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How AI Works in Real World

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ABSTARCT: With the potential to integrate human behavior and intellect into machines or systems, artificial intelligence (AI) is a key technology of the Fourth Industrial Revolution (also known as Industry 4.0 or 4IR). Therefore, the secret to creating automated, intelligent, and smart systems that meet today's demands is AI-based modeling. To tackle real-world difficulties, many forms of AI such as analytical, functional, interactive, textual, and visual AI can be utilized to increase the intelligence and capabilities of an application. However, because real-world issues and data are dynamic and vary, creating an effective AI model is a difficult process.

KEYWORDS: Machine learning, deep learning, neural networks, Natural Language Processing and Knowledge Base System

I. INTRODUCTION

When scientists initially envisioned devices that could mimic human intellect in the middle of the 20th century, artificial intelligence (AI) was born [1]. AI has advanced from simple algorithms to increasingly intricate models throughout the years. In some jobs, AI can now mimic and even outperform humans. Artificial intelligence (AI) is a disruptive factor in many international sectors in the digital age.

AI algorithms that can accurately detect illnesses have led to a technological advancement in healthcare diagnostic methods [2]. Fraud detection in finance is no longer done by hand. Rather, millions of transactions are analyzed in real-time by complex algorithms, which accurately identify questionable activities [3]. The retail industry, which has always been guided by human experience and intuition, now uses AI models to customize shopping experiences and revolutionize commercial dealings [4].

To close the gap between conventional methods and technological innovation, farmers are using AI-based predictive analytics to make well-informed decisions about planting, harvesting, and irrigating crops in the agricultural sector [5]. AI has also been used to the automobile and energy industries, enabling automation and monitoring. The primary AI applications in the sector are compiled.

Even if it appears promising, incorporating AI is not a simple process. The industry is facing difficulties including protecting data privacy, figuring out how to handle potential biases in AI models, and meeting the rising need for a workforce with the necessary skills to use these new technologies [6]. Additionally, the requirement for thorough documentation and comprehension of real-world implementation is highlighted by the quick growth of AI applications.

This study aims to provide a thorough examination of the real-world applications, difficulties, and achievements of AI across a range of industries. Therefore, this study can offer a more comprehensive viewpoint to help professionals, researchers, and AI technology stakeholders.

Medical

AI integration in healthcare has led to predictive analytics, individualized treatment, and quicker diagnosis. AI's powers in picture identification and interpretation, in particular, have revolutionized medical imaging.

Early Identification of Idiopathic Scoliosis in Adolescents Doctors have employed artificial intelligence (AI) and deep learning based on convolutional neural networks (CNN) to examine patients with scoliosis [7]. In order to automatically calculate the Cobb angle, the CNN architecture was developed to identify the position of spinal vertebrae from X-ray pictures. When compared to manual clinician measurements, the suggested approach has exceptional

dependability and can measure Cobb angles with up to 93.6% accuracy, making it applicable in actual clinical situations.

Additionally, the technique shortens the time needed for diagnosis, resulting in quicker actions to improve patient care. If integration goes well, other medical facilities could be inspired to investigate comparable AI-based diagnostic options.

Mammography-Based

reast Cancer Diagnosis Worldwide, breast cancer is a major health issue for women. Effective prevention and therapy depend on early discovery. Early detection of this cancer is aided by a standard mammography, which is an X-ray scan of the breast. AI may be used to segregate mammography regions that show signs of malignancy [8]. AI may also be used to identify unusual patterns and enhance image quality. AI is transforming breast cancer detection, making it quicker and frequently more accurate. AI in medicine, however, can serve as a tool rather than a replacement for human knowledge. For additional detection and decision-making, a physician and radiologist can perform it.

Financial

AI has been essential in addressing difficult financial problems like risk assessment. Due to the daily large number of financial transactions, human fraud detection is almost. impossible. Financial institutions fight a never-ending war against ever-changing fraud tactics. Conventional techniques frequently detect fraud after it has already happened. Financial organizations may use AI predictive analytics to proactively identify and discourage questionable activities.

Identifying Fraud in Real-Time Payment Systems

Fraud detection in a real-time payment system has to happen instantly. Conventional methods frequently fall short of this number of transactions and speed. Millions of transactions are used to train AI techniques like deep learning [3]. Compared to people, these models are quicker at spotting trends and abnormalities. High-value transactions from nations where users have never transacted can be flagged as suspicious by the AI model. When AI-based real-time fraud detection was implemented, a number of financial institutions saw a 40% decrease in fraudulent transactions and a 40% decrease in false positives.

Estimating the Risk of Credit Card Default

In order to determine credit limits and minimize losses, credit card firms must forecast the likelihood of a default user. AI algorithms can produce more precise forecasts on the probability of user default by using historical data, such as previous transactions, payment histories, and social variables [11]. Even more sophisticated algorithms take into account unconventional data, such social media activity. Compared to conventional techniques, credit card firms can decrease problematic loans by utilizing AI-based risk assessment technologies.

Automated Risk Management and Trading

The stock market has a reputation for being erratic. Rapid variations are often too much for manual trading techniques to handle. AI systems are capable of making trading choices in real time after being educated on massive databases of years' worth of market data [12]. AI can more accurately forecast short-term price changes by examining trends. Additionally, by predicting future market declines based on world news and events, AI helps portfolio managers analyze risk. Trading firms that employ AI-based trading tactics often beat conventional approaches; some claim to have seen a 15% improvement in yearly profits.

Retail
Personalized Real-Time Online Buying Experience

Online buyers frequently have a lot of options, which might cause them to abandon their carts. The online shopping interface is dynamically adjusted by the AI model, which is educated on users' browsing habits, past purchases, and click-through rates [4]. This customization might include anything from changes to the visual layout to highlighting particular features of the product. E-commerce sites using AI customization features have shown a 15% rise in average order value and a 20% increase in conversion rates.

Customized In-Store Suggestions Using Augmented Reality (AR)

For in-store customers, physical establishments try to mimic a customized online experience. AI-powered augmented reality (AR) devices examine a customer's past purchases and interactions in-store [13]. The customer's perspective is

then updated with real-time product recommendations and information via the AR gadget. Stores that use AI and AR to provide individualized suggestions have seen a 20% rise in customer return rates and a 10%–15% boost in in-store sales.

Agricultural Production
The goal of modern agriculture is to integrate technology advancements with traditional knowledge. AI has become an essential tool that gives farmers access to data-driven insights that were previously unavailable. AI-powered predictive analytics provides ways to maximize agricultural output forecasts depending on a number of factors.

Forecasting Yield Using Weather Trends
Crop yields are directly impacted by changes in the weather. Real-time reaction to abrupt weather changes is sometimes absent from traditional forecasting models. Crop yields may be forecast using machine learning models that are trained on satellite images, historical meteorological data, and crop yields [5]. AI-model-using farms claim yield gains of up to 20% as a result of predictive pest management, irrigation optimization, and early interventions.

Analysis of Soil Health and Crop Yield
Crop yields are significantly influenced by the health of the soil, especially its nutrient and moisture content. In order to determine which plants thrive in certain soil types and circumstances, advanced sensors and artificial intelligence algorithms can evaluate soil samples [5]. These forecasts can also be used to recommendations for certain treatments or fertilizers. The farm saw a 10% decrease in

fertilizer and maintenance expenses and a 15% boost in crop yields by planting crops in accordance with soil health guidelines.

POWER
AI is now driving a revolutionary change in the energy sector. AI offers innovation, promise efficiency, flexibility, and foresight across a variety of energy production, distribution, and consumption industries as the world's energy demand rises and the pressing need for sustainable solutions grows.

Forecasting of Renewable Energy
Unpredictable natural conditions have an impact on renewable energy sources like solar and wind. Forecasting of energy generation from various sources is enhanced by AI [15]. By examining vast volumes of data, such as satellite images, historical energy production, and weather patterns, AI models are better able to forecast energy output. As a result, the energy network may minimize reliance on non-renewable resources, maximize energy distribution, and successfully incorporate renewable sources.

Building Energy Efficiency
Structures like residences and workplaces use a lot of energy. In order to improve these buildings' energy efficiency, AI is crucial. Through the analysis of sensor data, historical energy use, weather forecasts, and occupancy patterns, artificial intelligence algorithms can optimize lighting, heating, and cooling systems in real time [16]. To avoid waste, AI can make sure that energy is only utilized when and where it is needed. AI may also anticipate when a system might require repair, preventing wear and tear-related energy inefficiencies. As a result, AI is a clever system manager that guarantees ideal energy use and drastically lowers expenses.

Automotive
Artificial Intelligence is driving a dramatic transformation in the automobile industry. The car industry is entering a new era of increased safety, unparalleled efficiency, and redesigned driving experiences when digital AI skills are combined with antiquated vehicle mechanics.
Automobiles Self-driving automobiles, also known as autonomous vehicles, mostly rely on intelligence (AI) for navigation and decision-making. Through a range of sensors, cameras, and radar, the vehicle continuously collects information about its surroundings. AI analyzes this data instantly, assisting automobiles

REFERENCES

[1] Z. Shao, R. Zhao, S. Yuan, M. Ding, and Y. Wang, "Tracing the evolution of AI in the past decade and forecasting the emerging trends," Expert Syst Appl, vol. 209, p. 118221, Dec. 2022.

[2] A. Parfett, S. Townley, and K. Allerfeldt, "AI-based healthcare: a new dawn or apartheid revisited?," AI Soc, vol. 36, no. 3, pp. 983–999, Sep. 2021.

[3] A. Ali et al., "Financial fraud detection based on machine learning: A systematic literature review," Applied Sciences,vol. 12, no. 19, p. 9637, Sep. 2022.

[4] A. S. Riegger, J. F. Klein, K. Merfeld, and S. Henkel, "Technology-enabled personalization in retail stores: Understanding drivers and barriers," J Bus Res, vol. 123, pp. 140–155, Feb. 2021.

[5] M. Javaid, A. Haleem, I. H. Khan, and R. Suman, "Understanding the potential applications of artificial intelligence in agriculture sector," Advanced Agrochem, vol. 2, no. 1, pp. 15–30, Mar. 2023.

[6] U. Wilkens, "Artificial intelligence in the workplace – A double-edged sword," International Journal of Information and Learning Technology, vol. 37, no. 5, pp. 253–265, Nov. 2020.

[7] W. Caesarendra, W. Rahmaniar, J. Mathew, and A. Thien, "Automated Cobb angle measurement for adolescent idiopathic scoliosis using convolutional neural network," Diagnostics, vol. 12, no. 2, p. 396, Feb. 2022.

[8] I. Sechopoulos, J. Teuwen, and R. Mann, "Artificial intelligence for breast cancer detection in mammography and digital breast tomosynthesis: State of the art," Semin Cancer Biol, vol. 72, pp. 214–225, Jul. 2021.

[9] D. Paul, G. Sanap, S. Shenoy, D. Kalyane, K. Kalia, and R. K. Tekade, "Artificial intelligence in drug discovery and development," Drug Discov Today, vol. 26, no. 1, p. 80, Jan. 2021.

[10] C. J. Harrison and C. J. Sidey-Gibbons, "Machine learning in medicine: A practical introduction to natural language processing," BMC Med Res Methodol, vol. 21, no. 1, pp. 1–11, Dec. 2021.

[11] J. Gao, W. Sun, and X. Sui, "Research on default prediction for credit card users based on XGBoost-LSTM model," Discrete Dyn Nat Soc, vol. 2021, 2021.

[12] R. Michaela Denise Gonzales and C. A. Hargreaves, "How can we use artificial intelligence for stock recommendation and risk management? A proposed decision support system," International Journal of Information Management Data Insights, vol. 2, no. 2, p. 100130, Nov. 2022. [

[13] R. Zimmermann et al., "Enhancing brick-and-mortar store shopping experience with an augmented reality shopping assistant application using personalized recommendations and explainable artificial intelligence," Journal of Research in Interactive Marketing, vol. 17, no. 2, pp. 273–298, Mar. 2023.

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