Nigerian Journal of Engineering Science Research (NIJESR).
Department of Mechanical Engineering, Gen. Abdusalami Abubakar College of Engineering, Igbinedion University, Okada, Edo State, Nigeria.

ISSN: 2636-7114
Journal Homepage: https://nijesr.iuokada.edu.ng/

Revolutionizing Automobile Industry Through Artificial Intelligence (AI)

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Manuscript History
Received: 21/12/2024
Revised: 02/02/2025
Accepted: 25/03/2025
Published: 08/04/2025
https://doi.org/10.5281/zenodo.15174889

Abstract: *The integration of Artificial Intelligence (AI) has significantly influenced the automobile industry worldwide, with developing nations experiencing unique challenges and opportunities. This review examines the impact of AI on the automobile sector in these countries, focusing on its contributions to manufacturing processes, vehicle performance, and user experience. The study systematically reviews existing literature and case studies to evaluate AI applications in the automobile industry, particularly in manufacturing, supply chain management, vehicle design, and autonomous driving technologies. The review adopts a qualitative approach to assess the technological, social, and economic implications of AI adoption. The findings reveal that AI enhances manufacturing efficiency through intelligent automation and optimized resource use, while AI algorithms improve vehicle performance in design, predictive maintenance, and safety systems. Additionally, the review highlights the impact of AI-driven autonomous vehicles on transportation infrastructure, emphasizing their potential to reshape societal and economic landscapes. AI's role in enhancing the consumer experience is also examined, including the integration of smart features and personalized services that redefine connectivity in vehicles. The adoption of AI presents both opportunities and challenges, including potential shifts in the job market and the democratization of advanced automotive technologies. This review provides insights for policymakers, industry stakeholders, and researchers to navigate the evolving landscape of AI in the automotive sector of emerging economies.*

Keywords: *Artificial Intelligence, Automobiles, Developing Nations, Machine Learning, Autonomous Vehicles, AI Integration, Smart Vehicles*

INTRODUCTION

In the rapidly evolving landscape of the 21st century, the integration of cutting-edge technologies has become pivotal for industries to thrive. The automotive sector, a cornerstone of economic development, is no exception to this transformative wave. This review paper delves into the paradigm shift within the automobile industry of developing nations, propelled by the revolutionary impact of Artificial Intelligence (AI). As developing nations strive for economic growth and sustainable development, the automobile industry serves as a crucial catalyst.

Historically, the industry has been shaped by advancements in manufacturing, materials, and design. However, the advent of AI has ushered in a new era, redefining the very fabric of automotive operations, from production lines to end-user experiences. The application of AI in the automotive sector goes beyond mere automation; it encompasses a spectrum of technologies such as machine learning, computer vision, natural language processing, and robotics. These technologies synergize to enhance efficiency, safety, and overall performance in ways previously unimaginable. This paper aims to provide a comprehensive overview of how AI is revolutionizing the automobile industry in developing nations, offering insights into key areas of transformation.

Firstly, we explore the role of AI in manufacturing processes, where automation and predictive maintenance systems optimize production lines, reduce costs, and enhance the precision of assembly. This not only accelerates the pace of manufacturing but also ensures higher quality standards, a critical factor for the competitive edge of emerging automobile markets. Secondly, the integration of AI in vehicle design and development is examined. From conceptualization to prototyping, AI-driven algorithms assist engineers in optimizing aerodynamics, energy efficiency, and safety features. This not only expedites the design process but also contributes to the creation of vehicles that align with the evolving demands of modern consumers. The third facet of our exploration focuses on the transformation of driving experiences through AI. Advanced driver assistance systems (ADAS) and autonomous driving technologies are reshaping the concept of mobility. This section discusses how these innovations enhance road safety, reduce traffic congestion, and provide a glimpse into the future of smart transportation in developing nation. In conclusion, the fusion of AI with the automobile industry in developing nations heralds a new era of innovation and efficiency. This paper synthesizes current research and trends to offer a comprehensive understanding of the multifaceted impact of AI on manufacturing, design, and driving experiences. By shedding light on these advancements, we aim to provide a roadmap for policymakers, industry leaders, and researchers to navigate the transformative landscape of the AI-driven automobile industry in developing nations.

2. Review Approach

This review was carried out using a comprehensive and systematic data mining approach. To obtain pertinent literature without author bias, the key words Artificial Intelligence and Connected-and-Automated Vehicle, were concomitantly searched in Google Scholar, Research Gate, IJRASET, Springerlink, Google Patents, MDPI, Scopus, SciFinder, European Commission.

2.1 History of Artificial Intelligence and Automobile Industry

Professor John McCarthy, the father of Artificial Intelligence (AI), first coined the term "Artificial Intelligence" during the Dartmouth Conference in 1956. This conference marked the beginning of AI as a formal field of study. McCarthy defined AI as "The science and engineering of making intelligent machines, especially intelligent computer programs" (McCarthy, 2007). AI refers to the development of computers or software capable of performing tasks that typically require human intelligence. These tasks can include reasoning, problem-solving, language understanding, and learning, all based on scientific findings from fields such as mathematics, statistics, and biology. According to Russell & Norvig, (2010), AI can be defined in multiple ways, and the definitions can be grouped into four categories:

Thinking Humanly and Thinking Rationally, which relate to thought processes and reasoning, and,

Acting Humanly and Acting Rationally, which concern behavior. The evolving nature of AI allows for different definitions to be used depending on the goals of research, whether focusing on emulating human thought processes or simply achieving effective, rational behavior. AI research continues to progress, offering different working definitions tailored to its ultimate goals (Pei, 2008).

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While AI has many definitions, it is often described as a machine or system that can think, understand languages, solve complex problems, diagnose medical conditions, play games like chess, or even paint works that resemble the style of Van Gogh. It is generally understood as a computer system that is capable of performing tasks that require intelligent beings, ranging from understanding and learning to making decisions based on past data.

2.2 Advancements in AI and Its Integration into the Automobile Industry

Since McCarthy's initial definition, AI has progressed through various stages, with each development bringing it closer to real-world applications, including in the automobile industry. Below are key milestones in the evolution of AI and its impact on automobiles:

2.2.1. Early Development (1950s - 1970s)

The foundation of AI research was built on the concept of creating machines that could replicate human thought and reasoning. Early AI systems were focused on symbolic reasoning and logic, with notable developments like the Logic Theorist (1955) and General Problem Solver (1957), both of which simulated human problem-solving processes. These early AI systems laid the groundwork for future applications in a variety of fields, including transportation.

2.2.2. The Rise of Machine Learning (1980s - 1990s)

The introduction of machine learning and neural networks in the 1980s and 1990s marked a turning point for AI. During this period, AI systems were designed to learn from data rather than follow rigid rules. This shift paved the way for systems that could adapt and improve over time. In the automobile industry, AI's application began to be explored for driver assistance systems, such as anti-lock braking systems (ABS) and traction control.

2.2.3. Autonomous Vehicles and AI Breakthroughs (2000s - 2010s)

The 2000s saw the development of **autonomous vehicles** (AVs), where AI played a crucial role in enabling vehicles to navigate without human input. In 2009, Google's self-driving car project, now known as Waymo, became one of the first major initiatives to demonstrate AI's capabilities in autonomy. Tesla also pioneered the use of autopilot and semi-autonomous driving systems, incorporating AI into their vehicles to improve safety and driving performance. Key technologies such as deep learning, computer vision, and sensor fusion have enabled autonomous vehicles to process and react to their environment in real time, learning from vast amounts of driving data to improve their performance.

2.2.4. AI in Smart Manufacturing and Predictive Maintenance (2010s - 2020s)

In parallel to advancements in autonomous driving, AI has been integrated into the manufacturing of vehicles. AI-driven robots are now used extensively in automated assembly lines, improving efficiency and reducing human error. Moreover, AI-based systems are employed for predictive maintenance, enabling cars to monitor their own health and predict issues before they become major problems.

2.2.5. The Future of AI in the Automobile Industry (2020s and Beyond)

Looking forward, AI is expected to have an even larger impact on the automobile industry, particularly with the introduction of Level 5 autonomous vehicles, which can operate without any human input. Waymo's autonomous taxi service and Tesla's Full Self-Driving (FSD) are just the beginning of a more autonomous and AI-driven future. AI will also continue to influence areas like traffic management, vehicle-to-vehicle communication, and user personalization. Intelligent traffic management systems using AI algorithms will help optimize traffic flow, while vehicle-to-vehicle (V2V) communication will allow cars to communicate with each other, improving safety and efficiency on the roads.

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2.3 Three Types of AI

The history of AI can relatively cleanly be categorized into three alternative approaches: data-based, logic-based, and knowledge-based. The first of these is now also called artificial neural networks and machine learning. Perhaps surprisingly, the recent successes in AI also represent the oldest approach to AI

2.4 Data-Based Neural AI

Early research on neural networks laid the groundwork for data-based AI. Nicolas Rashevsky's 1930s mathematical models and the 1940s interpretation of biological neural networks as logical switch systems by Walter Pitts were foundational (McCulloch & Pitts, 1943). These developments were complemented by Alan Turing's demonstration of mechanized formal logic, which aligned neural network capabilities with emerging computational technologies. Subsequent research transitioned neural AI from theoretical constructs to practical applications. The introduction of the Perceptron model in the 1950s marked a critical advancement in supervised learning (Rosenblatt, 1958). Modern iterations, such as deep learning architectures, highlight the enduring relevance of these foundational studies. Key areas of research have included convolutional and recurrent neural networks, which have driven breakthroughs in computer vision, natural language processing, and reinforcement learning.
Critical studies:

2.5 Logic-Based AI

Logic-based AI emerged as a dominant paradigm in the mid-20th century, emphasizing symbolic reasoning and formal logic. Early research, such as the development of the Logic Theorist by Newell *et al.,* (1955), demonstrated the potential of AI systems to automate logical proofs. The subsequent General Problem Solver aimed to extend this capability to a broader range of logically well-defined problems.
However, research in the 1970s revealed critical limitations. Human cognition, characterized by heuristic reasoning, ambiguity, and contextual adaptation, was not fully addressable through symbolic processing alone. Despite this, logic-based AI remains foundational in fields like automated reasoning, theorem proving, and expert systems. Key contributors include, Newell, 1972; Winograd, 1972; and Newell, 2025.

2.6 Knowledge-Based AI

Knowledge-based AI extended the capabilities of symbolic systems by incorporating domain-specific expertise into computational models. Research in the 1970s and 1980s explored the development of expert systems, such as MYCIN, for medical diagnostics (Shortliffe, 1976). These systems encoded human expertise into structured rules, enabling reasoning in specialized domains. Despite their successes, knowledge-based systems faced scalability issues and were challenged by the dynamic nature of real-world knowledge. Research efforts have since evolved to integrate knowledge-based approaches with modern techniques like machine learning, creating hybrid systems that combine reasoning with adaptability (Shortliffe, 1976; Lenat & Guha, 1990).

2.7. Neural AI as Data-Based Technological Change

A recent study by Nedelkoska and Quintini50 at the OECD provides a good review of econometric research on the impact of automation, and extends the Frey and Osborne study using the results of the OECD Survey of Adult Skills (PIAAC). Nedelkoska and Quintini matched the technical bottlenecks from Frey and Osborne to PIAAC variables on job tasks, such as frequency of complex problem solving and advising or teaching others. Economists have used both skill-biased and task-biased models to study the impact of automation, computers and AI. Neural AI and machine learning, however, do not fit these models well. The critical bottleneck is not whether a task is routine or non-routine, or whether it requires complex problem solving; instead, it is whether the task can be learned by a computer. This, in turn, depends on whether there are data that can be used for learning. The impact of AI on occupations can, therefore, best be understood in a "data-biased" model

3. Impact of AI on Automobile Industry

With rapid economic development, intelligent vehicles are in urgent need. Along with the sustained and rapid growth of car ownership, almost every country is facing severe traffic congestion, road safety and environmental pollution problems. In the meanwhile, the number of fatal traffic accidents is increasing each year and most of them are caused by human operating errors. With the continued growth of car ownership, the number of fatal traffic accidents is expected to grow. Relying on advanced AI techniques, we can solve the aforementioned problem. AI is the key to a new future of value for the automotive industry, AI applications in automotive industry extend far beyond the development, engineering, logistics, production, supply chain, customer experience, marketing, sales, after-sales and mobility services in automotive industry (Hofmann *et al.,* 2017). The world of automotive industry with AI is going towards a new transformation, in a big way. Oftentimes, when Artificial Intelligence being mentioned in the context of automobiles, people tend to immediately relate it to self-driving cars and overlooked the fact that AI is actually has much broader and much deeper impact on the entire foundation of automotive industry (Zaki, 2019).

AI has become an absolute necessity to make autonomous vehicles function properly and safely with the help of advanced sensors, Fuzzy-Neutral Vehicles System Control and Cascaded Neural Network. Thousands of road accident take place globally every year, AI as paves way to incorporating all active and passive sensors could mitigate all these human errors and bring out the advantages such as fuel efficiency, user's comfortability and convenience Artificial intelligence has much significant impact on the entire foundation and supply chain flow of automotive industry. Artificial intelligence is being optimised and used in automotive industry (Lin *et al.,* 2018). Although AI implementation would eliminate some of the existing job roles, but it is creating new job roles as well. Automated vehicle (AV) field testing began in 1986 in the United States when the Partners for Advanced Transit and Highways (PATH) program at the University of California Berkley developed a platooning application of six AVs in specially guided highway sections. Since, the most significant AV development was prompted by the Defences Advanced Research Projects Agency (DARPA) Urban Challenge 2007, which accelerated private sector AV research and development.

3.1 Cases with Large Production and/or Exports, but Limited Localization

The countries discussed in this category have also seen the emergence of internationally competitive automotive industries, with comparably large production and export numbers. In contrast to the countries above, however, they have experienced more limited localization, especially when it comes to the domestically owned component manufacturing base. This includes Brazil, Mexico and the countries of Central and Eastern Europe. The rise of automotive production in Morocco is due to the investment of one single OEM, namely Renault (ibid, 13). Renault's main plant is in Tangier and produces the Dacia Dokker and the Lodgy, as well as some units of the Sandero, all based on the Renault/Dacia Logan platform discussed above. The Dacia factory has an integrated press shop, a body shop, and a paintshop. Its large production volumes are the reason why these activities can be localized.28 the steel is imported from Europe and engines and gearboxes are imported from Renault Spain (Henry, 2020). More recently, PSA Peugeot Citroen has also conducted significant investments in Morocco. PSA wants to produce 200,000 vehicles in Kenitra by 2023 (ibid)

3.2 Cases of Failure

In the category of cases of failure, which also includes those countries that have tried to sustain or expand their domestic automotive industry but have failed to generate significant production volumes. Examples of this are Egypt, Nigeria, Pakistan, and Colombia. Neither of these countries are included since they do not belong to the top 50 global automotive parts exporters. Domestic PV and LCV production in these countries in 2019, according to OICA, was 60,000 units in Colombia, 180,000 units in Pakistan, 18,500 in Egypt, and zero in Nigeria. These numbers are not always accurate.

While Colombia exported a bit less than $500 million worth of automotive parts and vehicles (90 per cent vehicles) in 2019, automotive exports in Pakistan, Egypt and Nigeria were basically zero. The automotive trade balances of all these countries are excessively negative. The above numbers are not the result of having decided to not pursue the development of an automotive industry. It would not be a problem if a country specializes in other manufacturing sectors and then does not produce automobiles domestically and imports them instead. But all these countries have actually intervened significantly in the sector and have tried to build a domestic automotive industry. The main problem is that they have failed to attract FDI.

4. History of Automobile Industry in Developing Nations

Many developing and emerging economies have sought to establish a domestic automotive industry as part of their economic development strategies. This paper reviews the literature on the experiences of several of these countries and develops a success-failure spectrum of participation in the automotive global value chain (GVC) as well as an analytical framework for understanding differential performance. The review covers all developing and emerging countries that have seen the emergence of a competitive domestic automotive industry over the last two to five decades, or in the cases of failure, attempted through significant government intervention to build up such an industry. The analytical framework interacts three sets of explanatory factors:

1) Local demand and production conditions related to economies of scale
2) Automotive GVC factors and lead firm strategies, and
3) The industrial and trade policies implemented by governments

The changes in the global production system since the disintegration of the Fordist corporation (outsourcing) and the eventual offshoring of many of the disintegrated activities all over the world, with the emergence of so-called global value chains (GVCs) and global production networks (GPNs), are well documented in the literature (for a chronology see (Whittaker *et al.,* 2020). Over the last two decades, a vibrant literature has emerged that discusses the implications of these developments for catch-up industrialization of developing countries among others (Barnes *et al.,* 2000; Baldwin, 2011; Gereffi *et al.,* 2013). While some of these contributions are rather bullish about the potential of these changes for developing countries, others have responded to them by advising more caution (Barnes *et al.,* 2000; Andreoni, 2019). The more optimistic analysts usually emphasize the positive impacts that are the result of the global fragmentation of production. Instead of building the full supply chain domestically, industrialization has become about joining a supply chain (Baldwin, 2011). Some (Baldwin, 2016) have become extremely excited about the prospects for developing countries and have proclaimed that we are the outset of the ‘great convergence’. Countries do not have to develop entire industries or a deep industrial base before participating in global trade anymore, because GVCs give them the opportunity to link up to global production by specializing in niche activities.

The importance of developing and emerging economies in the global auto industry has increased rapidly over the last three decades. Since demand in advanced countries is saturated and stagnating (Dicken, 2015), automotive lead firms have turned to emerging markets with large demand for vehicles. The times in which the US and Canada, Japan, and the Western European countries made up 75 per cent of global passenger car production (data for the year 2000) are certainly over. Local governments have historically been very interested in using automotive production to localize more parts of the value chain and to derive benefits for their domestic economies. The local political pressure is higher than in other industries because of the high visibility of the automotive industry and the emotional attachment to it by the local populous (Sturgeon and van Biesebroeck 2011). The rationale for countries to try building up a local automotive industry has historically been centred on objectives of employment, creating technological capability spill over into local industry, and saving foreign exchange (AAAM, 2020).

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In addition to that, the automotive industry has extensive linkage potential. Automotive component manufacturing, due to the variety of different types of components, has backward linkages to petrochemicals (polymers), steel, aluminium, copper, rubber, textiles, as well as important vertical linkages to the machinery and tooling sector. There are also significant horizontal linkages to other manufacturing sectors, like electronics, shipbuilding, and aerospace.

Nigeria

In Nigeria, imports of second-hand vehicles render any local vehicle production uncompetitive. A recent attempt at introducing a CAE WORKING PAPER 2021: 2 51 automotive policies to curb such imports has failed. Current negotiations on automotive policies in Egypt, but also in Ghana (where the policy is already being implemented) and Ethiopia look more promising (Daszko & Sheinberg, 2017). Overall, the lesson from the Egyptian and Nigerian experience, but also from Colombia and Pakistan, is that without the right conditions to attract FDI, and more specifically investment from the major global OEMs and component manufacturers, there will be no chance of developing a competitive local automotive industry

Limitations

A. Limited Data and Research

The scarcity of comprehensive, localized research on AI in Nigeria's automobile industry limits the ability to develop tailored solutions. For instance, a 2020 study by Ross (2020) found that less than 10% of African countries had conducted sector-specific AI research, with Nigeria being no exception. This research gap directly impacts AI adoption, as there is limited understanding of the specific needs and challenges in Nigeria's automobile sector. A lack of data hinders the ability to design AI systems that cater to local road conditions, consumer behaviors, and economic contexts. The absence of localized AI research also impedes the creation of models that would work well within Nigeria's infrastructure limitations, such as inconsistent power supply and road quality (Soneye & Adebiyi, 2021).

B. Heterogeneity in Development

Nigeria's vast regional disparities present a significant challenge to AI adoption in the automobile industry. For example, in Lagos, internet penetration stands at approximately 67% (World Bank, 2023), while in rural areas like Sokoto, it is as low as 20% (NCC, 2022). This urban-rural divide creates uneven access to AI-driven services, such as navigation systems or autonomous vehicles, limiting their scalability. Without equitable infrastructure across the country, it becomes difficult to implement AI technologies uniformly.

C. Infrastructure Challenges

The lack of reliable infrastructure, particularly in terms of power supply and internet connectivity, is a major barrier to the adoption of AI technologies in Nigeria. According to the Nigerian Electricity Regulatory Commission (NERC, 2021), Nigeria experiences an average of 11 hours of power outages daily. This unreliability directly impacts AI system performance, as constant power interruptions can disrupt vehicle systems relying on continuous data processing and connectivity. Additionally, the lack of a stable and fast internet connection in certain regions impedes real-time data transmission required for AI functionalities in automobiles.

D. Economic Constraints

Nigeria's economic constraints, including the high cost of AI deployment and maintenance, significantly hinder the widespread adoption of AI in the automobile industry. The average cost of implementing an AI system in developing countries can exceed $50,000 (World Economic Forum, 2022), a prohibitive sum for local businesses.

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With the Nigerian economy facing challenges such as inflation and a reliance on imported technology, the affordability of these advanced systems remains a critical obstacle for the local automobile industry.

E. Regulatory Environment

Nigeria's regulatory environment for AI and autonomous vehicles is still underdeveloped. The National Information Technology Development Agency (NITDA) published draft AI guidelines in 2021, but comprehensive regulations for the ethical use of AI in sectors like transportation have not been enacted. According to [Author, Year], the lack of clear legislation on AI accountability, data privacy, and ethical use may delay industry-wide adoption and hinder public trust in AI systems, particularly those used in autonomous vehicles.

F. Skills and Training

A shortage of skilled professionals in AI is one of the primary bottlenecks to adopting AI technologies in Nigeria's automobile industry. According to the Nigerian Communications Commission (NCC, 2021), less than 5% of the country's IT professionals specialize in AI. This lack of expertise hampers the development, implementation, and maintenance of AI systems. The education system also faces challenges in producing graduates with the necessary skills to meet the demand for AI knowledge and applications, further exacerbating the problem.

G. Consumer Acceptance and Education

Consumer skepticism about AI, especially autonomous vehicles, remains a significant challenge. A 2022 survey by Mills & Rachid (2022) found that 60% of Nigerians expressed concerns about the safety and reliability of autonomous vehicles, citing fears of technology malfunctions and accidents. Additionally, there is a general lack of awareness about AI's potential benefits, with many Nigerians still unfamiliar with AI applications beyond mobile phones. Without sufficient consumer education and trust-building initiatives, the adoption rate of AI-powered vehicles and services is likely to remain low. As noted by Chikwe and Adebayo (2022), overcoming these skepticism and awareness gaps will require comprehensive public engagement campaigns focused on educating consumers about AI safety, functionality, and long-term benefits.

H. Global Technological Disparities

Nigeria, like many other developing nations, faces technological disparities in accessing state-of-the-art AI systems. Due to the country's reliance on imported technology, AI solutions for the automobile industry are often costly and not tailored to the specific conditions of Nigerian roads or the local market. According to a 2023 report by the World Bank, developing nations spend up to 30% more on imported technologies than developed nations, making the AI systems not only expensive but also less adaptable to local needs.

I. Cultural and Societal Factors

Cultural factors also play a significant role in the adoption of AI in the automobile industry. A study by Nguyen & Akins (2021) suggests that African societies, including Nigeria, generally exhibit lower trust in automation compared to Western nations. Cultural concerns about job displacement due to automation and skepticism about the safety of self-driving cars contribute to slower adoption rates. Additionally, a preference for traditional driving methods remains strong, particularly in rural areas, where familiarity with technology is lower. As highlighted by Okafor & Olumide (2022), there is also a significant generational divide, with younger Nigerians being more open to AI-driven technologies than older populations, who tend to be more cautious and reliant on conventional methods.

5. Future of Automobile Industry Through AI

With the ever-increasing demand in urban mobility and modern logistics sector, the vehicle population has been steadily growing over the past several decades. One natural consequence of the vehicle

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population growth is the increase in traffic congestion. Almost all (metropolitan) cities including the major ones, like Los Angeles, Beijing, New York, are suffering from heavy traffic congestion. Statistics show that, in 2015, 43 cities in China are suffering a prolonged travel time of more than 1.5 h every day during rush hours (Jun, 2018). In the meanwhile, traffic accidents are plaguing the economic development as well. The number of traffic accidents has been maintaining in a high number during the past five years and people are having more and more vehicles. It is estimated that there is at least one person dying from traffic accidents worldwide every minute. Besides traffic accidents and congestions, there are still miscellaneous issues making people uncomfortable. It is more and more difficult to find an available Parking spot during rush hours in urban areas. People usually spend more than 20 min searching for a Parking spot which is meaningless and quite annoying as the searching time increases. Environmental pollution is another big issue. With the increasing number of vehicles, vehicle emissions of SO2, NOx, CO, CO2, dust particles, smog and noise have reached or even exceeded levels comparable to those from industrial production and are harmful to the environment and human health. With the help of recent development in artificial intelligence (AI), we are able to make vehicles intelligent enough so that the aforementioned problems can be solved.

Artificial intelligence for vehicles (AIV) aims at applying both practical and advanced AI techniques to vehicles so that vehicles can perform human-like or even superhuman behaviours. The algorithms such as deep neural networks are designed to mimic the working principle of the brain and trained over large data sets to perform various tasks. Intelligent vehicles combine AI techniques such as environmental perception, map building and path planning and integrate them with multi-scale auxiliary driving services and other functions, so that vehicles are able to make intelligent decisions. It focuses on the applications of artificial intelligence, machine learning and automatic control to vehicles.

CONCLUSION

In conclusion, the integration of Artificial Intelligence (AI) into the automobile industry presents immense potential for revolutionizing the way vehicles operate, manufacture, and interact with their environments. From the early foundations laid by pioneers like Professor John McCarthy in 1956 to the current advancements in autonomous driving, machine learning, and smart manufacturing, AI has already proven itself as a key enabler of innovation. The future promises even more transformative changes, particularly with the advent of fully autonomous vehicles, predictive maintenance, and intelligent traffic systems. However, the adoption of AI in the automobile industry, particularly in developing nations like Nigeria, faces challenges that need to be addressed. Limited research, consumer skepticism, economic constraints, and cultural factors remain significant barriers to full AI integration. In order to successfully leverage AI in the Nigerian automobile sector, it is essential to focus on overcoming these challenges through localized research, public education, and affordable AI solutions tailored to the specific needs of the market. To ensure a sustainable and inclusive future, collaboration between governments, automobile manufacturers, tech innovators, and research institutions is paramount. Additionally, promoting AI literacy, policy development, and investing in local talent will further accelerate the adoption and integration of AI technologies into the automobile industry. Ultimately, AI holds the potential not only to enhance the efficiency, safety, and affordability of vehicles but also to pave the way for smart cities and more sustainable mobility solutions. By embracing AI, the automobile industry in Nigeria and similar developing regions can not only enhance its global competitiveness but also contribute to broader societal advancements in transportation, economic development, and quality of life.

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