



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

 9940 572 462

 6381 907 438

 [ijirset@gmail.com](mailto:ijirset@gmail.com)

 [www.ijirset.com](http://www.ijirset.com)

# Artificial Intelligence's Impact on the Automotive Industry

Khushboo Choubey<sup>1</sup>, Kuldeep Soni<sup>2</sup>, Divyanshi Tiwari<sup>3</sup>, Ayush Tiwari<sup>4</sup>

Department of Computer Science and Engineering, Baderia Global Institute of Engineering and Management, Jabalpur, Madhya Pradesh, India<sup>1 2 3 4</sup>

**ABSTRACT:** The aim of this study is to determine artificial intelligence's impact and benefits for the automobile sector. This study employs the descriptive research methodology, which gathers data from already-existing facts. The study's findings clarify the significance of autonomous car technology for the automotive industry's use of artificial intelligence as well as the benefits and drawbacks of this technology in current usage. The research's findings were attained as a result of the rise in human requirements in the age of industry 4.0 technology, which led some businesses to create driverless car technology. Using autonomous car technology, this study was carried out to examine artificial intelligence's impact on the automotive sector.

**KEYWORDS:** “Artificial Intelligence”, “Automobile sector”, “Autonomous car technology”, “Descriptive research methodology”.

## I. INTRODUCTION

This period of technological growth is characterized by a number of factors that make every element of human life dependent on consumer technology. The automation and data sharing capabilities of manufacturing technologies therefore classify human demands for the 4.0 industrial era as fairly high. areas in which artificial intelligence is applied in an attempt to lower risk (Artificial Intelligence, AI). As technology advances, it must be able to analyze and distribute all of the data and components that are involved in every interaction between human beings and autonomous robots.

According to research done by Invesco (Financial Services), artificial intelligence has started to be created as a subfield of computer science that uses complicated data and scientific advancement since the 1950s. In a matter of years, computers gained the capacity to forecast outcomes and initiate actions. Although some people desire to utilize autonomous car technology in their vehicles due of the assisted parking and cyber security features, up to 75% of car owners are still apprehensive about doing so. Due to sensor features and other features, driverless cars will not be able to make traffic reports and will operate differently from human-driven cars.

The deployment of driverless car technology can reduce traffic accidents, which result in 1.24 million fewer fatalities worldwide each year, and save up to 10% of gasoline used in automobiles. Even though driverless car manufacturers are presently unable to investigate them, autonomous vehicles will rule the road in the future. This has pushed independent producers to keep coming up with new ideas. Not only are industrialized nations creating technologies for autonomous automobiles, but underdeveloped nations have also started to work on these projects, however they are still in the simulation stage.

Information technology has transformed the real world into the cyber world, as Soegoto discusses in his book. In order for the automotive sector to understand the advancement and advantages of driverless car technology, this research aims to clarify the impact and benefits of artificial intelligence. This study employs the descriptive research methodology, gathering data from available sources such as known facts, information from earlier studies, and data regarding the advancement of autonomous vehicles. Artificial Intelligence has had a significant impact on the automotive sector. The ability of a machine or computer to do tasks like learning, designing, and making decisions without the need for human interaction is known as artificial intelligence. Numerous businesses across all sectors need to understand how AI might lead to advancements. However, over time, AI emerged as a key component in achieving ever-higher levels of creativity. AI has improved supply chains, cut prices, and optimized manufacturing, all of which

have had a substantial impact on the worldwide market. As a result, AI is now playing a bigger part in fostering innovation in the automotive sector.

**How Does AI Affect the Automotive Industry?**

AI-enabled systems monitor blind areas and employ sensors to help with steering and pedestrian recognition. As a result, it enables drivers to take proactive measures to avert collisions. There are five tiers of vehicle automation in addition. One of the most extensive uses of AI in the automotive sector is ADAS. The World Health Organization (WHO) claims that machine learning for advancements in the automotive sector improves road safety and lowers human error. Additionally, human error is the primary cause of most traffic accidents globally.

Car AI is categorized into three levels. A car must undergo substantial machine learning (ML) model training before it can operate fully autonomously, at which point the driver is reduced to a passenger. Additionally, the vehicle needs to process about 1 TB of data each second. Cloud platforms receive the data, process it, annotate it, and use the results to enhance the algorithms. Nevertheless, this strategy conflicts with the need for minimal energy usage.

**AI-assisted driving autonomy levels**

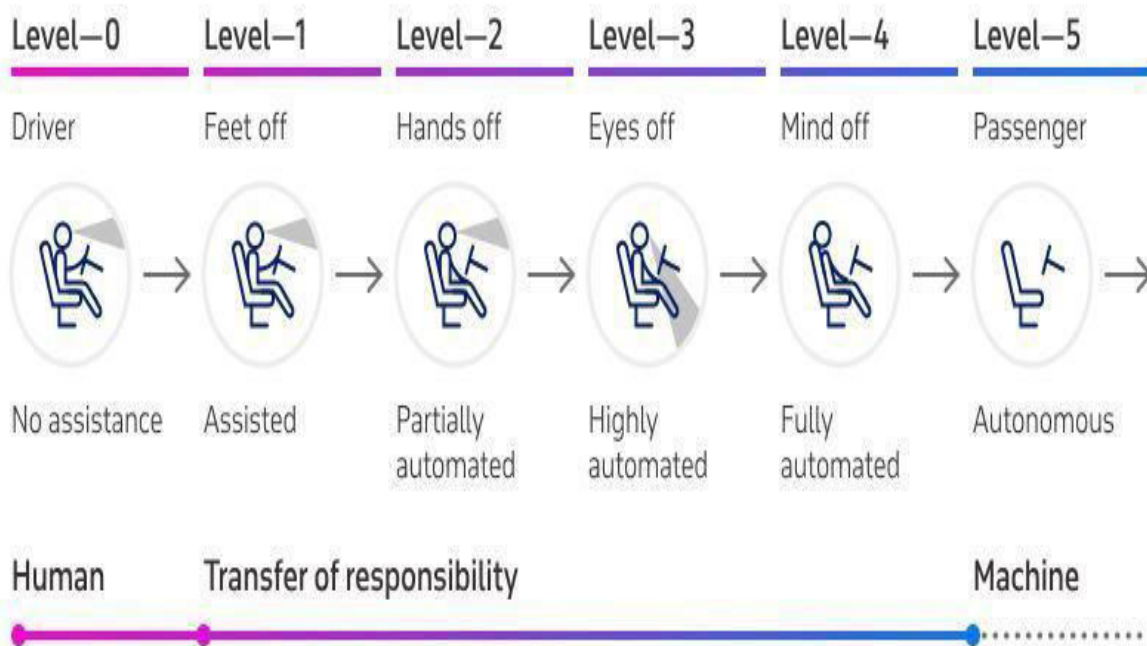


Fig.1 AI assisted driving levels

Furthermore, there are certain financial difficulties brought on by the extensive use of autonomous vehicles throughout the world. There is some degree of success with autonomous cars. But they only pick just one path. As a result, the AI system can produce an extremely thorough road map. However, because it is impractical to map every path in a single area, it is not useful for larger-scale autonomous cars.

**II. ARTIFICIAL INTELLIGENCE'S EFFECT ON THE AUTOMOTIVE SECTOR**

Artificial Intelligence (AI) in the automobile sector has transformed conventional methods by streamlining production lines, improving the supply chain, and cutting expenses. Real-time data from sales and vehicle data can be used to model and control the production process. AI also aids in cost reduction, supply chain management improvement, and production process streamlining in the automotive sector. AI is transforming the car business, making it smarter, safer, more efficient, and environmentally friendly.

1) Services for Dealerships

Back when the automobile sector was more traditional, car dealerships were antiquated. When the dealer and buyer met and the dealer took the automobile for a test drive, the negotiation was completed. However, retailing has now implemented AI in the following ways, using automotive chatbots and machine learning. This enables clients to receive assistance around-the-clock by giving them the precise information that piques their interest. With the use of virtual vehicle studios, artificial intelligence in the automotive sector has also enabled a digital and virtual inspection of cars.

#### 2) Production Procedure

The production of cars relied on a manual labor force prior to AI. The production cost was considerable and the process took a long time. At the time, gathering information on the performance of built cars was a task.

#### 3) Transforming Dealership Promotion

AI has completely changed the way car dealerships sell their vehicles. It enables them to forecast consumer preferences and adjust their marketing plan appropriately. Dealerships can use AI-powered tools to generate customized marketing campaigns based on customer data, such as prior purchases and internet behavior. Businesses will benefit from higher consumer engagement and a higher conversion rate. Dealerships can also optimize their stock by taking into account forecasted trends, stock vehicles, and market demand.

#### 4) An improved encounter

AI technology has recently been incorporated by many automakers into their vehicles, improving the driving and customer experience. Real-time monitoring systems that were previously unavailable are now possible because to AI. However, AI has developed much since then, and businesses are now figuring out new methods to include capabilities in their produced cars. AI in cars can now monitor and identify signs of deterioration to the vehicles. These days, rising automotive industry trends come standard with these features.

### **III. HOW IS ARTIFICIAL INTELLIGENCE CHANGING THE AUTO INDUSTRY'S FUTURE?**

One of the biggest investors in AI is the automotive sector, which is also spearheading a significant future transition for the technology. Players in the automotive sector are enhancing the quality of data essential for autonomous driving systems by utilizing machine learning techniques. This guarantees more accuracy and safety in the operation of self-driving cars.

AI's automation and machine learning capabilities are opening up new opportunities for the automobile sector. The automobile sector is gradually moving in the direction of environmental sustainability, and businesses are producing electric vehicles with the aid of AI technology. These current AI developments in the automobile sector will demonstrate the extent to which artificial intelligence is affecting the industry and how it will impact it in the future.

AI also plays a critical role in improving motorist safety and convenience. AI-enabled features like automated braking and blind-spot detection are becoming standard. Driving is now more convenient and accident risk is much lower thanks to these developments. AI technology in cars is expected to advance and lead to brighter, safer, and more efficient vehicles in the future.

#### 1) 5G, a New AI Friend

One of the newest developments on the internet is 5g. The automation sector can produce vehicles that contribute to the construction of a digital bridge with the aid of the connectivity that 5G promises. 5g can link individuals and devices while commuting. The Internet can offer users a better driving experience with the integration of AI. With the help of drivers' instructions, our entertainment system can develop into a reliable information source. A driver can use their voice alone to access more technical information about their automobile, such as how much oil is left in the engine and how it runs, rather than merely utilizing the system for hands-free calls or music.

#### 2) Artificial Intelligence for Automotive Operations

AI has the potential to automate production process modifications in the automotive sector. By giving the salesman information such as potential clients' customer journeys, it can have an effect on the selling and sales process. Salespeople will be able to maximize both their conversational and process sales by doing this. Costs and conversion rates can be decreased if processes are properly linked.

### 3) Improvement of Security

There are several possible risks and road hazards on commutes and road excursions. AI's cutting-edge machine learning technology assists automakers in creating vehicles that can recognize traffic patterns. This can assist drivers in identifying possible hazards and directing them toward safety.

### 4) Customized Car Experience

One way one can express oneself is through driving an automobile. With its capabilities, artificial intelligence (AI) in cars can offer something akin, and several major automakers, including Porsche, are offering what is known as a "Recommendation Engine." Using machine learning, car packages can be recommended based on the preferences of individual drivers.

### 5). Overcoming Restraints

Businesses understand AI has the potential to significantly and creatively transform the automobile sector. Artificial intelligence systems have been used to generate various designs, engines, and body parts. AI has opened up new possibilities for manufacturing that were not anticipated in the past. The chances that AI will one day surpass what the automobile companies currently believe to be their limit.

## **IV. WHAT ROLE WILL AI PLAY IN THE AUTOMOTIVE SECTOR?**

From 2024 to 2024, there will be an astounding compound annual growth rate of 55%. In 2024, the automobile sector will also have to contend with issues like rising interest rates and supply chain disruptions. But by 2024, it had stabilized into a rising trend. The auto industry is ready to adjust to shifting consumer preferences, and sales are expected to rise. Below are some future prospects for automotive firms in 2024 related to artificial intelligence cars:

Prospects for Automotive Companies in the Future:

1) Integration of OEM-based AI chips: To improve features like cruise control, lighting systems, and autonomous driving capabilities, automakers are more likely to integrate OEM-based AI chip designs.

2) Market Value and Software Integration: Due to the smooth software integration with automotive systems, the artificial intelligence (AI) market is expected to be valued \$200 billion within the next ten years.

3) Growth of the autonomous vehicle market: by 2024, the value of the autonomous vehicle market is expected to reach \$30 million. Furthermore, there is a growing demand for autonomous vehicles per consumer. It is projected that the market share of autonomous vehicles will increase by 10.9%, reaching 99,451 million units by 2032.

4) ADAS Growth: With a projected market size of \$131 billion, the ADAS market is likely to increase significantly at a rate of 9.6% each year. This notable increase is a result of more people utilizing cutting-edge car safety measures.

Artificial Intelligence in the Value Chain of the Automotive Industry:

Automakers can enhance driver enjoyment, safety, and efficiency by utilizing artificial intelligence. In the car business, artificial intelligence is notable at every point of the value chain.

1) Manufacturing: The current automobile industry relies heavily on artificial intelligence for innovation and optimization. It makes it possible to create more creative automobile designs, improve supply chain management, and assemble cars more quickly using robots and exoskeletons.

2) Transportation: Driver assistance technology relies heavily on artificial intelligence. It helps drivers to navigate highways, gauge their own level of weariness, and identify serious car problems. Moreover, it lowers tension and improves driving safety.

3) Service: By utilizing Internet of Things sensors to track battery life and engine health, artificial intelligence improves car performance and efficiency. AI makes insurance solutions better by facilitating quicker and more equitable claims handling.

## V. RESULT AND DISCUSSION

Industry 4.0 is upon us. Artificial intelligence has advanced to the point where computers can now predict outcomes based on input data. This is known as "Deep Learning," and it enables computers to make judgments on their own that may be swiftly carried out by other components. With the use of artificial neural networks and algorithms, computers can now comprehend abstract and complicated ideas thanks to this technology. The industrial era 4.0's integration of technological components can result in an autonomous vehicle that can drive on a roadway under predetermined conditions. Today's autonomous cars are equipped with intelligent parking assistance and crash-avoidance systems thanks to artificial intelligence.

When an autonomous vehicle is turned on, the driver needs to enter some details, including the destination, so that the computer may make decisions on its own. The speed of the car will also be influenced by data from autonomous vehicles, including radar sensors, cameras, and distances from surrounding objects like curbs, traffic signals, road markers, and pedestrian sensors. This is an example of an autonomous car in visual form.



### 1.1 DRIVERLESS CAR ILLUSTRATION

Among the technology found in driverless cars are the following:

#### 1. Car navigation system

The route from the starting point to the goal is not too difficult as long as the driver operates his vehicle. The vehicle must, however, be able to automatically plan the route to the destination when operating in driverless car mode. In driverless cars, an onboard navigation system was employed for this purpose. Geospatial information systems and the Global Positioning System (GPS) are utilized in automobile navigation systems to obtain satellite location data, including longitude and latitude. The driverless automobiles will determine their location and destination after obtaining various information that has been analyzed and executed; the road route is also programmed and computed by the car navigation system's path planning model.

#### 2. Location system

Identifying the vehicle's location using its initial location and destination is the primary goal of the location system technology used in autonomous vehicles. The Global Positioning System will be used to process this data. There are three categories for the location system: hybrid (the essential technology), absolute, and relative.

#### 3. Vehical control

Direction and speed control of the vehicle are included in vehicle control. The variables that determine a vehicle's speed and direction of travel are perceptions of the surrounding environment, the status of the vehicle, driving objectives, traffic laws, and driving expertise. Subsequently, the vehicle control algorithm will accurately calculate and transmit the result to the vehicle control system, which will then implement the control instructions for direction, speed, light, and other parameters.

To set themselves apart from autonomous car models manufactured under other brands, all autonomous car brands in the globe are currently implementing the newest advancements. Technology that is still being developed, like crash monitoring and accident avoidance features for drivers. As autonomous car technologies persist in their development,



customers will come to believe in the technology of driverless automobiles. Following up on the development of AI technology for the automotive sector and the creation of driverless cars, the following are the advantages of driverless cars for society as a whole

## **VI. CONCLUSION**

Both the global population and industry can gain from the effective integration of AI. In summary, artificial intelligence (AI) is causing a significant shift in the automotive sector. It transforms retailing, improves the consumer experience, and redefines the manufacture of automobiles. AI is having a wide range of effects on the automotive sector, from eco-friendly projects and individualized design to safety advancements and predictive analytics.

Artificial Intelligence is invigorating the automotive sector. Manufacturers are now able to surpass all expectations thanks to new AI-powered technology. The only things stopping AI are your creativity and imagination. But issues like safety worries and complicated regulations need to be dealt with. Notwithstanding these obstacles, artificial intelligence (AI) is guiding the car industry toward a future where cars are safer, more effective, and highly customized, completely changing the way we drive and interact with our vehicles.

## **REFERENCES**

- 1.SAE International Releases Updated Visual Chart for Its Levels of Driving Automation Standard for Self-Driving Vehicles, December 2018
- 2.M. McMahon, D. Mumper, M. Ihaza and D. Farrar, "How Smart is your Manufacturing? Build Smarter with AI", 2019 IEEE 43rd Annual Computer Software and Applications Conference (COMPSAC), pp. 55-60, 2019.
- 3.MIT Initiative on the Digital Economy– “Biggest challenges with Digital Platform”, July 2019
- 4.Automotive Industry Challenges to solve in 2020
- 5.D. Miller, "Industrial Digitization with Blockchain and the Internet of Things", IT Professional, vol. 20, no. 3, pp. 15-18, Feb. 2019.
- 6.C. McClelland, "The Difference Between Artificial Intelligence Machine Learning and Deep Learning", Dec. 2017.
- 7.Adamashvili, N. & Fiore, M., 2017. Investigating the role of business marketing techniques in sales process. European Journal of Management
- 8.Ajzen, I. & Fishbein, M., 1973. Attitudinal and Normative Variables As Predictors of Specific Behaviors. Journal of Personality and Social Psychology
- 9.Berkovich & Izhak, 2016. School Leaders and Transformational Leadership Theory.
- 10.Bitner, M. J., Booms, B. H. & Tetreault, M. S., 1990. The Service Encounter: Diagnosing Favorable and Unfavorable Incidents.



**INNO SPACE**  
SJIF Scientific Journal Impact Factor  
**Impact Factor: 8.423**



**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

**9940 572 462** **6381 907 438** **ijirset@gmail.com**



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details