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Impact of Artificial Intelligence on Social Media Networks



Abstract: - The use of social media applications has become a part of our daily routine. There is a tremendous need to analyze the data generated by social media to develop solutions to various challenges. This study examines the implications and benefits of artificial intelligence (AI) on social media from numerous perspectives. Data analytics, process automation, developing new marketing tactics, and enhancing business efficiency are some of the common challenges where integrating AI with social media can play a big role. Social media applications provide various forms of support to individuals, communities, groups, and businesses. In order to keep in touch with their customers, business communities are using social media to post new products or services. On the other hand, educational communities are producing informative and educational materials for students worldwide. To further improve their performance, the communities are interested in evaluating the data generated by social media in the form of views, downloads, likenesses, ideas, improvements, and other demographic information. In order to properly assess the data, this study investigates the range of AI-based algorithms. It can provide the fastest possible understanding of user requirements for business organizations and communities. It is helpful to create innovative concepts considering the feedback and recommendations. All users and communities linked by social media applications can benefit from the proposed framework to strengthen their connections with each other. The investigated AI methods that can positively work with social media data includes machine learning, deep learning, and natural language processing, among other popular methods that can offer an extensive variety of solutions.

Keywords: Social Media Platforms, Artificial Intelligence, Machine Learning, Deep Learning.

I. INTRODUCTION

Artificial intelligence (AI) is a branch of computer science that focuses on training machines to perform human-like tasks. There are several AI applications that help enterprises in the health industry, education, telecommunications, marketing agencies, and other fields. Machine learning, deep learning, image recognition, predictive analytics, face recognition, and smart intelligence are the primary subfields of AI. The use of AI in various sectors emphasizes the importance and impact of modern computer approaches on society. For example, machine learning approaches applied to COVID-19 datasets assist health companies in identifying the most common trends identified in COVID-19-positive individuals [1]. Moreover, building automated decision support system [2], the use of deep learning on agriculture field [3], and predicting the telemarketing users using data mining strategies [4] are some examples of AI implementation in different domains [5].

Recently, social media platforms have been actively engaged in a variety of activities and are recognized as one of the most popular communication methods. It is apparent that in present settings, social media plays a key role in distributing valuable information [6], launch awareness campaigns [7], collect customers feedback [8], and speed up the sales and marketing promotions [9]. Social media platforms such as Twitter, Facebook, Instagram are useful applications where people are posting thousands of post every day in the form of text, images, and videos [10]. Therefore, there is a need of statistical and computing techniques to analyze that large amount of data.

Lian et al., proposed a framework for analyzing social media data using different steps; (i) trend analysis, (ii) network analysis, (iii) topic clustering, and (iv) sentiment analysis [11]. The model was applied to the obtained 96,435 comments and 55,186 repost data using several AI-based approaches such as text mining, keyword extraction, and sentiment analysis. The use of smart mobile devices is an excellent way to interact with a variety of AI-based applications for data collection and analysis. The study presented and assessed English-speaking practice

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utilizing a social networking program [12]. For five weeks, 70 students participated in various interactive sessions using AI technologies. The study revealed that the employment of AI applications can efficiently improve speaking skills.

This study elaborated on the use of AI algorithms to examine the enormous amounts of data created by social media applications. Augmented reality, virtual reality, text analysis, and online reviews are some significant AI features that might help improve the efficiency of businesses [13]. It has been demonstrated that monitoring online reviews and feedback from customers can effectively improve company services. Social media provides a venue for purchasing and selling things, advertising new products, gathering expert opinions, and developing new marketing methods.

Thus, this research presented a paradigm for understanding the impact of AI on social media platforms. The proposed framework will assist in answering the following research questions in this study. (i) identify viable AI strategies for analyzing social media data. Furthermore, (ii) it investigates the implications of AI on social media data to improve the performance of various businesses.

The remainder of this paper is organized as follows: Section II contains relevant work in the categories of social media platforms and AI applications. Section III presents the proposed framework and step by step implementation. Section IV presents the findings, and discussions. Finally, the paper ends with presenting the conclusion.

II. RELATED WORK

A. Social Media Platforms

The adoption of social media platforms has resulted in several benefits for organizations. Online interactive sessions can enhance teaching and learning activities. Especially during the COVID-19 era, social media platforms play a vital role in connecting communities with one another [14]. It demonstrates the value and usability of social media tools. On the other hand, for medical and health practitioners, it demonstrated a potential means to communicate and receive fast information on COVID-19 [15]. It assisted in the understanding of current pandemic trends and patterns, as well as the execution of the awareness campaign. Recently, a paper suggested the creation of an Internet Hospital in response to the tremendous increase in a number of people connected via social media platforms [16]. The concept of Internet Hospital can perform a variety of functions, maintaining information quality, and providing users with assistance.

The education business is another active domain where social media has made significant contributions. The use of internet tools actively engaged students, with interactive sessions and online materials allowing them to seek guidance in less time. Currently, social media platforms can provide a number of approaches for education, assessment, and participation [17]. The online learning experience using digital technologies was evaluated in order to better understand the level of involvement and comprehension during online studies. The author used a technology-organization-environment framework to identify online education processes and their impact on students and teachers [18].

The amount of data created by social media networks is massive. As a result, the usage of AI technology can improve comprehension for anticipating a variety of elements. People in this world communicate with one another via an online network, as seen in Fig. 1 [19]. Social networks are platforms where people may communicate and receive recommendations even if they don't know one other. Recommendation systems, expert systems, and opinion-based systems are some examples of how individuals make judgments based on information sharing.

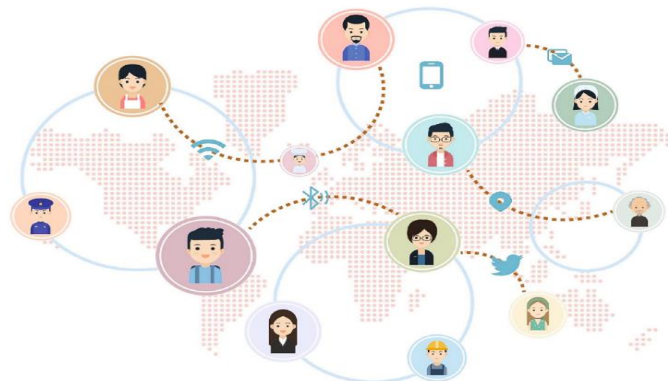


Fig. 1 The Association between Social Media Platforms [19]

The use of social media platforms has many as researchers proposed different ideas to promote the benefits of social media applications. For example, one study proposed a communication channel in which a message may be forwarded to a number of groups/people based on several categories. People can automatically receive information according to their interests [20]. The objective of using social media positively was utilized in a study examining how groups might exchange knowledge internationally [21]. Promoting social and cultural awareness, privacy concerns, and avoiding false information sharing were some aspects discussed in that research.

Current online platforms also propose using social media to deal with the organization's many difficulties. For example, it can assist in running various campaigns with cost-saving tactics, connecting with various groups, and discussing other linked topics with multiple stakeholders [22]. It can further help to understand the user's sentiments analysis for a particular product, news, events, or future development [23]. Platforms such as Twitter and Facebook are playing an important role to collect the feedback and suggestions from the community in a rapid way.

The discussion presented in this section highlights the important aspects of social media platforms as follows:

- How social media may aid businesses in several fields, including health, education, marketing, government, and more.
- It can facilitate awareness campaigns, social gatherings, cultural events, and feedback on community issues.
- It can help to run awareness campaigns, social gathering, cultural activities, and collect feedback on community's issues.
- Social media's value lies in its ability to connect people, groups, and communities to share recommendations for overall well-being.
- Use of social media platforms for online teaching and learning proven effective throughout the pandemic and can be continued in the future.
- Organizations require methods to gather, analyze, and give insight from the vast volume of data generated by these platforms.

B. AI Techniques for Social Media Data Analysis

The number of social network users grows by the day, increasing the volume of information shared through these platforms. However, not all data is acceptable for analysis and decision-making. There is a need to reduce noisy data, discover hidden patterns in data, find outliers, and lastly use this data to make future decisions. As a result, implementing AI algorithms is critical for analyzing such vast amounts of data.

The use of AI techniques to assess online enterprise services, which are essential component of enterprise architecture [24] and business architecture [25], [26], [27]. In the same way, all online services and performance can further be enhanced by analyzing feedback and suggestions from users through social media platforms [28]. In addition, several machine learning-based techniques applied on improving the digital marketing through social media platforms [29]. Authors described the use of AI tools for the transformation of data flow into valuable customer feedback and further create new marketing strategies based on the data analysis.

There are numerous AI approaches that can be used to improve service performance based on social media data. Predictive analytics, forecasting, AI-powered chatbots, virtual assistants, explainable AI, automated data analysis, and anomaly detection are examples of methodologies that can be used with social media data [30]. Finally, implementing these strategies can help organizations improve their business intelligence and online services. Specifically, automated data analysis assists organizations in launching AI chatbots that can answer client questions without the need for human intervention.

Deep learning is a cutting-edge AI technology that has demonstrated impressive results when working with data from online social networks. As millions of individuals join to online social networks, advanced technologies such as deep learning algorithms can assess the massive quantity of data generated through complicated online environments. As proposed by [31] and illustrated in Fig. 2, this helps to understand the application of deep learning techniques to social networks. It offers a variety of applications and schemes, including opinion analysis, structural analysis, sentiment analysis, classification of texts, and others.

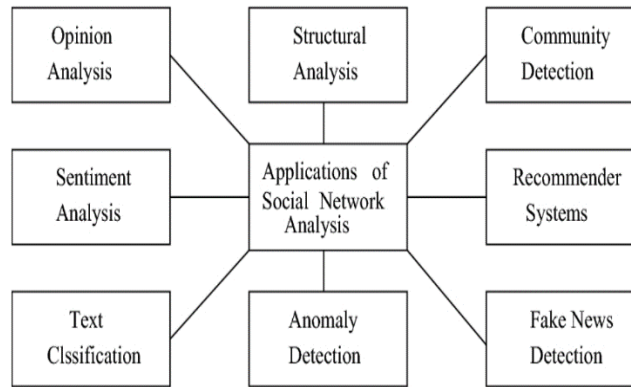


Fig. 2 Social Network Analysis using Deep Learning [31]

In closing this part, we can highlight the following key findings on AI implications for social network analysis:

- AI algorithms provide useful methods for studying social media data.
- For example, deep learning algorithms for visual data analysis.
- Machine learning can improve online business services through text classification and sentiment analysis.
- AI-based technologies provide automated decision support, chatbots, and customer query centers without human intervention.
- Identifies user preferences and interests to provide information to specific groups and communities.
- The implications of AI on social media are immense, and it's aiding the business in various ways.

III. THE PROPOSED FRAMEWORK

Based on the previous discussion, this study proposed a framework to demonstrate the importance of AI in processing data created by social media platforms, as illustrated in Fig. 3. The previous section covered numerous artificial intelligence applications that can be used to evaluate social media data. Text classification, voice recognition, navigation, and recommendation systems are examples of applications driven by AI that are having a significant impact on social media platforms and commercial organizations. Automatic posting, video assessment, user targeting, advertising, and content generation are some common examples of how organizations can improve their business processes and online services. The working of the proposed framework can be divided into several phases, which are explained below.

A. Phase-1 – Social Media Platforms

There are several social media platforms that collect massive volumes of data from different sources. Each platform serves a unique purpose and attracts a distinct set of users. For example, Facebook and X (Twitter) are frequently used to broadcast personal information, share community efforts, and disseminate business-related information. Likeness, posting, tweeting, retweeting, and hashtags are some of the factors used to determine the value and influence of user-posted communications. On the other hand, YouTube is well-known for posting video logs, information videos, and other entertainment content, with a large number of adverts producing a significant impact on businesses. These platforms generate vast amounts of content that can be useful in discovering solutions to various challenges related to a group, community, or enterprise.

B. Phase-2 – Problem Identification

Many people are connected to online social media platforms, which are contributing to the generation of large amounts of data. To collect relevant data, the domain, target consumers, and specific problem must be determined at this stage. As a result, the proposed methodology examined a sample of problems that can be addressed utilizing social media data. Companies, for example, can learn about their customers' perceptions of a product or service. Communities may detect a hidden trend in the comments left by different people. Advertising agencies can target consumers based on their interests and preferences. Furthermore, organizations can use several factors to assess their performance and efficacy. This stage will help you determine the data collection approach.

C. Phase-3 – Data Collection Strategies

This stage will establish a connection between the social media application and the organization in order to collect data based on the problem identified in the previous step. There are several data collection methods addressed,

including profile visits, to determine user engagement with the product or service. We can utilize demographic information to determine the kind of users associated with business. Several social media posts can be collected to examine sentiment, brand performance, and user-generated critical evaluations. The collected data can be useful in proposing a solution to a problem and determining the future path for the companies.

D. Phase-4 – Data Preprocessing Techniques

The obtained data is not necessarily suitable for using predictive or data analytics approaches. As a result, in this step, we provided several ways for preparing the data in a suitable format. Data preparation techniques are often used for a variety of purposes, including as filling in missing data, removing outliers, and transforming data into an appropriate format. It also depends on which AI approaches will be used in the following stages.

E. Phase-5 – Data Analysis Methods

Finally, stages 5 and 6 can provide useful information from the obtained data. Both phases can help find hidden patterns in the data. Cluster analysis is a technique that can generate a group of people categorized based on their interests, allowing organizations to easily promote important content to their target clients. Descriptive analytics would reveal some fascinating information about the users associated with a specific social media page. Advertising agencies will also update their algorithm for ad placement.

F. Phase-6 – The Use of AI Techniques

Based on the problem described in phase 1, this phase will assist in determining the optimal AI technique for developing a viable solution. As previously noted, AI offers a variety of approaches such as machine learning, deep learning, and natural language processing that can process data in various formats. Now, the technique will be chosen based on whether the problem is related with textual or visual data. For example, deep learning algorithms can be used to process X-ray images in order to comprehend their features and anticipate disease and other solutions. Natural language processing technologies can be used to evaluate, understand, and investigate audio and textual data without involving humans. Furthermore, machine learning technologies are relatively better to train machines for a particular problem using training datasets. For instance, machine learning classifiers help detect malicious accounts, identify potential customers, and improve customer satisfaction.

IV. FINDINGS AND DISCUSSION

This paper discusses the benefits of using AI techniques and models to examine data generated by social media applications. We provided a framework to understand the implementation and number of steps required to solve a problem related to social media networks. The first research question investigated the possible use of AI approaches to examine social media data. The study looked into numerous applications where artificial intelligence can help individuals, groups, and businesses find better solutions. Text analysis, recommendation systems, and improving the efficiency of corporate operations are all problems that AI algorithms can solve well. Furthermore, assessing users' comments, likenesses, ideas, and interest in an event, product, or service is another famous application of AI, which helps the business organization to improve their dealing with the users and enhance the number of potential customers.

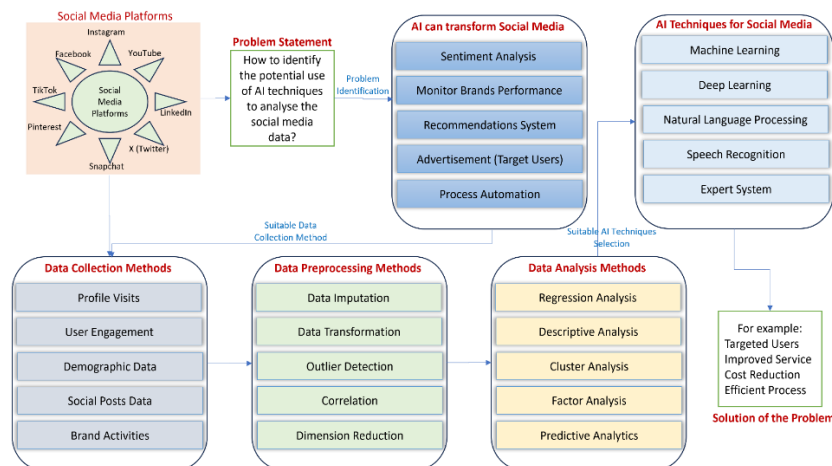


Fig. 3 Proposed Framework

In today's world, social media platforms represent a large number of individuals connected via the internet, and information exchange cannot be as fast as it is now thanks to social media. Furthermore, continual improvements in internet speed and the increasing number of social media applications are typical reasons for the widespread usage of social media for various purposes. Community-based services, promoting new brands, selling and buying products, publishing instructional information, and seeking user feedback constitute prominent instances of how social media can be used effectively.

The study revealed several fields of AI capable of analyzing various sorts of social media data. These networks have a complex structure, and huge amounts of data are generated through them. As a result, there is a need for unique algorithms capable of dealing with the complexities of huge data. Deep learning algorithms offer several techniques for dealing with images and text data in order to deliver solutions to various challenges. Deep learning technologies are especially popular for visual data analytics. Machine learning and natural language processing approaches, on the other hand, can be more effective for textual analysis and prediction. To summarize, social media platforms are not just for broadcasting content and information, but organizations are more interested in analyzing the data created through these platforms to improve their performance based on users' feedback and suggestions.

V. CONCLUSION

The use of social media platforms and their users is growing by the day, demonstrating the importance and benefits that people may gain from these platforms. This study shows that the huge amount of data generated by these platforms must be correctly processed in order to be fully utilized. Therefore, this paper proposed a framework for determining the implications and benefits of AI algorithms for evaluating social media data. Based on the findings, the study offered a number of AI-based techniques, including machine learning, deep learning, natural language processing, and speech recognition, that can assist in identifying various solutions. Using these strategies can provide answers to many problems linked to individuals, groups, communities, and enterprises to improve their work with the support of users' opinions publishing on social media platforms.

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