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Enhanced Generation Artificial Intelligence In Automotive Sector

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Abstract

The goal of this study is to examine how artificial intelligence (AI) is affecting the industrial industry of the automotive sector. Artificial intelligence (AI) with a wide variety of useful functions is a new potential value for the car sector. Artificial intelligence's influence on the automobile sector is strengthened by its use. So far, studies still lack reference materials and are conducted on the existence of functions or features introduced by artificial intelligence to the automotive industry, it is necessary to examine the extent to which these functions are acceptable to the automotive industry with the use of artificial intelligence by automotive organizations in the context of their transformational leadership, vehicles autonomous, intelligent. factory and marketing & sales. After a careful interpretation of the data obtained, leadership change, autonomous vehicles, smart factories, marketing, and sales are all dependent factors are considered to be significantly positive effects or side of artificial intelligence. This study's important viewpoints will provide insight into how the automobile industry is changing.

KEYWORD: Artificial Intelligence, Automotive Sector, Autonomous Vehicle

1. Introduction

This research paper for the journal research that the writer wants to produce is to find out about the development of new technology from Artificial Intelligence for the increasingly sophisticated automotive sector with various new functions or features introduced. Nowadays, the level of automation for autonomous vehicles (AVs) is always increasing in the number of users because of its capabilities through artificial intelligence that brings convenience to users of autonomous vehicle technology. To gauge the degree of automotive grade level, the automotive sector frequently uses a sixth level classification stage, which ranges start to 0 (fully manual) to 5 (entirely autonomous) (SAE International) (SAE International Standard J3016: DC (n.d.). December 13, 2022). for the rated level for autonomous driving determined by SAE for levels 1-5 can be interpreted according to the features or functions on the vehicle.

The study organization is about to elaborate the issues regarding A.I solution for automotive sector. According to perception, autonomous cars are aware of their driving situations thanks to a multitude of sensors, including radar, lidar, the global positioning system (GPS), and others. The cars' driving behaviors, including as lane switching, lane keeping, braking, and accelerating, are controlled by a decision-making controller. The planning feature aids autonomous vehicles in determining suitable running paths between two points. The onboard powertrain components would then get precise instructions from the control module to complete the driving maneuvers and proceed along the planned route. The AD is divided by first until sixth levels, or L0 to L5 based on these modules' intelligence degrees (Roza, F. ; 2020).

Deep Learning similar like End to End (E2E) that uses Deep Neural Networks (DNNs) to tackle complicated issues by utilizing their multi-layered structure. Each DNN layer (or collection of layers) may specialize to execute intermediate tasks essential for such situations, just like the human brain can. The system must decide which decisions to make in the behavior layer based on this model. In accordance with the objectives of the vehicle, it presents several behavior possibilities based on system policy and chooses the optimal one by using an optimization criterion. In the planning layer, the system uses the decisions made to determine the movements the vehicle must perform to conform to the selected behavior. Finally, the control values are delivered to the actuator interface modules in the vehicle control layer (Kadry, M. ; 2022).

When it does, to create the advanced automotive and the architecture module, it will need considerable long-term cooperation between innovators, autonomous automakers, and government agency, and other more to enable it. While competition is advancing the scene, the difficulties are too expensive and complicated for any one side to handle on

their own. The legal environment for self-driving car technology will depend on legislative changes made by policymakers, which is proving to be a challenging barrier to the widespread adoption and viability of AVs. When drivers are no longer held responsible for accidents and the regulations around AI become more complex, complex concerns will need to be handled.

In terms of driving assistance systems, driving duties that require lateral or longitudinal movement are occasionally assisted by level 1 cars. Multidimensional aid is automatically provided by level 2 vehicles, and for Level 3 vehicle drives automatically accelerate and decelerate steering guide in a particular situation without the input from drivers. When the automobile is operating partially autonomously, Level 4 driving does not need the driver to always operate the steering guide on wheel. At Level 5, all situations can be handled by a vehicle autonomously. The automatic system totally substitutes the development of vehicles matching to Levels 1 eliminates the need for a human driver and reaching to full automation. Until Level 5. However, a number of potential problems could prevent the use of autonomous driving, including unexpected, varied, and dynamic traffic players, linked, Unstructured, perplexing, and often illogical road infrastructures, as well as time-varying, complex, and traffic environments.

2. Discussion

framework of perception–decision–control hierarchical

The design of the primary position form of all functions utilized for independent form and execution depends on the perception, decision, control, and execution modules in the present autonomous driving system. Higher degrees of functionality must be made possible as artificial intelligence technology's capability advances. To merge existing functions and create new ones, contemporary research frameworks, based on the original system, typically immediately overlap other aspects. It is crucial at the primary phase to the development of autonomous systems when drive mode based on artificial intelligence to have an integrated architecture that is compatible with the design of the hierarchical structure and the primary location of the functions.

This strategy may successfully execute the particular situation-driven and task-driven types of autonomous mode are deemed to be appropriate for the method of determining decisions for AVs that corresponds from Levels 2-4. Finite state machines are one of its typical methods. The main ideas behind this strategy are simple, understandable, and straightforward to put into practice. Its applicability is superior than other workable ways in basic scenarios. It is difficult to apply these methods to the complexity of real-world scenarios, particularly when it comes to high-level autonomous driving, because they cannot sum up unknown facts. Figure 1 summarizes the unique traits and constraints of each subsystem in a hierarchical structure (Rasouli, A., & Tsotsos, J. K. ; 2018, May 30), (Development of autonomous car—part I: Distributed system architecture and Development Process (n.d.). Retrieved December 13, 2022), (Noh, S., & An, K. ; 1970), (Shalev-Shwartz, S., Shammah, S., & Shashua, A. ; 2016), (Sun, Z., Huang, Z., Zhu, Q., Li, X., & Liu, D. ; 1970, January 1), (Ruan, Y., Chen, H., & Li, J. ; 2017), (González, D., Profile, V., Pérez, J., Milanés, V., Nashashibi, Metrics, O. M. V. A. ; 2016).

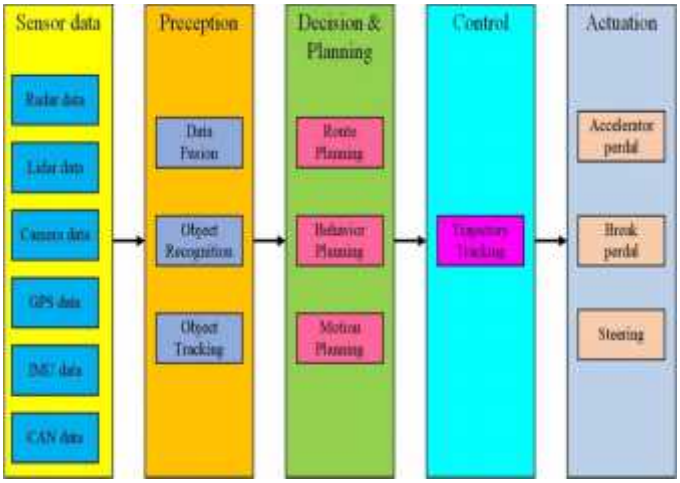

Figure 1 : the flow map for simplified process in hierarchical framework for perception-decision-control

End-to-end learning framework

The bottom controller of the vehicle can receive the input data acquired from sensors directly using the end-to-end learning mechanism (brake, throttle, steering, etc.). AVs can complete the self-adaptation and self-learning processes with the aid of a contemporary end-to-end learning framework's capabilities for continuing learning and exploration (mohanan, M. G. ; 2022). However, as a result of the end-to-end framework's intermediate link's hidden characteristics, a number of issues including illogical learning information, irrational learning guidelines, and inappropriate learning planning then arise for situation that is dark and uncertain in the real traffic scenario. There is a significant degree of discrepancy between comparable tasks and expectations as a result of the black-box issue with the intermediary step of determining each terminal. When creating cars at a higher level, the physical mechanism that has promise with the learning method even if it is always unclear also has a number of possible problems. However, every problem that can be interpreted is caused by a high level of fall in depth on the physical mechanism behind the prototype which can be a problem that inhibits the development and use of its opponent learning level methods.

Furthermore, based only on exploration at each point of terminal encounter or existing hierarchical work order, we cannot handle these out-of-control situations very well. Complex traffic scenarios often have unclear, components that are surprising and unusual. If the higher-stage artificial intelligence follows the current development trend that has complete functions, actions and tasks, the designers who develop it have no ability to a strategy for handling the erratic traffic conditions at the moment. Old method research techniques focused on certain actions also for basic traffic environments unsatisfied describe the capacity for control and decision-making of the particularly challenging to create a basis for anthropomorphic driving algorithm development control for higher stage intelligent cars in actual traffic settings in Figure 2.

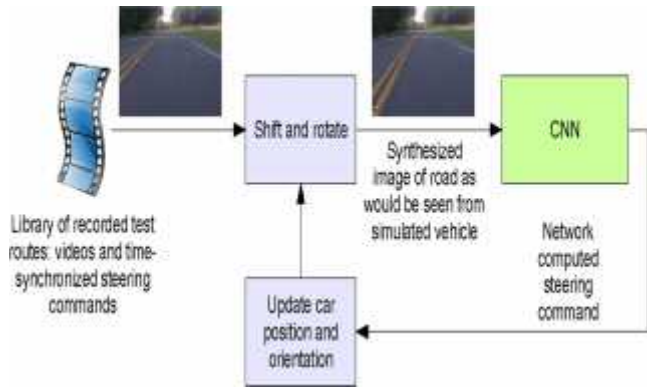

Figure 2 : the diagram for learning data from image or video make decisions for choosing any action to keep moving on the road.

Next Features Level 5 AV

It is believed that the autonomous driving system is a comprehensive framework. with several hardware components and computer programmers (Fernandez, F. ; 2017). In the framework of the traditional hierarchy, the main position includes various functions, physical structures that correspond to functional differences similar to another subsystems. Each part of the similar structure and function is launched according to the problems faced by the integrated work structure in practical applications. Controlling the ontologies of physical structures through information and energy flow results in system functions with various degrees of artificial intelligence. However, from a systems theory perspective, the route of difficulties connected to a hierarchical design framework already in place is necessary for latest concepts looks like the investigation for develop on higher-stage autonomous control drive mode systems. This issue forces to author to describe each function of the autonomous driving system to its constituent parts rather of defining each function separately. On the other hand, the author must evaluate the existing fundamentals, structures, substructures, and parts from the viewpoint of the vehicle system as a whole.

But as of right now, the high-level development route for autonomous vehicles is mostly based on various application scenarios and driving control needs. The superposition or continuous key positions within layered framework functions in scenario-driven and control-task-driven approaches eventually cause issues like choice conflicts and functional redundancy. As a result, Level 4 operating range restrictions will make it impossible for an autonomous vehicle

designed under this idea to pass through, while Level 5 or the Next-Generation Level will be tough to pass. As a result, the author discards the notion of the current framework, takes into account the autonomous vehicle as a whole, and develops a unified and universal framework based on hybrid intelligence from the standpoint of human-like systems, followed by the variables that might impact traffic.

3. Results and discussion

Many people associate AI in the automobile sector with self-driving or autonomous vehicles. These cars are undoubtedly one of the technology's more obvious uses, but there is so much more going on in the background and behind the hood. AI and automation are now crucial to the development and manufacture of vehicles, as well as the tens of thousands of related components that go into each one. The manufacturing process has benefited greatly from automation and the employment of intelligent robots. Additionally, AI has grown to play a crucial role in the interaction between the manufacture and sale of autos. Predictive modelling may be applied to vehicle and sales data to better manage production in response to current demand. Though self-driving cars may not be too far off, AI improves the driving experience and provides more immediate and advantageous chances. Vehicle producers are creating safer, more pleasant cars using robotic automation, natural language processing, and computer vision. These vehicles include connection and computer technology so they can better analyze traffic, road conditions, and other drivers' behavior (Rauch, S. ; 2022).

4. Conclusions

Future AI-based technologies will raise the value of autos by accelerating production, increasing production capacity, gathering data, and offering a unique user experience. Big data will surely be the future of the automotive industry's economic growth. Big data and an AI/ML-based system may accurately predict supply-demand fluctuation while also ensuring that a customer obtains the necessary goods. depending on progressive development. Artificial intelligence has officially entered its age. Everything about the automobile business is evolving, including how we engage with them and how we drive. The good news is that our industry is ready to benefit from this technology and is not just accepting it with open arms.

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