Business Boosting

by TII Service

ORIGINAL ARTICLE

Business boosting through sentiment analysis using Artificial Intelligence approach

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Abstract In the recent years, Artificial Intelligence has conquered every field whether it is health sector, financial sector, satellite system, farming sector and many more. Artificial Intelligence has enhanced the performance of all these sectors. In this paper, the focus will be on business performance and the AI methods will be applied in the form of machine learning and deep learning. This paper will present how Artificial Intelligence has enhance the business through the sentiment analysis. The work has also discussed the sentiment analysis approach for the business applications. The paper has covered all the aspects with respect to artificial intelligence in the business domain with its advantages for enhancing the performance of the business. The work has also described the natural language processing for performing the sentiment analysis through which business performance can be boosted.

1 Introduction

The most important part of any business is attracting the costumer to services provided by any organization. One of the interesting methods to attract the customers is marketing the business. In this era a new technique is used for marketing purposes. This technique involves human sentiments in order to appeal the customers. In sentimental analysis, the emotion of a customer guides him to buy a certain product. This paper involves the boosting of business using Artificial Intelligence which involves human sentiment. A brand's performance can be boosted and successful customer experiences benefit from sentiment analysis and machine learning techniques (Liu et al. 2020). To form an effective marketing strategy, companies must focus on their customers and spend a lot of money on research, from feedback analysis and competitor studies to product fit in new markets. Then you can see why data is essential in developing strategies, tools, and techniques to help a business stand out. However, any attempt to organize, sort, understand, and even monetize the vast amount of unstructured data available seems like an impossible challenge (Ramaswamy and DeClerck 2018).

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This information has enormous value, and sentiment analysis is an excellent method for bringing it to fruition (Alita et al. 2019). Companies using this technology can harness the great potential of market trends, customer attitudes, and people's inclinations and influences. Figure 1 describes how Artificial Intelligence is implemented on Business applications. One of the many applications of sentiment analysis is in brand monitoring and reputation management. Machine learning and big data analysis give companies an edge in their respective business fields (Redondo et al. 2020). For accurate sentiment analysis and sound business decisions, machine learning is essential. This includes everything from identifying long-term trends to coming up with catchy marketing copy that makes customers fall head over heels for your product. These types of business strategies can be proven very effective in smart cities. In smart cities major focus is on connecting peoples with the advance technology. The model presented in this research work can boost individuals in the smart city to get better services like online shopping experience, make effective use of OTT platforms, traffic navigation systems and many more.

The organization of the paper is as follows: Sect. 1 discussed the introduction with the Sect. 2 covers the literature survey. Section 3 defines the role of Artificial intelligence across the globe in various sectors whereas Sect. 4 focusses on the sentiment analysis for the business boosting. The Sect. 5 covers the conclusion and the future work followed by the reference section.

2 Literature survey

To better understand the relationship between artificial intelligence (AI) and business decision-making in dynamic environments, Trunk et al. (Trunk et al. 2020) conducted a literature review. To summarize existing studies' possibilities for the correlation of AI and business decision-making in dynamic environments, authors searched for peer-reviewed papers and conducted a content analysis. After describing how humans can use AI to make decisions in dynamic environments, the results are presented in a theoretical framework that discusses some of the challenges and implications of doing so.

It was done by Caner and Bhatti (Caner and Bhatti 2020) to present a theoretical model for examining AI organizational strategy in peer-reviewed scientific journal papers. Specifically, they looked at documents that were published
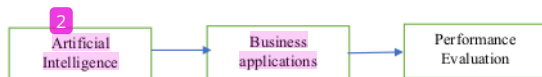

Fig. 1 Artificial Intelligence in business

in that time frame. Among the significant elements of AI in organizations, they found that financial matters and AI, organizational functions, and the workforce are all important, as is the use of AI in industries and AI laws and ethics to determine a company's corporate strategy.

As a result of their work, Borges et al. (Borges et al. 2021) carried out a literature review to determine the relationship between artificial intelligence (AI) and corporate strategy. By conducting an (Kumar et al. 2018) extensive literature review on the combination of artificial intelligence (AI) and business strategy, this article aimed to close the knowledge gap. It also combined current approaches with models to show the expected benefits, difficulties, and opportunities while also discussing possible future research directions. A framework was developed to introduce research gaps by selecting articles from peer-reviewed journals and conference proceedings.

3 AI based methods

In this work, the discussion will be on some of the artificial intelligence approaches that will be used to enhance the business performance. The approaches will be used in various domains of business such as decision support process, new product and service development process, capabilities etc. The AI approaches will be in the form of machine learning, deep learning, and the digital technologies. Let's connect them one by one.

3.1 Machine learning for the business enhancement

With the advent of machine learning, we now have cutting-edge technology that combines the best of mathematics, statistics, and artificial intelligence (AI) (Peng et al. 2021). The basic premise of artificial intelligence and machine learning technology is that engineers should perform tasks other than simply writing programs. Therefore, creating a computer that can teach itself how to write programs should be possible. The program should be "intelligent" in that it can learn from previous information and interactions. This is critical. As a result of artificial intelligence (AI), the software can now write its programs and use what it has learned to provide proactive solutions in the future. To develop actionable predictions for executives, businesses use machine learning to use the massive amounts of data they've collected.

Here are three ways that machine learning is assisting companies in growing shown in Fig. 2.
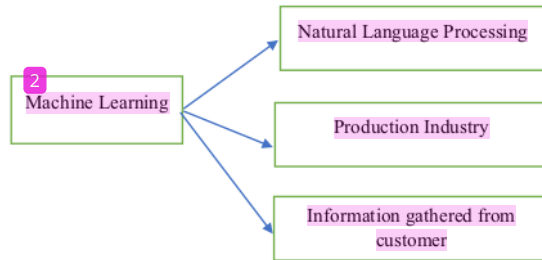
Fig. 2 Machine learning in business

3.1.1 Natural language processing

The creation of a program that can understand natural language has proven to be an impossible challenge for the tech industry since its inception (Pugalenthi et al. 2021). However, it's safe to say that software has advanced over the years, as users no longer have to type long search terms into Google to find what they're looking for. Despite this, computer programs have a hard time understanding human speech or natural language. Artificial intelligence and machine learning are beginning to alter this situation. Programs powered by AI can learn from mistakes and interactions in the past. Applications such as search engines and voice-activated assistants can now operate confidently because they have started to understand regular human speech more thoroughly. Moreover, these programs are constantly being improved in terms of accuracy. Vocal assistants like Google Assistant and Nuance Intelligent Virtual Assistant help executives and other professions (Newswire 2013). They use several methods to achieve this. AI-powered personal assistants may do many functions. For example, making appointments, scheduling activities, booking flights and hotels are all part of planning your life. They also work 365 days a year, 24 h a day. Employees benefit from personal assistants because they save time by using them throughout the day. Professionals, for example, used to have to manually look up old data or essential details. Today, executives can request interest rates from their assistant, who will recite sales figures for a specific quarter.

The logistics and retail industries are rapidly becoming data analytics and machine learning professionals (Panigrahi et al. 2018). As a result, their performance is often related to maximizing every sale. Improved shipping, storage, and sales processes are all made possible by machine learning. In addition, forward-thinking companies can now incorporate self-driving vehicles into their fleets thanks to this new technology. Machine learning helps international shipping businesses profit (Montes et al. 2018). These companies install thousands of components on cargo ships, long-haul trucks, and other tiny equipment.

Preventative maintenance schedules also assist managers in discovering breakdown tendencies.

Amazon, for example, employs machine learning to optimize delivery networks and predict customer needs. Using Amazon's "anticipatory shipping" system, you can forecast how many orders you'll get and from where. As a result, the company now sends popular commodities like phone accessories and household goods to regional distribution hubs ahead of time.

3.1.2 Production industry

Machine learning has already begun to permeate every stage of production in the manufacturing industry (Cioffi et al. 2020). To put it another way, using artificial intelligence (AI)-driven technology can save companies money by streamlining inventory management, increasing production efficiency, and forecasting equipment failure (Nair and Bhagat 2019). Data generated every day is a massive advantage for the manufacturing industry. Innovative data analytics software is being developed by savvy companies like Seebo with the help of Python developers. These programs make use of machine learning to anticipate annual manufacturing highs and lows and make suggestions for process improvements. These professionals also create maintenance schedules that save their clients' money by preventing unscheduled shutdowns.

Machine learning, according to McKinsey, will help manufacturing companies save 30% on material delivery times and 12% on fuel costs by streamlining their operations (Santosh Kumar et al. 2020). In addition, according to the firm's estimates, businesses that fully integrate AI-driven technologies into their operations can expect to see a 13 percent increase in gross revenue. According to Deloitte, machine learning can prevent millions of dollars in maintenance costs for companies (Times 2020). Deloitte estimates that AI-driven programs can save companies 15% to 30% when it comes to unplanned downtime and maintenance costs.

3.1.3 Information gathered from customers

Executives are most interested in seeing how increasing consumer data collection and analysis will affect future profits and growth. Every year, companies spend millions of dollars accumulating reams of customer data. This includes everything from shopping habits to demographic identifiers to income. These businesses can now use the data thanks to artificial intelligence (AI)-driven software. Senior management collaborates on cutting-edge data analytics tools that collect information and generate actionable predictions using Python software development companies. The online retail marketplace Etsy, for

example, makes use of machine learning to enhance the customer experience. As a result, personalized customer profiles were created, search results were improved, and overall user experience was enhanced. Despite stiff competition from Amazon and Target, the company has achieved annual revenues of $603 million, thanks in part to the innovative use of data analytics.

Netflix is another business that has had success with AI-driven technology (Gantz et al. 2017). User interest in shows and movies is predicted with high accuracy using machine learning on the online streaming platform. Each time a customer scrolls through a new film, they interact with the program and provide valuable data.

3.2 Deep learning

A wide range of practical applications is processed using Deep Learning. Labeled datasets are necessary for classification tasks because they can be used to identify patterns in the data. The human user must transfer his or her knowledge to the labeled set when using a labeled data set. This enables the neural network to connect the data to the labels and the system to do the same. Supervised learning is what's taking place here (O'Sullivan et al. 2019). Deep learning can recognize gestures in videos, hear voices, and determine who is speaking this way because of this. Other capabilities include:

- Text transcription
- Inferring sentiment from voice recordings
- Recognizing images like road signs or people

More data means better accuracy for an algorithm. Allowing systems to learn on their own can lead to incredibly accurate predictions. There are numerous applications for clustering. To begin, it's used for data, information, or document searching. It can also look for similarities between sounds and images. It can sift through large amounts of data, searching for anomalies or behavior that deviates from the norm. For example, this helps spot and prevents fraud. We can make accurate predictions thanks to deep learning. As a result, we're better equipped to avert or anticipate problems before they arise. It also improves the efficiency of analytics as a result of it. Here are some of the applications of deep learning in business industries shown in Fig. 3.

Last but not least, the data gathered here can be used to react quickly and effectively to changing scenarios.

3.2.1 Intensive instruction revitalization of retail

As a result, more and more people are opting to shop online at companies like Amazon. Older brands, particularly well-known ones from the high street, often struggle in the new
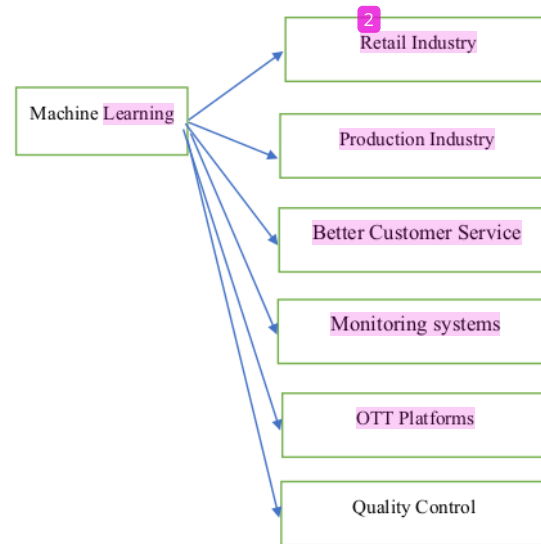
Fig. 3 Deep learning in business

environment. Many people have attempted to adapt and innovate by embracing new solutions. Burberry has revolutionized its business by utilizing AI and big data applications that use deep learning. Using deep learning and big data, luxury fashion retailer Burberry has reimagined its entire business model. Deep learning models are being used by the business to build stronger relationships with its customers. Traditional loyalty schemes collect customer data, which the company provides personalized recommendations both online and in-store. RFID tags on products can send additional information to customers' devices in addition to making product recommendations (Moraru et al. 2020). Information on how and where the product was made can also be included in this section. In addition, the business has seen an advantage. Recurring customers increased by 50% in 2015. To better understand which products will sell in-store, Burberry has implemented these systems (Straker and Wrigley 2016). The company used this data to create new images of underperforming products, which increased sales.

3.2.2 Better customer service

Customer service can improve and evolve thanks to deep learning applications. For instance, Disney uses these applications to enhance its already well-known level of customer service and satisfaction. After a long period of development and testing, Walt Disney World has finally introduced the MyMagicPlus system. Many aspects of the visitor's experience are taken into account in this groundbreaking approach to customer service. Everyone who

comes to Disney World gets a MagicBand when they get there. You can use it as a form of identification and get things like park tickets and FastPasses by scanning this barcode on your mobile device. It's also a credit card that can be used in-store. Guests no longer need to worry about forgetting their keys, wallets, or cash because their wristbands serve as a convenient storage solution.

The visitor merely swipes their wristband across one of the parks with sensors to enter or pay for whatever. Conveniently, intelligent technology is being utilized in this way. In addition, it gives Disney a tonne of valuable data. Disney can use this information to track the whereabouts and activities of all of its guests. As a result, Disney is prepared for anything a visitor may require. A smooth and personalized experience can be provided by using this translation of information by Disney. As a result of this information, the park can operate more efficiently. For example, Disney can identify areas where lines are forming to direct visitors to those areas or hire more employees. Increasing Disney World's efficiency in this way benefits both the park and its guests. The MyMagicPlus system, launched by Disney World, uses artificial intelligence (AI) and deep learning (Marr and Ward 2019). With the advancement of deep learning and the associated techniques, this system is now a reality. Walt Disney World hopes to use this data to figure out which areas and routes are the busiest. Marketing and operational decisions can be informed by this information, which helps boost the site's productivity even further. Machine learning and neural networks aren't just important to Disney because they want to improve the guest experience. Robotic versions of their most popular characters are also reportedly on the table.

3.2.3 Enhancing the customer experience through deep learning

In the past, Microsoft has used deep and machine learning and neural networks to improve and develop their systems. Deep learning-driven systems are the only thing that makes Microsoft's virtual assistant Cortana and Skype-compatible chatbots possible. Both applications quickly and accurately answer inquiries about the weather, traffic, or any other topic (Nair and Bhagat 2018a). Amazon and Google are also utilizing deep learning to their advantage with their Alexa systems. For some time now, Google has been utilizing these systems to enhance YouTube video recommendations. Deep and machine learning and artificial neural networks all help Google's search engine and Android platform. These applications are being sought to be expanded by various companies, with Google being one of them. Google uses machine learning, deep learning, geomapping, satellite data, and cloud computing to detect and prevent illegal fishing. Fishing activity on the world's

waterways is tracked by Global Fishing Watch, which keeps tabs on more than 22 million different data points.

Engineers can now use deep and machine learning systems to determine why a particular vessel set sail. Thus, suspicious or illegal activities such as fishing in restricted waters can be detected using this data.

3.2.4 Financial fraud is being reduced thanks to deep learning

Deep learning can also be used to identify system flaws and unusual activity in customer accounts (Morozov et al. 2022). In the past, nonlinear methods of detecting fraud were limited because they relied on transaction sizes that were simply too large and obvious. Companies can use deep learning and neural networks, on the other hand, to create a system that is more flexible and comprehensive. Systems based on deep learning can detect even the slightest shift in a customer's usual behavior patterns. In addition to the transaction, they keep track of the date, time, location, retailer type, IP address, and many other details. It also means that suspicious transactions can be linked together. As a result, a more complete and secure arrangement can be made. For example, Visa has reduced credit card fraud by two-thirds thanks to systems powered by deep learning. In addition, smartphone apps and wifi connections are increasingly being used to conduct financial transactions online. As a result, fraud and identity theft are now more likely. According to a recent report by online security giant McAfee, cybercrime costs the global economy 0.8% of its GDP. While customers must bear some of the consequences of their decisions, banks and other financial institutions are increasingly taking the heat. Financial service providers strive to create secure financial transfer methods that are reliable in today's increasingly digital world.

As a result, they are constantly re-evaluating and improving their fraud detection methods. Advanced systems can reliably detect suspicious behavior in the present day. Danske Bank is using deep learning systems to detect fraud better and protect customers. Many large banks are turning to artificial intelligence (AI) to help them detect fraud and keep customers safe. For example, Danske Bank turned to technology to improve their systems after realizing their old ones returned 1200 false positives per day (Phadke 2021). As a result, the Danish bank has created a sophisticated fraud detection system with the assistance of Think Big Analytics.

This system can notify the bank in a variety of situations where unusual behavior is detected. For example, it would help if you were on the lookout for customers using a new computer or completing forms much faster than the norm. Danske Bank has improved the security

and comprehensiveness of its systems by utilizing deep learning. This has resulted in a better user experience and increased safety. Crowe, a public accounting and consulting firm, has similarly created Crowe Data Anomaly Detection. These forensic investigators are using deep learning to look for signs of fraud and other unexplained activity. Some banks are working to educate their customers as well as constantly improving their systems. Erica, a chatbot developed by Bank of America, was created with this goal in mind. Erica does more than facilitate financial transactions for her customers. In addition, the chatbot can help users find better investments or accounts and provide answers to their questions about financial security.

3.2.5 Creating targeted marketing strategies and campaigns

Analyzing customer purchasing habits is one way to make use of this data. For example, using deep learning, companies can identify customers with similar characteristics, such as those who buy records in vinyl format.

As a result of this data, customized marketing strategies can be developed. Using neural networks and deep learning, Starbucks, for example, can better target its marketing efforts. As a result, Starbucks has integrated its existing customer reward program with information about past purchases, location, order preferences, etc. By incorporating this data into their app, they hope to keep customers engaged longer while also providing personalized discounts and customization options to each individual. Starbucks attributes a $2.56 billion increase in revenue to this customized service. Starbucks doesn't just use deep learning and neural networks. Other companies, like Sephora, use deep learning data analysis to deliver highly personalized email marketing campaigns. Each subscriber gets a unique email that highlights products based on their past purchases and searches. This flexibility maintains campaign interaction, click rates and reduces email fatigue. As a result, Sephora's business model works in a competitive market.

3.2.6 Continued adoption of energy production deep learning

Energy giants like BP aren't the only ones looking for new ways to save money (Jorge-Martinez et al. 2021). As an illustration, smart sensors are already being used on Shell's oil rigs in the Mexico's Gulf. By automating this process, the extraction can be done safely while saving the business money and time. Likewise, modernizing its operations requires GE Power to use advanced analytics, big data, and deep learning. GE Power, for example, modernizes its operations through the use of machine learning, big data, and advanced analytics. All of these innovations are geared toward creating a digital power station.

To remain competitive, energy producers such as GE Power want to improve the efficiency of their operations. As a result, big data and machine learning are used in conjunction with Internet of Things technology and deep learning (Kumar et al. 2021). GE Power's goal is to create a "digital power plant" by combining various intelligent solutions.

3.2.7 Improving quality control is step

Many businesses incur high costs because of the need to discard or replace substandard products. This aspect of production accounts for up to 30% of costs in the semiconductor industry. In addition, automating quality control is now possible with deep learning and machine-driven solutions like image recognition. It can also improve the detection of defects by up to 90% while they are still in the factory. In addition, systems powered by machine learning are capable of evolving continuously. As a result, the applications are flexible enough to meet changing needs or specifications.

Fujitsu, for example, currently utilizes an integrated assembly line system. Their systems can detect product defects, but they can also get the product ready for automated assembly in the next step. Regular Preventive Maintenance reduces costs System Downtime In the event of hardware failure, production may be halted for an extended period. Repairing expensive equipment can have a severe impact on a company's long-term viability. Deep learning applications have made predictive maintenance a reality, and it's a great solution to this problem. Smart sensors can also be installed in machines. These sensors can keep tabs on both operational flow and machine performance. Skilled technicians can easily access and interpret this data to spot potential issues with machines. These minor issues can be dealt with right away before they snowball into something more serious.

Numerous businesses have begun using predictive maintenance because of the increased productivity it offers. Shell, for instance, makes use of OneWatt's non-invasive listening solution. Devices from OneWatts listen for machine noise. In the event of a tonal change, engineers are notified, and the machine can be overhauled before a significant breakdown occurs if caught early enough.

3.2.8 Changes to the media production process

In the recent years, machine learning has also transformed the media industry. As part of its ongoing Talking with Machines project, the BBC, a world-renowned UK media

outlet, uses deep learning applications. This is a different kind of audio drama. Smart speakers allow listeners to participate in the conversation by speaking with the show's characters directly. Meanwhile, the Press Association is working on machine learning and artificial intelligence applications to cover local news stories. In recent years, local news has been fighting for its life, having once been the training ground for many aspiring journalists. According to the Press Association, Robotics and deep learning applications have a chance of saving the industry.

RADAR was launched by Urbs Media and the Pennsylvania Association of Governments (PAG) (Reporters and Data and Robots). Automated article creation using deep learning and artificial intelligence algorithms The PA and Urbs Media, a news automation specialist, launched RADAR (Data, Reporters and Robots). Once completed, robots will produce 30,000 local news stories per month. Data will be processed by deep learning systems from various sources, including local governments, public services, and government press releases. Natural language generation applications will use this data to produce local news stories. As a result, the market can be filled by using automation and smart solutions.

3.2.9 How consumer goods are transforming

A variety of cutting-edge technologies are altering everything from toys to cars to household appliances. Hello, Barbie is a good illustration of this. It's a talking Barbie doll that reacts to what the child says. When a child speaks into Barbie's necklace, a microphone records what the child says and sends it to ToyTalk's servers. Eight thousand different responses could be given in this conversation, and using deep learning, the system chooses the best one from them all. It's then sent back to Barbie so she can respond immediately. Unfortunately, what some may consider a cute children's toy, others consider a security risk.

This is partly because every exchange is recorded. The data, like a child's favorite colour, can be reused later. Coca-Cola is also using deep learning to maximize the value of its business data. As one might expect from a company that sells 500 brands in 200 countries, Coca-Cola generates a lot of data. Machines and deep learning can sort and transform this data into useful information. From new product development to augmented reality testing in its bottling plants, Coca-Cola uses the information. As a result, a lot of businesses generate a lot of data. This data contains information about the product, transportation and production details, sales and invent inventories, and customers' purchasing habits (Nair and Bhagat 2018b). Using this data can be a lengthy and laborious process. It's nearly impossible to make connections between all of this data

manually. However, unstructured data can be processed quickly and efficiently by deep learning applications. Furthermore, these applications can helpfully present the data and draw attention to relevant relationships. That way, the user can see the entire business model and gauge its efficacy from a vantage point of totality.

3.2.10 Manufacturing is becoming safer thanks to deep learning

Many manufacturing tasks use AI and deep learning. This is especially useful when repeating tedious tasks are involved in the system. An automated system won't lose focus and make a mistake. Corrections are simple in some industries but not in heavy industries or large-scale operations. There may be injuries or deaths. According to Cortexica, businesses in high-risk environments dealt with an average of 27 non-fatal injuries in 2018. Human error was responsible for 47% of these mishaps. Deep learning systems make manufacturing processes safer. BMW, for example, uses KUKA LBR iiwa robots. These systems can scan workers for PPE compliance upon arrival, and sensors can track every worker on the job site. Non-compliance may alert site managers or shut down systems. Using intelligent systems can help prevent accidents. Thus, automation can make manufacturing safer.

A lot of automakers are using deep learning in their manufacturing processes. Robots such as the LBR iiwa from KUKA are used in BMW's factories alongside humans. Here, robots do labor-intensive or physically taxing jobs for humans. Robots can safely work alongside humans who perform more skilled assembly tasks thanks to deep learning applications.

3.2.11 Boosting the energy sector's vitality

It's no secret that BP (British Petroleum), a global leader, wants to implement deep learning solutions across the board. BP has invested heavily in deep learning and big data systems as a result of this conviction. This investment has increased safety and improved resource management. The internet allows anyone in the world to access this data. The oil giant has become a driving force in adopting big data, artificial intelligence (AI), and deep learning. BP's chief digital innovation officer, Morag Watson, summed up this strategy. As Watson put it, artificial intelligence (AI) is "one of the most critical digital technologies to drive new levels of performance" in the sector. This is a BP gas station. For BP's oil and gas operations, the company wants to use deep learning solutions. By investing in more reliable gas and oil extraction and refining processes, BP has also increased the overall reliability of its entire operation. BP has installed smart sensors in nearly all of its

oil and gas wells. Data is continually generated and relayed by these sensors. Thus, the technicians at BP can quickly and accurately assess various factors, such as the conditions on-site, production levels, and equipment efficiency. Because of its high degree of trustworthiness and accessibility, this data proves to be highly beneficial. BP, for example, can keep an eye on how well equipment is performing and schedule maintenance to prevent costly machine failures.

This can help the business save time and money by preventing production from being shut down for an extended period.

3.2.12 In business, deep learning applications are fueling new approaches

There is already a significant impact of deep learning algorithms in a wide range of fields. It's possible to use unsupervised, deep learning-driven learning to improve services while also raising the bar on security and safety. These applications will improve and mature even further as they develop and become more complex. Businesses will benefit from this, allowing them to fine-tune and improve every aspect of their model.

4 Role of sentiment analysis in business enhancement

Sentiment analysis is a simple but effective way to monitor your brand's pulse. Given that "Sentiment analysis is a type of data mining that measures people's inclination to opinions through natural language processing (NLP), computational linguistics and text analysis, which are used to extract and analyses subjective information from the Web – mainly social media and similar sources,"

Data analysis quantifies general public sentiments or reactions toward specific products, people, or ideas. Sentiment analysis examines how people feel about a topic. Every social media post is tinged with emotions or sentiments. Sentiment analysis will help you understand your customers' feelings.

A text is scored using sentiment analysis if the sentiments and opinions expressed in the text reflect the author's feelings and beliefs.

It's easy to categorize the text's viewpoints into one of three general sentiments:

- A feeling of well-being
- Positive feelings
- Negative feelings

Consider the following example: "The car is amazing." (sentiment = positive/satisfaction).

It's hard to say whether or not I like the new look. (sentiment = Neutral).

"The quality of the car ride is poor." (sentiment = negative/dissatisfaction).

Sentiment analysis can help you dig deep into your customers' sentiments and emotions to understand better how they feel about your business.

4.1 Importance of sentiment analysis

In the year 2025, IDC predicts that 80 percent of all data will be unstructured. Organizations wishing to use unstructured data for further analysis face a unique challenge. Sentiment analysis comes in handy in this situation. Companies can make sense of the unstructured text and save hours of manual data processing while increasing accuracy by automating customer conversation analysis.

4.2 Purpose of sentiment analysis

When it comes to gaining insights and better understanding what customers want from a product, sentiment analysis is fantastic. However, understand the purpose of sentiment analysis before you can apply it correctly. To improve your company's performance, use sentiment analysis. Keep tabs on how customers feel about you. Sentiment analysis can be used for various purposes, but one of the most important is to determine how customers perceive your brand. When you conduct sentiment analysis, you'll be able to monitor your current customers, online audiences, industry experts, and social media influencers to see what conversations are taking place about your brand.

If you're interested in learning more about how customers view Slack, you might want to check out Capterra. In total, over 16,000 reviews have been written about Slack, all of which are valuable and authentic. Slack can extract customer opinions using sentiment analysis, which gathers and analyses all of the reviews (Arya et al. 2019). Sentiment analysis aids them in better understanding how Slack users feel about it. You can process a large amount of information using sentiment analysis, which can then better understand customer perception.

4.3 Improve the quality of customer service

When it comes to customer service, the goal is to make your clients love you. When you provide excellent customer service, you see a significant increase in revenue, while when you provide subpar customer service, you see a decrease in revenue. To give two examples, "I don't like their refund policy" and "I waited for 28 days with no idea about my refund. Their policy on refunds is appalling." When you use sentiment analysis on these two customer

reviews, you'll learn a lot. That's all the first sentence says: "Refund policies aren't great." There's no further context as to why the customer is dissatisfied. Look at the second example, and you'll see that there was an extremely long 28-day waiting period. There is a deep sense of dissatisfaction.

Further sentiment analysis will reveal whether or not more customers are providing the same feedback, allowing you to determine whether or not there is a pattern emerging. You'll be able to provide better customer service this way because you'll be working to fix the issue.

4.4 Plan to make improvements to the product

Every business aspires to create a product that people want to buy. Customers lining up outside their favorite stores, waiting for the doors to open to get their hands on their favorite products, excite entrepreneurs. Companies can achieve this by understanding what the general public desires. As a result, the use of sentiment analysis is quite advantageous. In addition, sentiment analysis is a powerful tool for identifying product flaws and implementing fixes. A student at Oklahoma State University, for example, looked at Amazon reviews to determine customer preference for a particular brand. The study examined Apple (iPhone 6 and 7) and Samsung (Galaxy S6 and S7) smartphone models. Customers who wanted a reliable battery and a good screen bought Samsung phones, while those who were more interested in design and cameras went with iPhones.

It's possible to discover which features are essential and should be removed by sorting comments based on topic or sentiment. Product development teams will know exactly what their customers want if they use sentiment analysis.

4.5 Prevent a future emergency

One of the major advantages behind sentiment analysis is its ability to detect and prevent impending crises. When a company keeps tabs on how its online audience feels about it, it can avoid a major setback caused by a few unfavorable comments. Taco Bell is an excellent example of how social media can be used against you. a video of a drive-thru employee calling the police on a deaf man's food order went viral after his mother posted it on social media went viral. Sentiment analysis can help put a crisis in perspective when a brand starts receiving some negative feedback: It'll determine if there are an excessive number or a disproportionately small number of negative comments. It'll determine whether or not people are overly angry by looking at the number of comments. Trend analysis can be performed using sentiment analysis, which can go back in time and retrieve data that pertain to a specific period.

With this information, the company will seize control of the situation and make necessary corrections before things get out of hand. By identifying an unexpected influx of negative online comments, brands can easily identify an impending crisis and take action before it spreads.

4.6 AI-based tools now have a solution to the problem of sentiment analysis

For the most part, businesses have relied on the old standbys for sentiment analysis. For example, customers' attitudes could be gleaned from surveys, questionnaires, focus groups, and telephone interviews. Because of the proliferation of the internet and the resulting data, machine learning and artificial intelligence (AI)-based technologies are now being developed better to analyze sentiments in a wide range of text. Here you'll find a list of companies that offer sentiment analysis and annotation tools, and APIs.

4.6.1 Clootrack

Clootrack is an analytics platform based on artificial intelligence that helps companies understands the general sentiment of their customers. These insights can devise and implement more effective product strategies, customer service enhancements, and marketing promotions. Positive perceptions would be boosted as a result, while negative ones would be addressed and eventually eliminated (The Impact of Social Media on Consumers' Purchasing Behaviour in Malaysian Restaurants 2020).

4.6.2 The monkey sees what the human sees

To automate text classification and text extraction tasks, the company provides pre-built classifiers. For sentiment analysis, they've created APIs for text classification and text extraction. Direct integrations, Zapier, and API are all options, as are CSV/Excel files and connections to your apps.

4.6.3 Gavagai (Monaghan et al. 2015)

The Gavagai sentiment analysis agency uses the Gavagai Explorer to perform meaning-based text analysis. The Gavagai explorer API lets you work with the Gavagai explorer without having to write any code.

4.6.4 The Lionbridge Company, Inc. (Gambín 2014)

Companies don't have to worry about collecting and annotating data with Lionbridge's custom-made AI training datasets. They provide artificial intelligence (AI) solutions such as developing natural language processing components and custody.

Sentiment analysis can be helpful in several different fields which are as follows:

- E-commerce, consumer voice, brand reputation, and advertising all play a role in the customer experience
- A brand's reputation on social media sites such as Facebook, Twitter, and Instagram can be tracked using social media analysis (Abdul et al. 2021). Real-time tweet analysis is an excellent example of this
- Voting advice and adjusting political programs are both part of politics
- When it comes to campaign issues, managers use sentiment analysis to understand how voters feel about them, how they react to speeches and actions, etc.
- Policy monitoring, transportation, and legal issues are all part of public relations
- Authorities can optimize traffic flow, improve public security, and resolve problems before they become critical by analyzing social media content and news feeds
- Finance: the evolution of stocks and shares, financial risk

5 Conclusion and future work

This paper has discussed about the application of machine learning and deep learning in the business domain. The work has covered all the areas including the financial sector, energy sector, banking sector, media and many more. The work has also covered the sentiment analysis approach which can help to boost the business. Although, this has covered artificial intelligence approach in the business domain and has shown the improved performance than the traditional approaches.

A more accurate understanding of consumer behavior could be gained by using psychologically-driven and brain-inspired reasoning algorithms. Therefore, to design intelligent sentiment mining systems, combining psychology and engineering tools is necessary to address consumers' cognitive and emotional needs. In the future, better sentiment classification will be possible by implementing hybrid machine learning techniques. In addition, AI can be used in marketing more effectively if optimization models are developed based on existing marketing theories.

Declarations

Conflict of interest The authors declare that they have no conflict of interest and all ethical issues including human or animal participation has been done. No such consent is applicable.

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