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An Analysis of the Use of Artificial Intelligence in Tesla and Mercedes Driverless Cars

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ABSTRACT: Artificial Intelligence is Also known as AI in the simple language, it is the development and the theory of some computer systems which can undertake certain tasks which will normally need the intelligence of humans. Artificial intelligence is already a very important tool for Mercedes-Benz and Tesla today — and not just for autonomous driving. Using state-of-the-art procedures for machine learning as a basis, we are working with our development units to create new functions for future vehicles and are continuing to develop the AI philosophy at Mercedes-Benz. At the company itself, the system is allowing the employees to experience a new form of individual support for their daily work in development, production, and sales units.

I. INTRODUCTION

Technology is advancing quickly in the modern world, and we are daily coming into contact with new innovations. Artificial intelligence is one of the rapidly developing fields of computer science that is poised to usher in a new era of technological advancement through the development of intelligent machines. Artificial intelligence is now pervasive in our world. It is now working on a wide range of subfields, including self-driving cars, chess play, theorem proving, music playing, painting, etc.

A subfield of computer science called artificial intelligence aims to replicate human intellect in a machine. Algorithms drive AI systems, which employ methods like deep learning and machine learning to display "intelligent" behaviour. Outside of autonomous driving, artificial intelligence (AI) is a crucial tool for Mercedes Benz. We create new features based on machine learning, for example, for upcoming automobiles and mobility services. Intelligent assistance systems let us experience a new kind of AI-powered individual support in our professional lives. ^[1].



Fig.1 Mercedes Benz MayBach Ref from Google



Working toward a same objective within the Mercedes-Benz Group are experts in AI algorithm development, function developers, psychologists, designers, and attorneys. Mercedes hopes to influence the way people travel in the future. They are certain that AI will significantly alter the game in this area. Mercedes is looking for professionals that wish to improve artificial intelligence with us. Because of the diversity of the people who work here, our AI professionals face a wide range of difficulties. And we provide them with the tools they need to start implementing their ideas. ^[1]

II. WHEN COMPUTERS LEARN

Artificial intelligence (AI) is the term for when computers imitate human cognitive skills. Up until recently, not even powerful supercomputers could accomplish this. Huang, who referred to artificial intelligence as the "answer to the challenge of autonomous driving" in his keynote address at the trade fair's opening, said that only so-called deep learning was responsible for the innovation.

The main artificial intelligence learning technique, Deep Learning, teaches computers to learn the world as a hierarchy of concepts. They encounter ever-more complicated concepts as they learn them, which they process based on their knowledge of the earlier, simpler notions. They continuously learn new skills in order to comprehend and control their surroundings in this way^[2].

III. FROM A VEHICLE TO AN INTELLIGENT CO-PILOT

Through deep learning, vehicles will "learn" to understand their environment. Connected to the cloud, a Mercedes has developed an adaptable co-pilot that permanently keeps an eye on the safety and comfort of its passengers, both inside and outside the vehicle. In future, artificial intelligence will make it possible for the software to learn from the driver's routine so that it can make personal predictions and submit recommendations. Examples of these are route guidance in the morning or the route to the nearest gas station, considering factors such as driving behaviour, current sensor input, and the destination of the trip.

IV. MERCEDES V/S TESLA

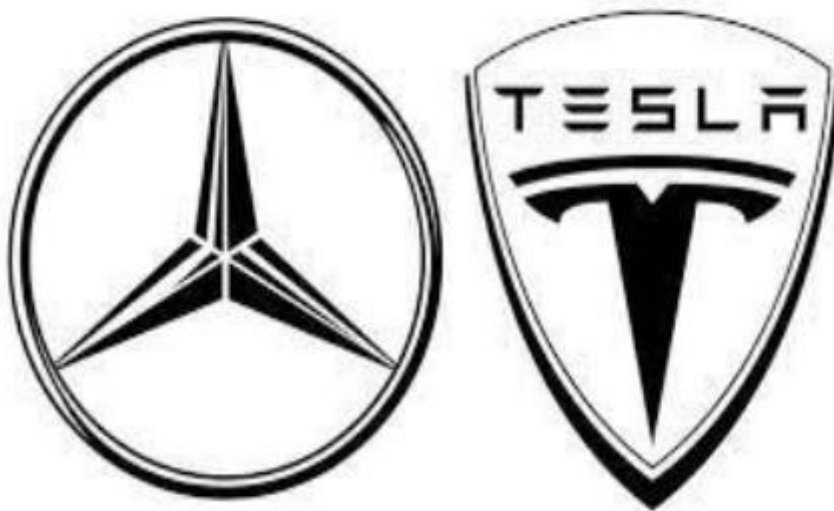


Fig.2 The Mercedes vs Tesla

Mercedes AI Beats Tesla AI - Mercedes' Drive pilot is in operation, "traffic jam assistant" technologies are already on sale today. On certain highways they required below 40 mph, a Drive Pilot will take control of the car's speed, steering, and brakes to move you along in traffic. But there's one key difference: Once you ON the Drive Pilot, you are no longer handle the car until it's turn off. You can look away, watch a movie, or zone out. If the car crashes while Drive Pilot is on, then that's Mercedes' problem, not yours. This distinction puts Mercedes' semi-autonomous system miles ahead of Tesla's AutoPilot Drive Pilot has already been approved for use on all German highways.



"By the end of last year, we were the first to get international certification for a Level 3 system," Proudly said by the Manger of development manager Gregor Kugelmann ^[7].

V. COOPERATION IN THE INTELLIGENT CAR

According to the co-founder and CEO of NVIDIA, artificial intelligence is the future of computing and will revolutionise cars of the future. The computer of the future will be powered by artificial intelligence, which will also transform the car of the future. A considerable contribution from artificial intelligence will be made toward the development of autonomous driving that is suitable for mass production. Because of this, Mercedes-Benz and NVIDIA have established a long-term relationship to make artificial intelligence usable in daily life.

The development process must be entirely upside down in order to achieve real artificial intelligence. Computer architecture serves as the foundation upon which everything else is built. For the past three years, Mercedes-Benz and NVIDIA have worked to realise this ambition. At the conclusion of the procedure, a vehicle that operates solely on artificial intelligence ^[3].

Automated Driving

On June 23, 2020 - Mercedes-Benz, and NVIDIA, planned to enter into cooperation to create a revolutionary in-vehicle computing system and AI computing infrastructure. It's Starting in 2024, this will be rolled out across the fleet of next-generation Mercedes-Benz vehicles, enabling them with upgradable automated driving functions. Working together, the companies plan to develop the most sophisticated and advanced computing architecture ever deployed in an automobile ^[4].

The new software-defined architecture will be built on the NVIDIA DRIVE platform and will be standard in Mercedes-Benz's next-generation fleet, enabling state-of-the-art automated driving functionalities. A primary feature will be the ability to automate the driving of regular routes from address to address. In addition, there will be numerous future safety and convenience applications. Customers will be able to purchase and add capabilities, software applications, and subscription services through over-the-air software updates during the life of the car.

We are excited to work with Mercedes-Benz. It's the perfect partner for us given its long record of innovation and our strong technical relationship. It's clear from our extensive discussions with Ola and his team, that we share a common vision of the automobile of the future. Together, we're going to revolutionize the car ownership experience, making the vehicle software programmable and continuously upgradeable via over-the-air updates. Every future Mercedes-Benz with the NVIDIA DRIVE system will come with a team of expert AI and software engineers continuously developing, refining, and enhancing the car over its lifetime ^[3].

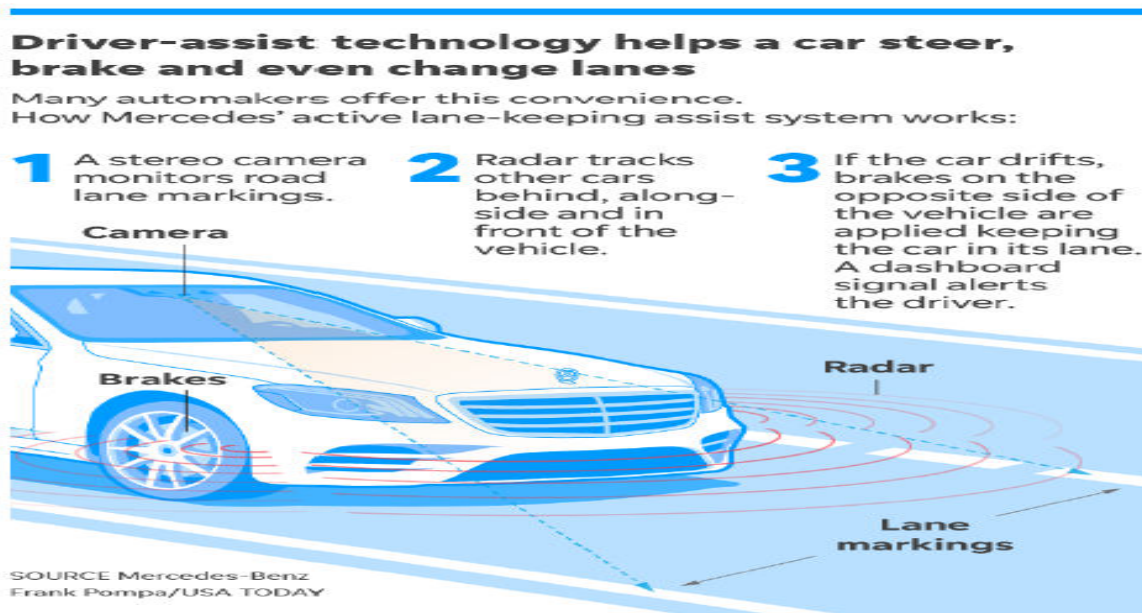


Fig.3 How The Driver Assistant Mechanism works shown in the figure



Jensen Huang, founder, and CEO of NVIDIA - We are delighted to be able to extend our cooperation with NVIDIA. Jensen and I know one another well and we have spent a great deal of time talking about the goals and potential of a next-generation vehicle computing architecture. This new platform will become an efficient, centralized, and software-defined system in our future Mercedes-Benz vehicles. NVIDIA's AI computing architecture will help us streamline our journey towards autonomous driving. These new capabilities and upgrades will be downloaded from the cloud, improving safety, increasing value, and extending the joy of ownership for all Mercedes-Benz customers^[6].

Ola Källenius, Chairman of the Board of Management of Daimler AG and Mercedes-Benz AG

A new computing architecture - Automated driving functions in future Mercedes-Benz cars will be powered by NVIDIA's next-generation DRIVE platform. The computer system-on-chip (SoC), called Orin, is based on the recently announced NVIDIA Ampere supercomputing architecture. The NVIDIA DRIVE platform includes a full system software stack designed for automated driving AI applications. NVIDIA and Mercedes-Benz will jointly develop the AI and automated vehicle applications that include SAE Level 2 and 3 levels, as well as automated parking functions (up to Level 4).

The new system's state-of-the-art capabilities will be harnessed with a total focus on safety. As the technology and regulatory framework development, it will be possible for every car to be updated over the air to enable new automated driving functions. Convenience as well as other safety features will also be available. To develop the new models, both companies will be utilizing NVIDIA DRIVE Infrastructure solutions to enable data-driven development and deep neural network development to handle the requirements of the regions and operational domains where the cars will be available [3].

VI. INTELLIGENT DRIVE

Since the invention of the automobile in 1886, we have been setting standards in vehicle safety with our technical innovations. With more and more new and optimized safety systems, we continue to refine the field of safety in road traffic. Our "Intelligent Drive" assistance systems and their increasing networking are ground-breaking – and a milestone toward autonomous and accident-free driving. People from all over the world put their trust in Mercedes-Benz for the things which are most valuable to them: In our vehicles, people get married, children are born, lives are saved, and grandchildren are chauffeured. In short: Every day, millions of people rely on the fact that they and their loved ones are safe in a Mercedes. And for this, our developers give their best worldwide [8].



Fig.4 The future of Intelligent driving technology

From the innovation to the standard - Many formerly innovative safety technologies of Mercedes-Benz are taken for granted today across the industry. They make their contribution towards the fact that the number of fatal traffic accidents has been declining for several years. Known examples are technologies such as the anti-lock braking system (ABS), which was introduced in 1978 in the S-Class W 116, the airbag, presented in 1981 in the S-Class, or the



Electronic Stability Program ESP®, which was first used in 1995 in an S-Class Coupe. Today, ABS and ESP® are registration standards for all cars in Europe.

Safety at Mercedes-Benz - With numerous technical innovations, we constantly set the benchmark in automotive safety ever since we invented the car in 1886.

Mercedes-Benz VISION EQXX Completes 1,000 Km on One Battery Charge- The VISION EQXX of Mercedes-Benz has demonstrated its range and efficiency in Europe. The EQXX covered more than 1,000 km (621 miles) in everyday traffic, on a single battery charge. The Test was taken at regular road speed, including fast lane cruising up to 87 mph. The battery's state of charge on arrival was around 15 percent, amounting to a remaining range of around 140 kilometres (87 miles), and the average consumption was 8.7 kWh per 100 kilometres (7.1 kWh per 62 miles) [5].

VII. CONCLUSION

To better prepare for the future society in which artificial intelligence (AI) will have a much more pervasive influence on our lives, a better understanding of the difference between AI and human intelligence is necessary. Human and biological intelligence cannot be separated from the process of self-replication. Therefore, a fundamental gap exists between human intelligence and AI until AI acquires artificial life. Humans' social and metacognitive intelligence most clearly distinguish human intelligence from nonhuman intelligence. Although advances are likely to improve the functioning of AI, AI will remain a function of human activity. However, if AI can learn to self-replicate and thus become a life form, albeit a man-made one, outcomes become uncertain.

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