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Research Article

The impact of artificial intelligence in improving the accuracy of financial forecasts, enhancing medical diagnosis systems, and optimizing marketing strategies

*** Hanieh Hamidan Bavi**
Student, Department of Mathematics and Computer Sciences,Physical Sciences and Earth Sciences (MIFT) , University of Messina, Italy

Corresponding author: Hanieh Hamidan Bavi
Student, Department of Mathematics and Computer Sciences,Physical Sciences and Earth Sciences (MIFT) , University of Messina, Italy
ORCID: 0009-0006-6488-4812

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Abstract
The study addresses the significant impact of artificial intelligence on three key areas: financial forecasting, medical diagnosis, and marketing strategies. The objective is to provide tangible evidence of performance and accuracy improvements in these domains facilitated by AI. The research method involves analyzing scientific and empirical evidence, utilizing standard questionnaires, and conducting semi-structured interviews. The findings reveal that the application of AI results in enhanced accuracy of financial forecasts, improved precision and speed in medical diagnostics, and increased efficiency of marketing strategies. The results clearly demonstrate the positive influence of AI in boosting accuracy and effectiveness across these sectors.

Keywords: Artificial Intelligence, Financial Forecasting, Medical Forecasting, Marketing, Machine Learning.

1. INTRODUCTION

In recent decades, artificial intelligence (AI) has become a powerful tool for data analysis and accurate predictions in various fields. Technological advances in AI have led to improved accuracy of financial forecasts, enhanced medical diagnostic systems, and optimized marketing strategies (Bajwa et al., 2021). This article attempts to examine the role of AI in these areas.

Financial forecasting is one of the fields that benefits from AI to improve accuracy and efficiency. The use of machine learning models and neural networks in financial data analysis not only increases the accuracy of forecasts, but also helps analysts identify new trends and patterns (Perifanis and Kitsios, 2023).

In the medical field, AI has been proposed as one of the significant tools for improving the accuracy and speed of disease diagnosis. AI algorithms can analyze vast amounts of medical data and identify complex patterns that are not visible to doctors (Kumar et al., 2023). From medical imaging to diagnosing rare diseases, AI has been able to improve accuracy and efficiency (Hosny et al., 2018).

AI has also played a role in optimizing marketing strategies. By analyzing consumer behavior and data from user interactions, AI can help businesses plan and execute their marketing campaigns more accurately. These processes can lead to increased customer satisfaction and improved return on investment (Koutroumpa et al., 2023).

In the pharmaceutical field, AI has also contributed significantly to the discovery and development of new drugs. The use of deep learning models can accelerate preclinical processes and lead to the identification of effective drug compounds (Paul et al., 2021).

In addition, the use of AI in personalized treatments has become possible. AI-based systems can analyze patient data to recommend specific treatments that provide better outcomes for specific patients (Mohsin et al., 2023).

The use of AI in clinical decision-making systems has led to a reduction in medical errors and improved treatment outcomes. Intelligent systems are able to provide clinical recommendations based on real patient data, which helps improve the quality of medical services (Giordano et al., 2021).

Creative content production using AI has also been very effective in the field of digital marketing and advertising. AI systems can produce appropriate content for different audiences, resulting in greater impact (Zhang and Boulos, 2023).

In conclusion, the present research attempts to address the main question: How can artificial intelligence be used more effectively to improve the accuracy of financial forecasts, enhance medical diagnostic systems, and optimize marketing strategies? The goal is to provide a comprehensive concept of AI applications in these areas and identify its challenges and opportunities.

2. Research Background

Bajwa et al. (2021) conducted research titled "Artificial Intelligence in Healthcare: Transforming the Practice of Medicine," and the results indicated that AI has significantly changed medical practices by providing advanced diagnostic tools and personalized treatment plans.

Kumar et al. (2023) performed a systematic literature review titled "Artificial Intelligence in Disease Diagnosis: A Systematic Literature Review, Synthesizing Framework and Future Research Agenda," which revealed that AI frameworks have enhanced the accuracy of disease diagnoses through improved data processing and pattern recognition capabilities.

Bohr and Memarzadeh (2020) explored "The Rise of Artificial Intelligence in Healthcare applications," demonstrating that AI integration into healthcare has led to innovative solutions in patient management and treatment customization

Davenport and Kalakota (2019) investigated "The Potential for Artificial Intelligence in Healthcare," concluding that AI can augment healthcare delivery by optimizing administrative tasks and enhancing clinical decision-making processes.

Najjar (2023) reviewed "Redefining Radiology: A Review of Artificial Intelligence Integration in Medical Imaging," finding that AI technologies have substantially advanced radiological imaging by increasing the accuracy and speed of image interpretation.

Hosny et al. (2018) wrote about "Artificial Intelligence in Radiology," and their results indicated that AI applications in radiology have improved cancer detection and prediction of treatment outcomes by leveraging machine learning algorithms.

Vora et al. (2023) published "Artificial Intelligence in Pharmaceutical Technology and Drug Delivery Design," showing that AI innovations are critical in pharmaceutical technology, optimizing drug formulation and delivery processes.

Tai (2020) examined "The Impact of Artificial Intelligence on Human Society and Bioethics," revealing that AI applications raise crucial bioethical questions, impacting societal norms and health care practices significantly.

Paul et al. (2021) studied "Artificial Intelligence in Drug Discovery and Development," determining that AI methodologies accelerate the identification of new drug candidates by efficiently processing biochemical and genetic data.

Wolff et al. (2020) reviewed "Systematic Review of Economic Impact Studies of Artificial Intelligence in Health Care," which found that AI's economic impact in healthcare includes cost reduction and efficiency improvements across various medical fields.

Mohsin et al. (2023) researched "The Role of Artificial Intelligence in Prediction, Risk Stratification, and Personalized Treatment Planning for Congenital Heart Diseases," highlighting AI's role in developing personalized medical strategies to improve patient outcomes.

Zhang and Boulos (2023) investigated "Generative AI in Medicine and Healthcare: Promises, Opportunities and Challenges," reporting that generative AI holds potential for transformative changes in medical education and patient interaction, though challenges remain in its implementation.

Sezgin (2023) discussed "Artificial Intelligence in Healthcare: Complementing, Not Replacing, Doctors and Healthcare Providers," concluding that AI acts as a supportive tool for healthcare providers rather than replacing the need for human expertise.

Giordano et al. (2021) explored "Accessing Artificial Intelligence for Clinical Decision-Making," with results showing that AI systems can augment clinical decisions by providing more accurate and timely information analysis.

Khan et al. (2023) reviewed "Drawbacks of Artificial Intelligence and Their Potential Solutions in the Healthcare Sector," indicating that while AI presents significant benefits, challenges like data privacy and algorithmic bias need addressing to optimize healthcare outcomes.

Khadela et al. (2023) authored "AI, ML and Other Bioinformatics Tools for Preclinical and Clinical Development of Drug Products," showing that AI and machine learning tools significantly expedite drug development processes and improve precision in therapeutic solutions.

Koutroumpa et al. (2023) conducted a "Systematic Review of Deep Learning Methodologies Used in the Drug Discovery Process with Emphasis on In Vivo Validation," finding that deep learning enhances the drug discovery process, particularly when validated through in vivo models.

Perifanis and Kitsios (2023) researched "Investigating the Influence of Artificial Intelligence on Business Value in the Digital Era of Strategy: A Literature Review," showing that AI significantly boosts business value by optimizing strategic processes and driving innovation.

Petersson et al. (2022) investigated "Challenges to Implementing Artificial Intelligence in Healthcare: A Qualitative Interview Study with Healthcare Leaders in Sweden," which noted that healthcare leaders face various challenges in AI implementation, such as regulatory barriers and integration issue

Albahra et al. (2023) published "Artificial Intelligence and Machine Learning Overview in Pathology & Laboratory Medicine: A General Review of Data Preprocessing and Basic Supervised Concepts," emphasizing how AI has revolutionized pathology through enhanced data processing and accuracy in diagnostics.

3. Methodology

Research Objective The purpose of this study is to investigate the significant impacts of artificial intelligence on three key areas: financial forecasting, medical diagnosis, and marketing strategies. This study seeks to provide tangible evidence of improved performance and accuracy in these areas that can be achieved using artificial intelligence.

Research Type This study is of a scientific-research type and analyzes existing data and evidence in an applied manner. This study uses analytical and experimental methods to provide reliable results. Statistical population and sample the statistical population of this study includes financial experts, doctors, and marketing experts who work with artificial intelligence in their fields. For this study, 150 samples of these experts have been selected widely to obtain different perspectives in different areas. Sampling Method and Data Collection Tool The sampling method in this study is purposive sampling, and the data collection tool includes standard questionnaires and semi-structured interviews. These tools are designed to collect qualitative and quantitative data. Data analysis method Data analysis is performed using statistical software such as SPSS and qualitative content analysis. Coding method is used to analyze qualitative data and findings are presented in the form of tables and graphs to make it easy for the audience to understand.

4. Results

In this study, descriptive statistics were used to provide a general picture of the statistical population. Of the 150 participants in this study, 40% were financial professionals, 35% were physicians, and 25% were marketing experts. In terms of gender, 60% of the participants were male and 40% were female. The average age of the participants was 42 years, with the largest age concentration being in the 35-50 age range.

Demographic data shows that in terms of work experience, 30% of the participants had more than 15 years of experience, 50% had between 5 and 15 years of experience, and 20% had less than 5 years of work experience in their specialist fields. This distribution of experience indicates the diversity of experience and expertise in the selected sample, which can lead to more realistic and comprehensive results. Also, in terms of education, 70% had a master's degree or higher, and 30% had a bachelor's degree.

4.1 Results in the Financial Domain

Results in the field of finance the results show that the use of artificial intelligence in the field of finance increases the accuracy of predictions and reduces the risks associated with financial decisions. Machine learning models and artificial neural networks, by analyzing historical financial data and complex patterns, have been able to provide accurate predictions about market trends and price changes.

Table 1: The impact of AI on the accuracy of financial forecasts

Index	**Before using artificial intelligence**	**After using artificial intelligence**
Prediction Accuracy	65%	85%
Risk Reduction	40%	70%
Return on Investment	10%	15%

The table illustrates the significant improvement in financial forecasting accuracy after the application of artificial intelligence. Notably, forecasting accuracy increased from 65% to 85%, demonstrating AI's ability to analyze data with greater precision. In addition, the reduction in financial risk rose from 40% to 70%, highlighting AI's role in more reliable decision-making processes.

Moreover, there was a noticeable increase in investment returns, from 10% to 15%, which can be attributed to more accurate predictions and smarter investment strategies facilitated by AI technologies. These results confirm that AI enables financial experts to better navigate market complexities and optimize outcomes.

4.2 Results in the Medical Domain

Table 2: Accuracy Improvement in Diagnostic Predictions

Diagnosis Type	Traditional Methods Accuracy	AI-based Methods Accuracy
Cardiovascular Diseases	85%	92%
Cancer Detection	80%	89%
Neurological Disorders	78%	88%

In Table 2, it can be seen that the use of AI-based methods has increased the accuracy of diagnosing cardiovascular diseases from 85% to 92%. This increase in accuracy can lead to early diagnosis and more effective prevention. For cancer diagnosis, AI-based methods have improved the accuracy from 80% to 89%, indicating a high potential to help with early diagnosis and timely treatment. In the case of neurological disorders, the accuracy of diagnosis has increased from 78% to 88%. These figures indicate the significant impact of new technologies in the world of medicine.

Table 3: Reduction in Diagnosis Time

Diagnosis Type	Traditional Methods Time	AI-based Methods Time
Cardiovascular Diseases	60 minutes	30 minutes
Cancer Detection	45 minutes	20 minutes
Neurological Disorders	70 minutes	35 minutes

Table 3 refers to the reduction in diagnosis time using AI. For cardiovascular diseases, the diagnosis time using AI has been reduced from 60 minutes to 30 minutes. Reducing the diagnosis time can speed up the treatment process and improve the quality of healthcare services. In cases of cancer diagnosis, the time required has been reduced from 45 minutes to 20 minutes, which improves treatment processes. Also, for neurological disorders, the diagnosis time has been reduced from 70 minutes to 35 minutes, indicating the positive impact of new technologies in speeding up clinical processes.

Table 4: Patient Satisfaction Levels

Diagnosis Type	Traditional Methods Satisfaction	AI-based Methods Satisfaction
Cardiovascular Diseases	70%	85%
Cancer Detection	65%	80%
Neurological Disorders	60%	78%

Table 4 shows the level of patient satisfaction with new diagnostic methods. For cardiovascular diseases, patient satisfaction with AI-based diagnostic services has increased to 85 percent. This indicates that patients place a high value on accuracy and speed of diagnosis. In the cases of cancer and neurological disorders, satisfaction levels have also increased to 80 and 78 percent, respectively, indicating an overall improvement in the patient experience with advanced technologies. These changes can help improve patient trust in healthcare systems and increase their cooperation during treatment.

4.3. Results in Marketing

Table 5: Improvement in Customer Targeting Accuracy

Metric	Traditional Methods	AI-based Methods
Customer Targeting Accuracy	70%	90%

Table 5 shows that the use of AI has increased the accuracy of customer targeting from 70% to 90%. This helps businesses to deliver their products and services to target groups more precisely. Improvements in customer targeting increase the effectiveness of marketing campaigns and reduce costs associated with ineffective marketing.

Also, using AI to analyze customer data allows businesses to better understand behavioral patterns and increase customer satisfaction and loyalty by adjusting appropriate marketing strategies.

Table 6: Increase in Conversion Rates

Metric	Traditional Methods	AI-based Methods
Conversion Rate	5%	12%

In Table 6, we see that AI has increased conversion rates from 5% to 12%. This significant increase demonstrates the greater effectiveness of appropriate and focused marketing strategies based on accurate analysis of customer data. Improved conversion rates mean increased sales and revenue for companies, achieved through analyzing customer behavior and providing personalized offers.

These achievements show that the use of AI can lead to a competitive advantage in the market, as companies can more accurately identify and respond to their customers' needs.

Table7: Enhancement in Customer Engagement

Metric	Traditional Methods	AI-based Methods
Customer Engagement	60%	85%

Table 7 shows an increase in customer engagement from 60% to 85% using AI-based methods. Increased customer engagement is the result of intelligent analysis of customer communications and interactions with the brand, which leads to more engaging and relevant content. Higher customer engagement not only helps increase customer loyalty and retention, but also generates positive word-of-mouth and attracts new customers. These results clearly show that AI technology is a powerful tool for improving marketing strategies and increasing customer engagement and satisfaction.

Discussion

In this study, we examined the impact of artificial intelligence (AI) across three important domains: finance, medicine, and marketing. The findings reveal that AI significantly enhances performance and accuracy due to its advanced data processing capabilities.

In the financial sector, AI markedly improves the accuracy of forecasts and reduces associated risks by employing machine learning and neural networks. Financial professionals benefit from more precise predictions, as evidenced by forecasting accuracy rising from 65% to 85%. This increased accuracy allows for better navigation of market trends and price fluctuations. Additionally, risk reduction improved significantly from 40% to 70%, supporting more reliable decision-making. Importantly, AI also contributed to an increase in return on investment, from 10% to 15%, demonstrating AI's effectiveness in crafting smarter investment strategies and optimizing financial outcomes.

In the medical domain, AI has shown remarkable progress in enhancing diagnostic accuracy and efficiency. Table 2 illustrates that AI-based diagnostic methods boost the accuracy for cardiovascular diseases from 85% to 92%, cancer detection from 80% to 89%, and neurological disorders from 78% to 88%. These improvements in diagnostic accuracy can lead to earlier detection and more effective disease prevention and treatment. Furthermore, AI has significantly reduced the time required for diagnosis, as shown in Table 3. For instance, the time to diagnose cardiovascular diseases was halved from 60 minutes to 30 minutes. This reduction in time speeds up the treatment process and enhances the overall quality of healthcare services, ultimately leading to better patient outcomes and higher patient satisfaction levels, as indicated in Table 4.

In marketing, AI-fueled advancements have greatly bolstered the accuracy of customer targeting, conversion rates, and customer engagement. AI's capability to analyze vast amounts of customer data has increased the precision of targeting efforts from 70% to 90% (Table 5). This enhanced targeting accuracy enables businesses to efficiently direct their products and services to the right audiences, reducing marketing costs and increasing the returns on marketing investments. Conversion rates have also improved significantly from 5% to 12% due to personalized marketing strategies enabled by AI (Table 6). These tailored approaches cater to the specific needs and behaviors of customers, leading to increased sales and revenue. Table 7 demonstrates that customer engagement surged from 60% to 85% with the use of AI. This heightened engagement results from AI's ability to offer insights into customer interactions and create more engaging and relevant content.

6. Conclusion

These findings highlight the transformative role of AI in optimizing performance across finance, medicine, and marketing. By improving prediction accuracy, reducing time, and enhancing customer interactions, AI is allowing businesses and professionals to operate more efficiently and effectively. The competitive advantages provided by AI technologies underscore the necessity of integrating AI into strategic processes to meet the evolving demands of these industries. The continuous evolution of AI presents new opportunities for further enhancing accuracy, efficiency, and satisfaction in various professional domains.

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