, this paper aims to explain the digital marketing strategies and the role and place of various artificial intelligence techniques for their improvement. In line with the defined goal, the paper presents three case studies on industry giants – Coca-Cola, Starbucks, and Nike – illustrating successful implementations of artificial intelligence and machine learning techniques in their digital marketing.
Keywords: artificial intelligence, machine learning, data science, digital marketing
JEL classification: C38, M31

Сажетак: Савремене дигиталне технологије значајно су утицале на трансформацију маркетиншких активности у компанијама током протекле деценије. Вештачка интелигенција сматра се једном од најдисруптивнијих модерних технологија. Њихова имплементација представља најзначајнији изазов дигиталног маркетинга. Вештачка интелигенција може аутоматизовати корисничку подршку, генерисати садржај и омогућити циљане рекламне кампање. Проблем идентификован од стране аутора јесте да мање компаније и предузетници недостају потребно знање и разумевање техника вештачке интелигенције које би могло унапредити стратегије дигиталног маркетинга. Проучавањем актуелне литературе, овај рад има за циљ да објасни стратегије дигиталног маркетинга и улогу и место различитих техника вештачке интелигенције за њихово побољшање. У складу са дефинисаним циљем, рад представља три студије случаја о индустријским дивовима – Coca-Cola, Starbucks и Nike – илуструјући успешне примене техника вештачке интелигенције и машинског учења у њиховом дигиталном маркетингу.
Кључне речи: вештачка интелигенција, машинско учење, наука о подацима, дигитални маркетинг
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Introduction

The Fourth Industrial Revolution has significantly influenced the intensive application of modern digital technology in all sectors of the economy. The introduction of contemporary digital technology into companies represents a process of digitalization. This process increases the efficiency and effectiveness of business operations, sales or productivity growth, innovation application in value creation, and entirely new forms of customer relationships. The digitalization process has also impacted the operation conditions, providing a competitive advantage in the market. The product and service lifecycle has become much shorter, and customer behaviours and expectations have become more demanding. Companies must proactively respond to future customer needs in the digital economy, where an unsatisfied customer can easily replace a product or service provider with a single mouse click (Ubiparipović et al., 2020). The need for digitization was particularly notable during the period of the COVID-19 pandemic, when circumstances required rapid digitization of services, including access to health care, education, and other essential services (Jovanović, Krstić, & Jovanović-Vujatović, 2023).

The digitalization process is closely related to the process of digital business transformation. Ismail, Khater and Zaki define the concept of digital business transformation as a process through which companies use the effects of the synergistic application of various digital technologies (the digitalization process), contributing to the achievement of better business results and a better competitive position in the market (Ismail, Khater, & Zaki, 2017). In other words, digital business transformation involves changes in the company's business due to the application and use of the advantages of modern digital technologies (Matt et al., 2015). The scope and content of the transformation depend on the industry and the degree of digitalization. Digital business transformation can encompass multiple business dimensions (Ismail, Khater, & Zaki, 2017): business model, customer experience during the consumption of digitized products and services, business processes, and decision-making methods, simultaneously influencing the necessary skills and talents of people in the company, organizational culture, and the overall value creation system.

Modern digital technology applications have been particularly prominent in marketing in the past decade. SMACIT (Social, Mobile, Analytics, Internet of Things) technologies have significantly influenced the transformation of marketing activities in companies and the emergence of so-called digital marketing. Digital marketing is a marketing subfield. It is an adaptive and technology-based process in which companies collaborate with customers and partners to co-create, communicate, and deliver value through digital channels for stakeholders (Bist et al., 2022). The current challenge for marketers and the digital transformation of the marketing business process is artificial intelligence (AI) technologies. Although many companies apply AI-based tools to support individual digital marketing tasks, only large innovative companies, such as Google, Netflix, Amazon, Microsoft, Coca-Cola, Starbucks, or Nike, have realized the complete and successful digital transformation of marketing activities based on the application of AI technologies. Smaller companies often lack the necessary knowledge and understanding of the possibilities of applying AI to improve digital marketing. Reviewing the current literature and successful examples from practice, the authors of this paper aim to answer the following research question:

IP. *How can artificial intelligence improve digital marketing strategies and activities?*

The paper is structured in four sections. The first section gives an overview of the key digital marketing strategies. The second section describes the foundations of AI, machine learning, and data science. It also describes the most prominent AI and machine learning techniques underlying digital marketing strategies. The third section presents three case studies on industry giants – Coca-Cola, Starbucks, and Nike – and successful implementations of AI and machine learning techniques in their digital marketing. Conclusions and directions for future work are summarized in the last section.

1. Digital marketing strategies

Digital marketing builds the digital identity of a company, through which it presents itself to a large number of users in the virtual world to achieve its business goals. Digital marketing involves the use of digital technologies in the process of attracting and retaining customers, building customer preferences, promoting brands, and increasing sales (Kannan & Hongshuang, 2017). Digital marketing influences consumer interactions, thereby developing an electronic word-of-mouth (eWOM) recommendation system among consumers (Marić et al., 2022). Digital marketing is a set of strategies and tactics for presenting, promoting, and selling products and services through digital channels, such as websites, social media, search engines, YouTube, and email marketing (Bist et al., 2022). The following chapter describes the most prevalent strategies in digital marketing.

Search Engine Optimization (SEO) Marketing Strategy is a digital marketing strategy that encompasses a set of techniques and practices designed to improve the visibility and ranking of a company's website on search engine results pages (SERP). The algorithm used by search engines considers various criteria, some publicly unknown, to determine the relevance of website pages and rank them. However, the crucial concepts of the SEO strategy include (Dumitriu & Popescu, 2020):

- Keyword Optimization involves researching keywords frequently used by users in search engines and related to the company’s business domain. Companies strategically place these keywords in the content of their website pages.
- On-page SEO refers to individual website page optimization to enhance their visibility in search results, including optimizing meta tags, titles, and content structure.
- Link Building involves acquiring high-quality backlinks from reliable, high-ranking websites, which is crucial for improving the website’s authority and ranking on search engines.
- Technical SEO focuses on optimizing the technical aspects of the website, including site speed, mobile responsiveness, and ensuring that web crawlers can access and index content.
- User Experience ensures that the website's user interface enables users to navigate and interact with the site easily, ensuring that content loads quickly and is mobile-friendly.

Search Engine Marketing (SEM) Strategy is a digital marketing strategy used to increase the visibility of a company's website on search engine results pages, similar to SEO. While SEO achieves this goal organically and free of charge, SEM involves a set of paid methods to promote websites to appear at the top of search engine results pages (SERP). Companies can implement SEM using one of three models: PPC (pay-per-click), CPC (cost-per-click), and CPM (cost-per-thousand impressions). Paid ads on the search results page always appear above organic search results. Each visitor from a paid ad gradually improves the website's ranking in organic search results. Therefore, the SEM strategy is excellent for quickly generating more traffic to a website, as search engines attract motivated potential customers like no other digital advertising channel (Terrance et al., 2018).

The SEM strategy involves conducting an ad auction. In other words, each Google ad goes through an ad auction before appearing on SERPs. To enter the ad auction process, a company must first identify keywords for which it wants to create ads and the budget it is willing to spend per click on each keyword (Barlas, 2004). The company enters the auction process when Google determines the user's search query contains the bid keywords. The auction process involves selecting the most suitable ad that Google will place on SERP for the keywords. In this process, Google considers two key factors: the budget the company offered for the keywords and the ad's quality. The more relevant the ad is to the user, the higher the likelihood that the user will click on it and have a pleasant experience on the landing page, thus indicating higher ad quality. Higher budgets and higher-quality ads win the best placement (Terrance et al., 2018).

Social Media Marketing Strategy. Social media marketing involves digitally presenting, promoting, and selling products and services through social media platforms. Various promotional and sales campaigns are utilized on social media to achieve different business objectives, such as increasing website followers, higher sales rates, increased customer interactions, and more. Additionally, social media marketing includes purpose-built data analytics that enables companies to track the success of their marketing efforts. There are also metrics on social media to monitor advertising costs, allowing an exact determination of return on investment (ROI) (Li et al., 2021).

The first step in defining a social media marketing strategy is selecting the appropriate platform based on the company's domain and business goals. According to authors Li et al. (2021), social media platforms are classified into four groups: social networking sites (e.g., Facebook, Google+), microblogging sites (e.g., Twitter), professional networking sites (e.g., LinkedIn), and content-sharing sites (e.g., YouTube).

Another crucial element of the strategy is targeting potential customers/users properly. Targeting can focus on individuals following the company's page on a specific social media or based on their past behaviour, interests, and recent purchases. Creating high-quality content is an essential strategy element, regardless of the social media platform used (Li et al., 2021).

Content Building Marketing Strategy involves creating and distributing both valuable and educational content in various formats to attract or retain customers (Vinerean, 2017). Jarvinen and Taiminen (2015) expand this definition, emphasizing the goal of increasing customer engagement in company relationships. Similarly, Du Plessis (2015) also highlights

the importance of engaging consumers in interactions with the company, introducing the concept of brand storytelling.

Rovlei (2008) identified three content groups: free, paid, and social content. Companies create free content to generate more customer engagement and build better relationships with them, aiming to sell products and services. In addition to increased engagement with paid content, the aim is also to sell digital content. Social content is created by brand/company community members expressing their views and opinions and exchanging knowledge and experiences with other members.

Companies can incorporate numerous tactics into their content marketing strategy. Some of the most common in practice are (Vinerean, 2017):

1. Blog posts published on the website's page and then shared on social media to target the desired audience. Blogs are also part of the SEO strategy, optimized and written for keywords or phrases users search for in search engines. Blogs aim to provide potential customers with valuable content, attracting them to the website and aiding the conversion.
2. Ebooks are valuable content for potential customers, containing comprehensive information on a specific topic of interest. Ebooks are a leading tool for lead generation, as potential customers typically need to provide their contact information to access this free resource.
3. Videos provide the highest audience engagement on social media and websites. Videos typically demonstrate products/services, explain a problem or present topics of interest to the target audience.
4. Guides are instructions containing steps to achieve a task/goal.
5. Podcasts are pre-recorded interviews and edited radio shows discussing topics attractive to the company's target audience. Podcasts are a good tactic for expressing the brand/company's expertise and credibility and for lead generation through audience subscriptions.
6. Webinars involve experts and leaders from specific fields discussing topics of interest to potential customers. Webinars contribute to building the brand/company's credibility.
7. Case studies are a content tactic that shares customer success stories, demonstrating how the company's products/services have helped a specific customer. The goal is to support the customer's decision to make a purchase.
8. User-generated content refers to texts, images, videos, or audio created by loyal customers. Such content is significant for companies, and they should redistribute it to increase its visibility to potential customers. It contributes to building the reputation of the brand/company.

2. AI, machine learning, and data science for digital marketing

AI represents a large set of methods, techniques, and approaches to data processing that enable the intelligent behaviour of computers or machines, hence the development of intelligent computer systems (Ng, 2018). It is an interdisciplinary field that comprises numerous sub-disciplines and requires their study, such as computer vision, sensors, robotics, and language synthesis (Kotu & Deshpande, 2019). It is closely related to machine learning and data science.

Machine learning represents the widest subset of AI. It is considered one of the AI tools enabling learning from experience without explicit programming (Goodfellow, Bengio, & Courville, 2016), (Ilić, Šijan, & Predić, 2023). In terms of computers and machines, experience comes in the form of data from which algorithms learn patterns, relationships, and variations. The ability of computers to acquire knowledge through the extraction of patterns from data is called machine learning (Goodfellow, Bengio, & Courville, 2016). Thanks to patterns extracted from data, machine learning also enables automated decision-making without instructions or pre-programming. Based on the way it learns from data, machine learning algorithms are classified into unsupervised learning, supervised learning, and reinforcement learning, which goes beyond the scope of this work (Goodfellow, Bengio, & Courville, 2016).

Unsupervised learning algorithms seek to discover patterns or natural groupings in data. It has no prior knowledge about the data reflected in the structure of the used datasets. The datasets are unlabelled, comprising only input attributes. The main task of the unsupervised learning algorithm is to discover hidden patterns and relationships in such datasets. The algorithm independently learns about the relevant characteristics of the set and its structure. Based on uncovered patterns, the algorithm identifies similar examples and groups data into meaningful segments with pronounced internal cohesion (Grljević, 2023). The results of unsupervised learning are segments, clusters, or groupings of related data, associations in data that indicate events that occur sequentially or simultaneously, sequences of data, etc.

In supervised learning, algorithms learn how to solve a specific task, i.e., they learn about the characteristics and data structures specific to a task. Supervised learning datasets consist of well-defined examples, each pre-labelled with a corresponding output or class attribute, facilitating clear distinctions in the learning process. Based on the available historical data, the supervised learning algorithm learns about the characteristics of input features, enabling it to map them to corresponding output values (Grljević, 2023). The goal is to determine the outcome (output attribute value) for a new, unknown instance based on what has been learned.

Data science is an interdisciplinary scientific research field combining methods, techniques, and approaches of machine learning and other quantitative fields, such as statistics, logic, and computing (Wing, 2020), (Kotu & Deshpande, 2019). The aim is to extract knowledge and insights from business data. The term ‘science’ in data science indicates that methods and techniques are grounded in evidence, empirical knowledge, and historical observations. Data science and machine learning are inconsistently used. They are

not clearly demarcated and are often equated. The main difference between machine learning and data science is reflected in the problems and tasks they address. Data science projects aim to develop an analytical model that will provide insights into the data and enable companies to make informed business decisions and take the necessary actions (Grljević, 2023). Machine learning applications aim to automate particular tasks.

A spectrum of diversified AI and machine learning methods and techniques support digital marketing. This section is restricted to clustering, classification, regression, and natural language processing (NLP). Clustering is one of the most prominent unsupervised machine learning approaches to marketing that underlies segmentation and user profiling. Classification and regression are the most prominent supervised learning approaches for marketing, underlying predictive analytics. NLP enables computers to understand and manipulate human language.

2.1 Unsupervised machine learning for customer segmentation and user profiling

To optimize digital marketing strategies, companies must understand target market characteristics (Indartoyo, Rahayu, Budiwan, Bismo, & Sadeghifam, 2016). The premise is that different consumers of services and products or website visitors exhibit not only various socio-demographic characteristics but also behavioural and psychological ones, and they use different keywords or vocabulary in content searches (Indartoyo, Rahayu, Budiwan, Bismo, & Sadeghifam, 2016). Therefore, the primary step of the marketing strategy is to understand consumer behaviour through the segmentation of the consumer base, user profiling, and analysis, which is achieved by applying clustering algorithms and interpreting the results. The main task of clustering is segmenting a heterogeneous dataset into subsets of elements with a high degree of mutual cohesion (Bošnjak, Grljević, & Bošnjak, 2019). Segmentation should ensure that one group, the so-called cluster or segment, comprises the most similar examples, which at the same time significantly differ from the examples belonging to other clusters (Grljević, 2023). In marketing, the dataset consists of data on the behaviour of consumers or website users. Based on the available data, the clustering algorithm derives patterns that describe different groupings and profiles of consumers according to similarities that clients exhibit in shopping behaviour, activities on the website, reactions to ads, preferences, socio-demographic data, or other characteristics. The resulting segments and consumer profiles provide intelligent and personalized recommendations to consumers based on discovered patterns in purchases, consumer behaviour on websites, or related products in the consumer basket (Grljević, 2023).

Clustering is an essential technique for segmentation and user profiling. As such, it is beneficial in various marketing strategies. Understanding user profiles enhances:

1. SEO strategy. User profiling enables the company to adjust keywords incorporated into the content of the website and to deliver results adapted to different segments, their behaviour on the site, and search patterns (Indartoyo, Rahayu, Budiwan, Bismo, & Sadeghifam, 2016).
2. Pay-per-click strategy. Understanding user profiles can help companies adjust and customize ads based on insights about different audience segments (Weideman & Neethling, 2006).

3. Social network strategy. User profiling underlies content personalization and campaign personalisation. It enables adjustments following the needs and interests of individual segments ((Kaushal, Ghose, & Kumaraguru, 2019), (Vasanthakumar, Sunithamma, Deepa Shenoy, & Venugopal, 2017)).

2.2 Supervised machine learning for predictive analytics

Predictive analytics forecast the likelihood of future events or patterns based on historical data (Ravi, Khandelwal, Shiva Krishna, & Ravi, 2018), (Sheikh, 2013), (Riahi, Saikouk, Gunasekaran, & Badraoui, 2021). They create a better future for the company by providing timely insights and knowledge about unwanted outcomes and making effective business decisions based on the probability of certain events (McKnight, 2014).

Predictive models use supervised machine learning algorithms for classification or regression and neural networks for time series analysis when predicting trends. Classification and regression are similar machine learning tasks. The goal of classification is to predict the output class. Based on the input attributes, the classifiers identify to which category, so-called class, a particular instance belongs. Examples of a classification task are predictions of customer behaviour, such as propensity to buy a product, identifying users who will click on an ad, or predicting visitors more likely to engage or converge into users. The goal of regression is to predict the numerical value of the output. Examples of regression tasks are predictions of the number of visitors, the number of clicks per ad or content, or the price of online ads. Prediction models undergo training and testing phases. During the training stage, the model learns from input data about the characteristics of input data and the most successful way of mapping them to output/target values (Grljević, 2023). During the testing phase, the model uses unseen data to assess the performance of the developed model, which, in a way, represents a simulation of how the model will perform during the deployment stage.

In this paper, we observe predictive analytics twofold: predictions of user behaviour or preferences and predictions of anomalies. Table 1 summarizes the role and place of predictive models that forecast user behaviour and preferences in digital marketing strategies. These models typically use historical data about a) user preferences of products, services, or content or b) user behaviour reflected in their engagement with the website, content, or ads.

Predictive analytics are also used to identify problems before they happen, such as anomalies and fraudulent activities. Anomaly detection is a machine learning task that examines events or objects and marks some as atypical examples (Grljević, 2023). It requires data with clearly distinguished and labelled non-fraudulent and fraudulent examples of activities or transactions from which the model learns differences in behavioural patterns (Grljević, 2023). In digital marketing, the detection of anomalies primarily refers to the identification of click frauds. Fraudulent online activities dishonestly deplete ad budgets and compromise the integrity of the online advertising industry (Choi & Lim, 2020). Click fraud significantly damages an advertiser's return on investment. Around 30% of ad revenue is wasted on click fraud (Haider, Iqbal, Rahman, & Rahman, 2018). Therefore, anomaly and fraud detection are particularly important for the optimization of social network strategy, targeted ads, search engine marketing, and pay-per-click strategy.

Table 1. The role of predictive analytics in digital marketing strategies

Data	***Digital marketing strategy***	***Goal***
User preferences	*Search engine optimization*	*Personalize results based on predicted search patterns.*
	Social network	*Anticipate trends and customize strategies based on user behaviour and preferences.*
User engagement	*Pay-per-click*	*Identify visitors more likely to engage with ads.*
Preferred content	*Content building*	*Create more effective and engaging content based on predictions of the content visitors are more likely to engage with.*

Source: the authors

2.3 Natural language processing

Textual data constitutes approximately 80% of the Internet's content (Dixon, 2023), (Anandarajan, Hill, & Nolan, 2019). For companies to thrive, understanding and processing texts becomes paramount. Unlike humans, comprehending natural language is a challenge to computers. Natural Language Processing (NLP) is a newer scientific research field that addresses this challenge, allowing computers to understand and generate text (Grljević, 2023). NLP combines computing, artificial intelligence, and linguistics knowledge to derive meaning from natural language (Farzindar & Inkpen, 2015). It stands out as the most trending and dynamic field within AI. Applications, such as text generators; chatbots and dialog agents that can automate customer support, order goods, or simulate sentience; written and spoken search; speech recognition programs that parse spoken language into words, and vice versa; or online advertisement matching, drive NLP. With its wide range of applications, NLP is beneficial for various digital marketing strategies described in the context of several NLP tasks: sentiment analysis, topic modelling, text generation, and speech recognition.

2.3.1 Sentiment analysis

Individuals perceive the world from their perspective, often focusing on diverse aspects of the same phenomenon or entity. These observations lead to the formation of opinions, attitudes, and expressions frequently shared on social media platforms. User-generated texts, encompassing comments, discussions, articles, and posts, represent the dominant form of expression of opinion and communication on social media, reflecting public sentiment, human interaction, and culture. While an individual's opinion reflects a subjective stance, the aggregation and analysis of numerous opinions offer a comprehensive view of public sentiment on specific topics, entities, persons, events, and more (Pang & Lee, 2008). Sentiment analysis forms the basis of such analyses, involving the identification of expressed sentiment polarity. Machine learning, particularly classification, serves as the underlying technique for sentiment analysis, typically categorizing sentiment into positive, negative, and sometimes neutral (Grljević, 2023). The application of sentiment analysis proves invaluable

in diverse business tasks, including market research for advertising, business intelligence, real-time understanding of consumer choices and sentiments, as well as market trend detection, technology discovery, and identification of markets in need of specific products (Grljević, 2016).

Sentiment analysis is relevant for social networking, content building, and SEM digital marketing strategies. Sentiment analysis strives to detect prevailing sentiment in user-generated content from social media. In social network strategy, sentiment analysis enables social listening through monitoring and analysis of social media conversations relevant to a company and its brand, as well as to competitors and the industry. Sentiment analysis insights help companies to understand public opinion and adjust marketing strategies by sentiments (Micu, Micu, Geru, & Lixandroiu, 2017), (Markić, Bijakšić, & Bevanda, 2016). Sentiment analysis enhances SEM strategy by enabling companies to understand the public perception of a brand and the public perception related to competitors. Insights help advertisers adjust messages and strategies based on sentiment analysis results (Fan & Chang, 2009). In content-building strategy, sentiment analysis allows companies to understand the public stance towards relevant topics, track changes in sentiment over time, and create content that resonates with the audience and is more contextually relevant (Salminen, Yoganathan, Corporan, Jansen, & Jung, 2019), which is closely related to topic modelling.

2.3.2 Topic modelling

Topic modelling is an unsupervised technique that identifies and extracts hidden thematic structures in texts (Maier et al., 2018). Topic modelling algorithms take a collection of documents as input and output a list of topics with assignments of proportions of each topic in the document. Topics are defined as lists of keywords. The main goals are to discover the leading topics that documents cover, to identify how the topics are interconnected, and to monitor the development and changes in current topics over time (Grljević, 2023). Thematically related conversation detection is relevant for business as it enables monitoring of trends, emotions, rumours, and triggers that drive people to particular actions. In commercial applications, topic modelling is used in the tasks of document classification, where categories are added to new documents based on the topics the document contains, information retrieval, and for improving sentiment analysis and decision-making in the field of marketing (Grljević, 2023). In addition, topic modelling is essential for content-building digital marketing strategy as identification of trending themes helps marketers create content that aligns with popular and relevant topics for targeted audiences.

2.3.3 Natural language generation

Natural language generation (NLG) is an aspect of NLP dedicated to creating texts similar to human-written texts. NLG can be observed twofold as an aid to autocomplete and chatbots. Autocomplete predicts the following word in a sequence. Industry autocomplete applications refer to predictions of search queries or content generation in different genres or formats, such as tweets or blogs (DeepLearning.AI, 2023). Chatbots automate conversation by supplying a database of questions and answers or by simulating dialogs with a human conversant.

NLG is particularly useful for SEO, content building, and social network digital marketing strategies. Traditional SEO projects involve labour-intensive and expensive

manual content creation. AI-assisted tools can help to address these costs by generating relevant and high-quality content for the websites' landing pages (Reisenbichler, Reutterer, Schweidel, & Dan, 2022), which is crucial for SEO strategy as search engines prioritize content aligned with user intent. Automation of content writing can aid in dynamic content creation and adaptation to user preferences, intentions, and sentiments, which personalizes the overall experience.

2.3.4 Automatic speech recognition

Automatic Speech Recognition (ASR) allows computers to convert human speech into text data. It analyses grammar, syntax, structure, and composition of audio and voice signals to comprehend and process human speech. ASR finds applications in voice commands, spoken questions, voice searches, virtual assistants, voice ads, personalized voice messages, and transcriptions (Yu & Deng, 2015). Developing ASR-based systems is particularly challenging due to variations in speech patterns influenced by factors such as gender, race, age, speech impairment (dysarthria, stroke survival, oral cancer, or cleft lip and palate), and accents (regional or non-native), as reported by authors (Feng, Halpern, Kudina, & Scharenborg, 2024). Feng et al. (2024) indicate that ASR systems favour female speakers and misrecognise the speech of African American speakers more often than of white speakers. According to the authors, recognition of child speech poses a greater challenge due to the shorter vocal tracts, slower and more variable speaking rates, and less precise articulation in children.

3. Case studies of the application of AI in digital marketing

This chapter presents three case studies of large, successful companies positioned as innovators in the market. The studies illustrate how specific AI techniques enhance digital marketing strategies.

3.1 Coca-Cola case study

The Coca-Cola Company is a renowned brand in the beverage industry, holding a position as an innovator in the market. With the advent of voice technology, the company recognized an opportunity to launch an innovative marketing campaign titled "Using Your Voice to Share a Coke," engaging consumers in an interactive and personalized manner. In this campaign, Coca-Cola utilized Voice AI technology for voice recognition and processing, allowing consumers to personalize the appearance of Coca-Cola labels on bottles. The campaign resulted in the participation of a large number of consumers, distinguishing itself from competitors by pioneering the use of voice technology for personalized marketing efforts. The innovative use of Voice AI technology set the campaign apart and demonstrated how AI can be leveraged to create unique and memorable customer experiences (Westwater, 2023).

3.2 Starbucks case study

Starbucks, one of the most renowned brands in the global coffee shop industry, recognized the need for innovative marketing strategies to stand out from the competition. The goal was to enhance the personalized experience for its customers worldwide by implementing

predictive AI and machine learning. For this reason, Starbucks developed the platform - Deep Brew. The platform enables data analysis on preferences, order history, and customer behaviour. Embedded algorithms allow the platform to suggest products tailored to customers' unique desires and needs based on the analysis results. Through personalized offerings, AI has enabled Starbucks to build deeper connections with its customers. Personalized recommendations, order predictions, and intuitive menu adjustments through the Deep Brew platform have increased user engagement and brand loyalty, leading to higher sales and an enhanced reputation for Starbucks. Thanks to this AI-based digital transformation of marketing activities, Starbucks saw its user base grow to nearly 18 million by the end of 2019 (Hyperight, 2021).

3.3 Nike case study

Nike, a sports apparel and footwear global leader, recognized the significance of leveraging AI to enhance customer engagement, build greater loyalty, and strengthen brand connections through highly personalized marketing experiences. Nike initiated a personalized design campaign using AI as a primary technology. The introduction of AI into marketing strategies involved several steps. The first step involved consumer segmentation based on data from customer interactions on the Nike app and social media. Segmentation enabled a deep understanding of user preferences, insights into past purchases, and identification of behavioural patterns. The second step involved the application of machine learning algorithms to create personalized design recommendations for each user. In the third step, digital marketing automation tools are implemented to distribute personalized marketing messages through various digital channels. The integration of these tools allowed Nike to automate many marketing activities, including targeted ad placements, to achieve broader campaign visibility. The fourth step utilized analytical tools to track key campaign performance metrics: user engagement rate, conversion rate, and revenue increase rate, enabling Nike to evaluate campaign effectiveness and adjust the strategy in real time (Westwater, 2023).

Through the systematic implementation of AI, Nike successfully harnessed the potential of artificial intelligence to enhance personalization and improve overall marketing efforts. The campaign resulted in a significant increase in customer engagement, improvement in retention rates, and overall revenue growth (Westwater, 2023).

Relevant success factors of this campaign lie in a deep understanding of the target consumer group and their needs, innovative application of AI technology, and effective integration with other marketing tools. Through their synergy, Nike demonstrated how AI can revolutionize the approach to personalization and enhance marketing strategies.

Conclusion

This paper explores the key ways in which AI transforms digital marketing strategies, including SEO, SEM, social media, and content-building. Through the analysis of various aspects of digital marketing and the use of data, machine learning, and AI, the authors revealed that AI plays a crucial role in enhancing personalization, data analysis, and the automation of marketing processes.

Coca-Cola, Starbucks, and Nike case studies provide concrete examples of AI applications to create innovative campaigns and deepen customer relationships. By applying technologies such as voice recognition, customer data analysis, personalized recommendations, and automation, these companies demonstrate the power of a holistic and integrated approach to technology in achieving marketing goals, such as increased customer engagement, loyalty, and improved marketing performance.

The case studies show significant implications for the broader application of AI in digital marketing. Lessons learned from these cases can guide other companies in harnessing the potential of AI for transformative marketing initiatives. The success of these case studies points to the importance of innovation in digital marketing. Companies that use AI for unique and personalized marketing campaigns, such as Coca-Cola, stand out in the market. Innovation becomes a powerful tool for market differentiation. AI-driven marketing strategies like Starbucks and Nike improve customer experience and drive brand loyalty. Increased engagement, such as the one achieved by Nike's personalized design campaign, leads to higher retention rates and sustained customer loyalty. Companies that use AI to analyse customer data, such as Starbucks, can make informed decisions about product offerings, marketing strategies, and overall business direction, in line with the broader trend of businesses becoming more data-centric. AI automation enables scalability and readability. Companies can streamline marketing activities, target specific audiences with personalized messages, and achieve broader campaign visibility, which can be especially valuable for globally operating companies.

Case studies illustrate how large enterprises leveraged AI to improve digital marketing strategies. To implement similar technologies, small and medium-sized enterprises might face limitations such as resource constraints in terms of limited data, budget limitations, high costs of acquiring necessary technology infrastructure, and shortage of expertise and talent as AI-driven campaigns require specialized knowledge and skills. In these terms, the research presented in this paper has limitations as it does not reflect on the possibilities of AI implementations in small and medium-sized enterprises and it does not address how these enterprises can overcome the challenges.

The research presented in this paper emphasizes that AI is a means of more efficient marketing and a driver of innovations that transform how brands communicate with their target audience. These conclusions underscore the importance of integrating AI into contemporary marketing strategies for companies to gain a competitive edge and remain relevant in the digital ecosystem.

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