NELSON MANDELA UNIVERSITY

"The rise and impact of Machine Learning (ML) and Artificial Intelligence (AI) in our modern world"

SCHOOL OF INFORMATION TECHNOLOGY

NAME: THULISILE MALULEKE (s225166097)

MODULE: EMERGING TECHNOLOGIES (IEMT302)

LECTURER'S NAME: KEVIN KATIVU

DUE DATE: 21 NOVEMBER 2025

Summary

At the core of recent technological innovation, Artificial Intelligence (AI) and Machine Learning (ML) are changing economies, society and industries. This report provides a thorough investigation of machine learning (ML) and artificial intelligence (AI) as emerging technologies. The report then evaluates AI/ML's several current uses and opportunities for future development in a variety of industries, emphasizing its purpose as a multi-purpose technology. A critical comparison with its antecedents such as expert systems, showing the core shift in thinking machine learning represents. A real-world experiment demonstrates the basic concepts of machine learning by creating an easily understandable predictive model for cancer diagnosis. Additionally, a hypothetical system design called “OncoCare AI” will be set to demonstrate how AI can be integrated into personalized patient care. This report concludes by reflecting on the possible ethical and societal implications of AI and ML evaluating its impact on the United Nation’s Sustainable Development Goals (SDGs). According to the findings, even while AI or ML show previously unthinkable opportunities for improvements in efficiency, sustainability and healthcare, its improvements must be guided by strong ethical frameworks and effective governance reduce the risks of unfairness, social harm and inequality.

Table of Contents

Table of figures

INTRODUCTION

This report presents a comprehensive analysis of Machine Learning (ML) and Artificial Intelligence (AI) as the most significant emerging technologies of our time. The quick implementation of AI and ML in sectors like healthcare, finance, education, manufacturing and automated cars indicates a social change quite comparable to the industrial revolution and offers an important moment in time for predicting its future.

The primary issue driving this report is the extremely multifaceted nature of these emerging technologies as they present major risks such as bias in algorithms, big job displacements and ethical issues surrounding accountability but also offer previously unthinkable opportunity to address difficult problems like disease diagnosis and climate change.

The aim of this report is to critically analyse this conflict by following developments of AI and ML, analysing its current and future use and assessing its greater implications. Through a practical experiment and a hypothetical system design, it aims to provide concrete examples to solidify this discussion.

The purpose of this report is to be an essential resource that goes beyond technical interest by providing an essential and balanced approach that is necessary for the public, developers, and politicians to manage the responsible development and deployment of artificially intelligent systems.

Background

Artificial Intelligence (AI) is the capacity of a machine to carry out the cognitive processes that we identify with human minds, including perception, reasoning, learning, interaction with the environment, problem-solving, and even creative expression (company, 2024) whereas Machine Learning (ML) is the subset of artificial intelligence that focuses on building systems that learn and improve as they consume more data. (Chen, 2024)

This structural change from rule-based programming to data-driven learning brings three major factors such as the increase of big data, theorical developments in algorithms and the availability of powerful computing hardware like GPU. Given this powerful combination, AI and ML is now a disruptive, all-purpose technology that is actively changing economies, industries and every aspect of our daily lives, making its research both relevant and Important.

Literature survey on Artificial Intelligence (AI) and Machine Learning (ML) and its antecedents.

Understanding the history of AI is important to evaluate its advantages and disadvantages. The dream of making living things is ancient but the scientific and practical developments of AI is a story of the 20th and 21st century filled with bold ambitions, disappointing errors and at the end major discovery. This part follows that path from its philosophical beginnings to the current data-driven revolution.

What is AI and ML?

Artificial intelligence is a technology that allows computers to do a wide range of sophisticated tasks such as seeing, comprehending and translating written and spoken language, analysing data, making decisions and more. AI is a broad topic including computer science, data analytics and statistics, hardware and software, engineering, languages, neurology and even philosophy and psychology (Cloud, 2025).

In simple terms, AI is the process of building intelligent machines to perform different tasks. The goal of AI is to have the ability to learn, understand and apply its knowledge to solve real world problems just like human beings.

Machine learning is a method that searches possibly very large data sets for patterns and trends that go beyond basic statistical analysis to uncover previously undiscovered links in the data. To find patterns in data and build models, machine learning employs complex algorithms that have been trained. These models can be used to classify data and create predictions (Chen, 2024).

Deep learning is the subset of machine learning and artificial intelligence and is method of teaching computers to process and learn information in a manner like that of neurons in the human brain. With deep learning machines can execute jobs that were previously only possible for humans. It teaches them to interpret data in a way that mimics the multiple layers of our brain. (ISO, 2024)

A simple example is the development of a self-driving car. The goal of developing a car that drives itself is AI. ML is a technique that involves exposing the car's software to millions of kilometres of human driver video footage and to recognize a pedestrian, a stop sign, or another car is deep learning.

History of AI and ML

AI's philosophical beginnings can be traced back to Aristotle's formal logic. However, the "Imitation Game" (also known as the Turing Test), which Alan Turing proposed in 1950, offered the first useful framework for assessing machine intelligence. This made measurable intelligent behaviour the focus instead of deeper questions concerning awareness (Philosophy, 2003)

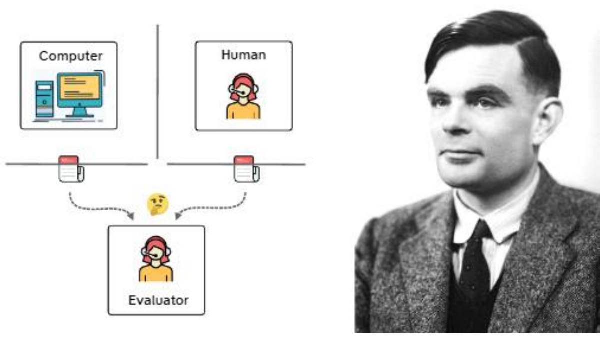

Figure 1: "Turing test" by Alan Turing

At the 1956 Dartmouth Conference which was organized by Claude Shannon, John McCarthy, Marvin Minsky, and others, the name "Artificial Intelligence" emerged with much hope, marking the official beginning of the discipline. Logic puzzle-solving programs were among the early achievements (Tomeczek, 2025).

Figure 2: The 1956 Dartmouth Conference

Expert system development began in the early 1980s with the development of MYCIN, a medical expert system that was created to identify bacterial infections and suggest remedies. One of the earliest examples of an AI system capable of making decisions in a specific subject was MYCIN, which was created at Stanford University (Ai, 2025).

Machine learning used a data driven methodology in place of manual knowledge programming, was the source of the field's comeback. In the 1980s and 1990s, neural network training was improved by backpropagation, and technologies such as Support Vector Machines were developed. With the growing amount of data and the rise in computing power brought about by the digital revolution, artificial intelligence (AI) moved from logic-driven to probability-based systems (Tiwari, 2024).

The success of Deep Learning in 2012 marked the beginning of the modern AI growth, when the AlexNet neural network significantly outperformed conventional techniques in image identification. This improvement resulted in improved algorithms, big datasets and powerful Graphics Processing Units (GPUs) that could effectively train difficult models. This *"perfect storm"* has made it possible for modern uses such as generative models and conversational AI, turning AI from lab research into a technology that is revolutionizing industry and society globally (Shivam, 2025).

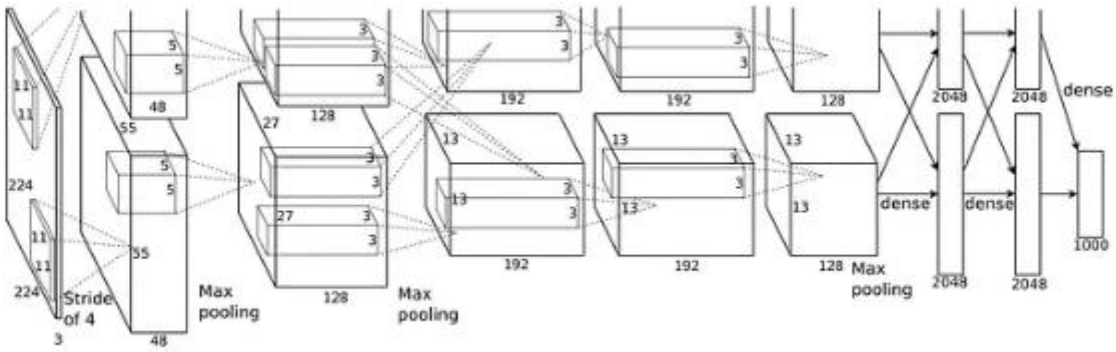

Figure 3: AlexNet

The use and potential for growth of AI and ML.

Every aspect of society is changing because of the real-world uses of AI and ML's potential capabilities. This part highlights both immediate applications and new opportunities as it looks at the current state of AI/ML deployment now and predicts its course in the future.

AI in healthcare

Figure 4: AI in healthcare

One of the most promising sectors for integrating Artificial intelligence (AI) and Machine learning (ML) is healthcare. These technologies are being used to increase productivity in administration, facilitate treatment plans and improve diagnostics. For example, Google's DeepMind Health and other AI-powered medical systems have shown accuracy on level with human doctors in detecting breast cancer and eye problems (Reid, 2020). Additionally, oncologists have used IBM Watson to help them propose personalized cancer treatments based on large clinical data (Zhou, 2018).

Developing predictive models for healthcare also depends on machine learning algorithms. During the covid-19 pandemic machine learning driven systems played a key role in monitoring spread, predicting infection rates and supporting vaccine distribution logistics. Additionally, natural language processing (NLP) models have improved the management of electronic health records (EHRs) by making it possible to extract clinical data from messy medical records (Al-Garadi, 2022).

AI in business and finance.

Figure 5: AI in business and finance

Artificial Intelligence (AI) and Machine Learning (ML) in the financial is used for risk assessments, algorithm in trading, detecting fraud and customer analytics. Machine learning models can help businesses to gain competitive advantage against their competitors because they can evaluate market trends and implement trades in milliseconds. Businesses use real-time transactional data is monitored by AI-based fraud detection systems to spot problems that might point to fraudulent activity (PwC, 2023).

Outside the traditional finance, AI has changed the business intelligence and decision-making support system. Businesses can predict demand, simplify the supply chain and tailor marketing advertisements with the help of artificial intelligence. While social media platforms like Meta (Facebook) use machine learning (ML) for content moderation and targeted advertising, online retailers like Amazon and Alibaba use algorithms for recommendation to customize product recommendations (Platform, 2025). The above examples highlight how important AI is to data-driven business strategies.

AI in education.

Figure 6: AI in education

In education, Artificial Intelligence (AI) transforms individual schooling by modifying learning experiences to each student's particular requirements and learning preferences. Machine learning algorithms are used by platforms like Coursera and Duolingo suggest ways to learn and constantly change the level of difficulty of the content according to student performance. Furthermore, AI-driven tools let teachers track students' development and spot students who are facing difficulties in their studies.

Education is becoming more inclusive and accessible thanks in large part to artificial intelligence (AI), particularly for students with disabilities. AI can help students with hearing or visual disabilities access educational material by utilizing technologies such as speech recognition. For instance, speech-to-text systems allow students with mobility or skill challenges to "write" using their voice, while text-to-speech software enables blind students to "hear" written material (Research, n.d.).

AI in manufacturing.

Figure 7: AI in manufacturing

One of the highlights of the "Industry 4.0" revolution has been the use of artificial intelligence (AI) and machine learning (ML) into manufacturing. Predictive maintenance systems save downtime and maintenance costs by using sensor data to foresee equipment faults before they happen. Businesses like Siemens and General Electric use artificial intelligence (AI) models to predict mechanical failures by analysing temperature, vibration, and sound analysis (Johnson, 2024).

AI systems are used in supply chain management and logistics to optimize energy consumption, transportation routes and inventory levels. Machine learning algorithms reduce the danger of shortages or overproduction by predicting changes in demand. The combined power of AI, the Internet of Things (IoT) and robotics continues to reshape manufacturing as a data-driven environment.

AI in transportation

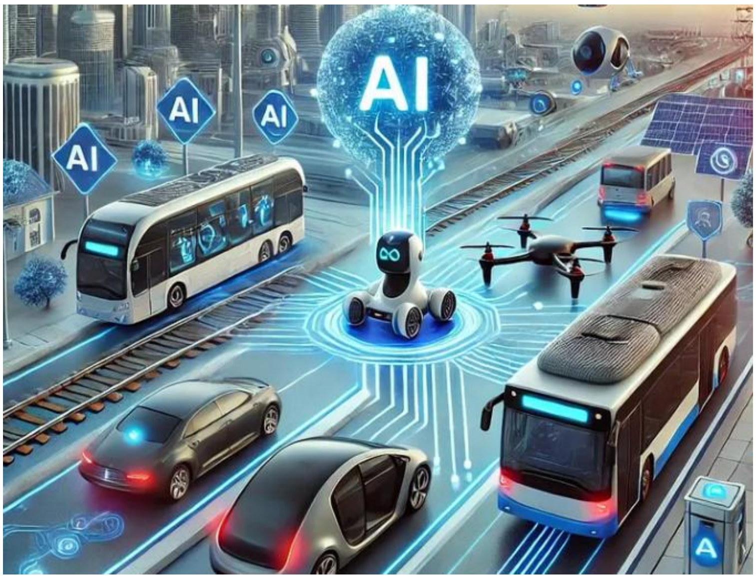

Figure 8: AI in transportation

One of the most well-known and strongly debated uses of AI and ML is autonomous vehicles (AVs). Machine learning techniques are used by businesses like Tesla, Waymo, and Cruise for perception, navigation, and decision-making in practical settings. These systems use Convolutional neural networks (CNNs) for dynamic path planning, LIDAR data processing, and image identification (Anglen, 2024)

Vehicles may now move quickly on the road without even requiring human intervention, marking a historic advancement in the transportation sector. It is obvious that advances in technology have contributed to its remarkable journey of invention and development. Now is the time when AI contributes to significant advancements in the transportation industry, attracting the attention of global transportation executives. The global automotive aluminium market was predicted to be worth $2.99 billion in 2022 and is projected to expand at a compound annual growth rate (CAGR) of 25.5 between 2023 and 2030 (Bhardwaj, 2025).

The future of AI and ML: Generative AI and independent systems.

The most important recent development is probably the increasing use of generative AI. Systems such as GPT-4 and DALL-E 2 show creative talents that were previously thought to be unavailable to humans by producing original text, graphics, and code. These foundation models can automate jobs that need human creativity and are being included into design tools, customer service platforms and productivity software (Company, 2024).

As autonomous systems develop further, self-driving cars are now traveling millions of miles on public highways. Limited autonomous driving has already been used in mining, agricultural, and warehouse operations, however completely autonomous personal vehicles are still in the development stage (Garikapati, 2024).

According to projections, the global market for autonomous vehicles is expected to experience tremendous growth, rising from $54 billion in 2019 to $556 billion by 2026 (Insights, 2025). As computing power increases and algorithms improve, AI/ML is positioned to become the 21st century's fundamental technology, as revolutionary as electricity was in the 20th century, as computing power and algorithms advance.

A critical comparison of AI and ML with its antecedents.

It is necessary to compare modern AI/ML to the technology it replaced to fully understand what makes it extraordinary. This part looks at the basic paradigm changes that set modern methods in comparison to past attempts to create artificial intelligence.

Adaptability and scalability: The power of data

It was difficult for traditional AI systems to scale and adapt into new domains. It was impossible to apply an expert system for medical diagnosis to regenerate financial analysis without actually starting from scratch (Onwodi, 2019). It took a lot of computing knowledge and time to extract and translate human skills for each new application.

The capacity to transfer learning capabilities of machine learning systems are impressive because a model trained on one big dataset can be adjusted for related tasks with very little additional data. Additionally, ML systems get better with more data, which creates a positive feedback cycle whereby higher usage leads to improved performance (Arnold, 2023). This scalability explains why many recent improvements in AI have been driven by IT companies with access to big datasets.

The transition from programmed logic to learned patterns is more than just a development in technology but it is an important change in the way we think about using computers to solve problems. With this change, applications that were previously unachievable are now possible, but it also comes with new difficulties in terms of management and accessibility.

Learning vs programming: the core differences.

The most crucial difference relies on how systems acquire capabilities. Both traditional systems and expert systems relied on clear programming whereby human developers created detailed instructions that addressed every possible issue the system could face (Belitsoft, 2024). For example, in early chess programs there were many restrictions regarding movements and board positions.

However, modern machine learning systems pick up knowledge by observing patterns and examples. Instead, a version system is trained with thousands of cat images rather than programmed with descriptions of their features. The system creates its own definition of “cat” by analysing statistical patterns. By switching from programmed information to learned models, systems become more flexible in unexpected situations and can generate insights that humans might not have specifically written down in code.

Managing complexity: Going beyond basic rules.

Expert systems performed very well in specific, clearly defined areas but they drastically failed in situations involving originality or complexity. These systems were fragile and even minor changes from the known inputs could result in total failure (Dhar, 2024).

Modern machine learning, especially deep learning, is far better at handling uncertainty and complexity. Natural Language Processing (NLP) systems can understand human language's characteristics, context and sarcasm (Erickson, 2025). Computer vision systems can recognize things in a variety of lighting situations, from a wide range of angles, and even when they are partially blocked. The ability to adapt in complex real-world settings is a significant improvement above previous technique.

Experiment: Building a simple cancer diagnosis model.

This part explains a machine learning experiment focused on healthcare, an industry where AI has great potential but needs solid testing, to ground theoretical understanding in real-world application.

The goal: Using a meaningful example to showcase machine learning.

The goal of this experiment is to develop a predictive model that could use diagnostic data to classify or categorise breast cancers as benign or cancerous. Machine learning can assist medical decision making by finding patterns in complex clinical data as proved by this classification task. The goal is to show the whole process of building, training and assessing a supervised machine learning model using actual medical data rather than to construct a clinical tool.

The tools: Using technology that is accessible.

I conducted this experiment to show how ML is becoming more accessible by using commonly available tools. I used Google's AutoML, a cloud-based technology that lets users create unique machine learning models without writing code, in place of complicated programming environments. Using the platform's simple interface, I was able to upload the Wisconsin Breast Cancer Dataset and set up the training procedure using buttons and drop-down choices. For data preparation and basic analysis, I used Microsoft Excel, a software that most people are familiar with, to look for patterns and relations in the dataset before training.

These user-friendly tools effectively achieved the same objective as more advanced programming libraries, proving that people without programming expertise may now understand the fundamental ideas of machine learning using common software.

The process: Step by step process.

I carried out the experiment using a straightforward, three-step procedure, following to the simplified tool technique. Firstly, I started by preparing the Wisconsin Breast Cancer Dataset in Excel, cleaning it up and using simple charts to show how various cellular characteristics relate to tumour diagnosis. Secondly, I then uploaded this prepared dataset to the AutoML platform at Google. I followed the interface's instructions to choose *"Classification"* as the task and *"Diagnosis"* (benign or cancerous) as the label I wished to predict. After that, I just selected *"Train Model,"* and the platform took care of the complicated process that took almost an hour long separating the data, choosing the best algorithm, and training the model.

Lastly, I tested the model's performance on an incomplete set of data it had never seen before using the platform's integrated evaluation dashboard, which produced clear metrics and a confusion matrix.

The outcome: What the results show.

On the test data, the Google AutoML model distinguished between benign and malignant tumours with a 95% accuracy rate. The platform's evaluation dashboard displayed a high *"precision"* score, which indicates that it was nearly always accurate when predicting a tumour to be cancerous, and a strong *"recall"* score, which indicates that it was able to identify the great majority of real cancerous cases.

This great result, which was achieved without writing any code, clearly shows how machine learning's fundamental benefit by identifying complex patterns in data to provide accurate predictions is now possible thanks to user-friendly technologies. The platform informed me of the model's performance, but it was unable to clearly explain why it produced a particular prediction, or which features were most significant. This was another significant issue that the experiment brought to light.

This *"black box"* feature emphasizes that even though these technologies make AI production more accessible, human skills are still necessary for interpreting results, guaranteeing ethical application, and making crucial judgments, particularly in industries like healthcare.

Hypothetical system design: Oncology Care AI, A personalized cancer platform.

Building on the results from my experiment, I suggest Oncology Care AI, an integrated system that uses easily available AI capabilities to transform cancer care by using data-driven, personalized approaches throughout the patient journey.

The goal: Transforming the patient's experience.

To customize every phase of cancer care, from risk assessment to treatment and recovery, Oncology Care AI aims to provide a single platform that uses no-code AI solutions. By combining data from several sources and offering reliable decision support through user-friendly interfaces that medical professionals may use without programming knowledge, the system fills important holes in modern oncology.

The blueprint: Components and system architecture.

The architecture uses a flexible, cloud-based design that is focused on easily accessible AI platforms. The data integration layer securely combines all patient reported outcomes, wearable technology and Electronic Health Records (EHR). According to healthcare standards, this feeds into a central data repository with strong privacy protocols (Ofeo, 2025).

The AI component builds personalized prediction models for various clinical purposes using platforms such as Google's AutoML and comparable no-code solutions. Using user-friendly interfaces, patient and clinician sites promote participation and decision-making, while a clear dashboard displays model outputs as straightforward clinical recommendations with confidence scores.

How it functions: Key functions for doctors and patients.

The system works through three integrated parts with the help of easily accessible AI technologies. Risk assessment part uses simple data inputs to identify high risk individuals and suggest schedules for personalized screening. The treatment guidance part compares patient data with medical research to recommend the best course of action.

The monitoring part offers ongoing treatment by using wearable data and patient reports to manage long-term effects and identify complications early. The method offers doctors clear recommendations free of complicated terminologies. It establishes an inclusive care partnership by providing patients with tracking tools and learning materials.

Considerations: advantages and disadvantages of this implementation.

There are several benefits to this method including better early detection, fewer ineffective treatments, and more effective care. Using easily accessible AI tools reduces implementation costs and technical challenges. However, challenges with system integration, data privacy, and regulatory compliance still exist.

In this design ethical values are highlighted including keeping people in charge for important decisions, promoting equity among populations and being transparent in recommendations. Oncology Care AI represents a realistic vision for enabling AI-powered cancer treatment with tools that doctors can truly use and understand.

Reflecting on the ethical and societal implications of AI/ML.

As AI and ML are developing so quickly, it is important to critically assess their greater implications. This part explores how these technologies both promote and possibly hinder global sustainable development using the Sustainable Development Goals (SDGs) of the UN as a framework.

The Sustainable Development Goals (SGBs)

The SDGs offer a thorough road map for tackling global issues like poverty, health, education, and climate change to create a better and more sustainable future for everybody (Nations, 2023). This framework provides an organized method for evaluating AI/ML's dual effects as a possible source of new hazards and inequalities as well as a progress facilitator.

The positive side: AI/ML as a facilitator for the SDGs.

- SDG 3 (Good health and well-being): With healthcare platforms, AI-powered diagnostic tools and personalized treatment recommendations, such as those investigated in our experiment and system design, can improve healthcare outcomes and availability, particularly in underprivileged areas.
- SDG 4 (Quality education): AI tutors and flexible learning platforms can assist close educational gaps by offering additional support and personalizing educational resources.
- SDG 7 (Affordable and clean energy): AI improves smart grids by balancing supply and demand to in order improve the incorporate renewable sources like solar and wind and increase the reliability of clean energy (Mccall, 2024).
- SDG 13 (Climate Action): AI supports global climate initiatives by increasing the accuracy of climate models and assisting in the monitoring of emissions and deforestation using satellite images (Luca, 2022)

The negative side: AI/ML as a risk to the SDGs.

- SDG 5 (Gender Equality): AI programs that have been trained on biased historical data may continue gender stereotypes, producing unfair results in areas such as credit scoring and jobs.
- SDG 8 (Decent Work): In some industries, AI-driven automation may result in a huge decline in jobs, putting people’s lives in danger and demanding costly reskilling programs.
- SDG 10 (Reduced inequalities): Existing socioeconomic inequalities may be increased and made worse by technological discrimination in hiring, financing, and resource distribution.

Focusing on Advantages and Reducing disadvantages.

It takes effective and multidimensional governance to manage this dual impact. To ensure equity, transparency, and responsibility in AI systems, we must create and implement ethical standards. Strong regulatory frameworks are required to control dangers such as privacy invasion and bias. To ensure that the advantages of AI are shared fairly throughout the world, it is important that we improve the integration of technology.

This involves making infrastructure and educational investments to stop the development of a new technological lower class. We can capitalize on AI's potential to accomplish the SDGs while carefully reducing its risks to society if we guide its development with a dedication to societal principles.

Conclusion

The purpose of this report was to critically analyse AI and machine learning as revolutionary new technologies. This goal was directly met by thorough research of their development, potential, and effects. The report effectively showed the paradigm transition from rule-based systems to data-driven learning, showing that the most important aspect of modern AI is its capacity to recognize complex patterns. This idea was made concrete by the cancer diagnosis experiment utilizing easily accessible technologies. As carefully evaluated against the SDG framework, the report further evaluated the technology's dual impact, demonstrating its huge ability for transforming sectors such as healthcare, education, manufacturing, transportation and finance while also posing major ethical dangers, particularly related to bias and inequality.

The main findings highlight that while no-code platforms are increasing AI's value, its "black box" nature still requires constant human supervision, particularly in crucial applications. To improve healthcare efficiency and personalization, the hypothetical Oncology Care AI design demonstrated a feasible route for incorporating these technologies into complex systems. Although the report's goal of offering an equal perspective has been achieved, it is recognized that the technical scope of the suggested system and the field's rapid growth represent limitations, indicating the need for more research on the effects of AI on society and real-world

The main recommendation is to give the most attention to creating strong ethical frameworks and educational programs that promote digital literacy. By doing this, we can guide these emerging technologies towards only positive outcomes and make sure they are genuine tools for advancing global sustainability and well-being.

References

Ai, T. (2025). The rise of expert systems. *Chapters*.

Al-Garadi, M. A. (2022). The Role of Natural Language Processing during the COVID-19 Pandemic: Health Applications, Opportunities, and Challenges. *PubMed Central*.

Anglen, J. (2024). *rapidinnovation*. Retrieved from Computer Vision in Autonomous Vehicles: https://www.rapidinnovation.io/post/computer-vision-in-autonomous-vehicles

Arnold, M. (2023, September). *Artificial Intelligence & Machine Learning Insights*. Retrieved from Pinnacle: https://pinnacleinvestment.com/artificial-intelligence-machine-learning-insights/

Belitsoft. (2024, January 21). *A Noventiq Company*. Retrieved from What is Artificial Intelligence? AI vs Traditional Software: https://belitsoft.com/ai-development/artificial-intelligence-vs-conventional-software

Bhardwaj, C. (2025). AI in transportion . *Appinventiv*.

Chen, M. (2024, November 25). *Oracle*. Retrieved from Oracle: https://www.oracle.com/africa/artificial-intelligence/machine-learning/what-is-machine-learning/

Cloud, G. (2025). *What is Artificial Intelligence (AI)?* Retrieved from What is Artificial Intelligence (AI)?: https://cloud.google.com/learn/what-is-artificial-intelligence?hl=en

company, M. &. (2024, April 3). What is AI.

Company, M. &. (2024). What is generative AI?

Dhar, V. (2024). The Paradigm Shifts in Artificial Intelligence. *Mags*.

Erickson, J. (2025, September 22). *Oracle*. Retrieved from what is NLP?: https://www.oracle.com/africa/artificial-intelligence/natural-language-processing/

Garikapati, D. (2024). Autonomous Vehicles: Evolution of Artificial Intelligence and the Current Industry Landscape. *ResearchGate*.

Insights, F. b. (2025, September 29). *Autonomous Vehicle market size*. Retrieved from https://www.fortunebusinessinsights.com/autonomous-vehicle-market-109045

ISO. (2024). *Deep learning: The mechanics of magic*. Retrieved from Deep learning: The mechanics of magic: https://www.iso.org/artificial-intelligence/deep-learning

Johnson, E. (2024, September 19). *Siemens*. Retrieved from Data, AI, and Sustainability in Predictive Maintenance: https://blog.siemens.com/2024/09/data-ai-and-sustainability-in-predictive-maintenance/

Luca, C. (2022). Satellite Imagery and AI in Monitoring Environmental Changes.

Mccall, A. (2024). AI-Powered Smart Grids for Energy Optimization and Sustainability. *ResearchGate*.

Nations, U. (2023). *Sustainable Development Goals*. Retrieved from United Nations: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Ofeo, S. (2025). Data privacy in healthcare: Global challenges and solutions. *National Library of Medicine*.

Onwodi, G. (2019). Expert Systems in Medical Diagnosis. *ResearchGate*.

Philosophy, S. E. (2003). The Turing Test.

Platform, D. R. (2025, September). *A guide towards collaborative AI frameworks*. Retrieved from A guide towards collaborative AI frameworks: https://digitalregulation.org/a-guide-towards-collaborative-ai-frameworks/

PwC. (2023). *Harnessing the power of AI to transform the detection of fraud and error*. Retrieved from Harnessing the power of AI to transform the detection of fraud and error: https://www.pwc.com/sk/en/current-press-releases/harnessing-the-power-of-ai-to-transform-the-detection-of-fraud-and-error.html

Reid, D. (2020, January 2). *CNBC*. Retrieved from Google’s DeepMind A.I. beats doctors in breast cancer screening trial: https://www.cnbc.com/2020/01/02/googles-deepmind-ai-beats-doctors-in-breast-cancer-screening-trial.html

Research, S. S. (n.d.). *Revolutionizing Learning: How AI is Uplifting Higher Education*. Retrieved from Revolutionizing Learning: How AI is Uplifting Higher Education: https://ssbr-edu.ch/revolutionizing-learning-how-ai-is-uplifting-higher-education/

Shivam. (2025). Understanding AlexNet: The 2012 Breakthrough That Changed AI Forever. *Medium*.

Tiwari, D. K. (2024). Geoffrey Hinton: The Mind Behind Deep Learning Revolution.

Tomeczek, J. (2025). The Dartmouth Conference - A Summer Brainstorming That Created AI. *AI for everyone*.

Zhou, N. (2018). Concordance Study Between IBM Watson for Oncology and Clinical Practice for Patients with Cancer in China. *PubMed Central*.

Appendices

.