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CURRENT AND FUTURE DEVELOPMENTS IN AUTOMOTIVE ENTERPRISE

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ABSTRACT

This article discusses the current status and review of innovations in traffic management, as well as future developments. Automotive radar has evolved from the first studies in this direction to future systems. The future of fossil and other fuels in the automotive industry, reuse of automotive software, from changes in product management software to trend analysis and survivability systems in Simulink vehicle models, turning data-driven green space into the electrification of the future and automotive systems. A secure e-architecture framework is mentioned. Agricultural machinery design information according to ISO 11783 is specified. Including security-oriented development and ISO 26262. At the C-ITS and security conference, smart transportation cooperation, vehicle connectivity and security, V2X security, smart transportation and software topics were introduced. The article concludes with a discussion of future trends of electric vehicles powered by network connectivity, solar power, and battery technology, as well as new technologies, future models, and issues in today's automobile design.

KEYWORDS: Innovation Analysis, ISO 11783, ISO 26262, C-ITS, V2X, Autonomous Vehicle

1.INTRODUCTION

Automotive engineering is a branch of applied science concerned with the design, development and production of land vehicles. Vehicle development is an optimization problem that requires multiple, often conflicting, designs. During the development of new cars, the main design is defined in terms of fuel consumption, vehicle safety, crashworthiness, durability, ride comfort, handling performance, ergonomics, aerodynamics and NVH details. -Competition in the automotive industry forces original equipment manufacturers (OEMs) to make important decisions on design. Transportation still relies on fossil fuels. In 2016, gasoline and diesel accounted for 92% of all transportation energy. Bioethanol and biodiesel usage is around 5%. —— Contributions of gas and electricity are 3% and 1% respectively. Globally, 67% of the world's oil is transported. By 2050, oil demand is expected to increase by 70% and CO_2 emissions by 130%. These emissions are predicted to cause an increase in global average temperature to 6 °C, possibly causing irreversible climate change. The Intergovernmental Panel on Climate Change (IPCC) announced that carbon dioxide emissions must be reduced by 85% to keep the global average temperature increase below 2°C. Ensuring sustainable transportation and reducing CO_2 emissions, the use of alternative fuels, electric vehicles and hybrid vehicles are encouraged (Taylor, 2010; Eberle et al., 2012; Chang et al., 2017). In fact, it is planned to phase out the sale of fossil fuel vehicles in the near future. Norway announced that it will ban petrol and diesel vehicles by 2025 (The Independent, 2017). France and the UK plan to ban the sale of fossil fuel vehicles by 2040 (Environews, 2017). Current research on pure electric vehicles and hybrid vehicles aims to reduce vehicle energy consumption and improve energy management strategies. In these cars, the powertrain is replaced by electric motors, electronics, capacitors and battery systems. - Electronic components

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interact dynamically with the mechanical components of the vehicle. Interactions should be optimized for overall performance and efficiency.

Electronics, especially dynamic control systems (CS) in automobiles, are growing rapidly. Electronic Stability Control (ESC) is a safety system and an important system of intelligent driving. The status of the vehicle is not the basis of ESC control and directly affects the effectiveness of ESC-related functions. ESC dynamic CS helps to understand the operation of CS dynamic CS, includes data interface module, parameter estimation module, functional logic module, functional coordination module, pressure control module and functional safety module. Topics include management fundamentals, product management, and research on the car deviation pricing algorithm. The greater the yawing time, the faster ESC Dynamic CS intervenes to protect vehicle safety. Based on big data, the ESC loading rate is evaluated, and the road survey is used to understand the increase of the ESC loading rate, and the steering angle and speed of the vehicle are analyzed. The car's ESC CS connects the steering, braking and powertrain systems. It has been proven to be one of the important safety technologies that effectively reduces car accidents. ESC is crucial for the research and evaluation of CS.

2.EVOLUTION OF automotive software ENGINEERING

Today's automakers assemble and supply to the dealer products designed and manufactured by suppliers in addition to actual performance, although the product's specifications are defined by the OEM (manufactured product manufacturer) or automaker. Most components come with their own electronic control unit (ECU) and software stack. When these individual pieces of software are put together, they form the massive software found in modern automobiles. The basis of this deployment model has many advantages, allowing a clear separation of integration and communication via the Controller Area Network (CAN) bus or FlexRay. Well-defined laws govern the exchange of words between goods. Functionality can be added or removed by connecting or disconnecting components on the CAN bus or FlexRay. The rigidity of the interfacing process makes it possible to design the product individually. Such development will eventually lead to a richer ECU and corresponding software.

AUTOSAR for the automotive industry allows suppliers to offer equipment operating according to the AUTOSAR standard. Using AUTOSAR is an important step in separating the application from the computer. However, there is still room for improvement. There is an increasing need for energy informatics, especially in hybrid vehicles and vehicles with advanced driver assistance systems. Computing power can be provided by a set of ECUs or by introducing general hardware in the form of central processing units (CPUs) and graphics processing units (GPUs). The second would be a better and safer development. A similar development occurred when specialized electronics were replaced by general hardware and functions were implemented through software rather than specialized hardware. Universal equipment in automotive systems is a successful design concept. This forms the core of the vehicle development center with many high-performance multi-sensors and many sensors and actuators connected to the central processing unit. This design will impose strict constraints on the overall security performance of the system. Software in the automotive field was created in Matlab/Simulink and finally C code was created from the design in SysML. Of course, some functions are created directly in C. In the field of security, model-driven technology can be used to support the development of safety and security. Based on the ISO26262 standard, the Metamodel tool can do wonders for security postures and metrics. Automotive Embedded Software Systems use a general concept for automotive software development. The Current State of Automotive Software Development report explains the challenges currently facing automotive software development. This provides an overview of current developments and tools. Future directions for business project-based, domain-specific languages and scenario-based virtual verification method can be derived from the data.

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3. Area-oriented software program ENGINEERING

Software engineering is a broad, dynamic and diverse field where research can range from very abstract theoretical models to the development of many branches and empirical research in business. Good software development requires, in addition to software engineering skills, knowledge of the application domain in which the software runs. Software engineering research has evolved from finding solutions (through ideas, scenarios, methods, or tools) to creating unique solutions using proper names. Domain expertiseSeminars, conferences and publicationsincreased; Many forums and journalsdivide conferences or topics into specific areas.

Domain-focused research has the ability to

-Narrow problem analysis,reflect.
-Domain structure, constraints, patterns, and values,help accelerate validation, and
-Accelerate industrial uptake.

4.Development of Product Line Architectures

Software architecture provides an important framework for making earliest design decisions for effective execution of tasks and requirements. The architecture of a machine family should identify the differences between different systems and be clearly defined with information about the differences. Car production is difficult, business production is difficult, family products production is even more difficult. Each decision must be chosen from several model options; In addition, there are often multiple people involved in the decision-making process with different and often conflicting goals, technologies and project constraints such as available platforms, cost, and time.

Selecting multiple design options involves a combination of design considerations. Each decision must be chosen from several model options; In addition, there are often multiple people involved in the decision-making process with different and often conflicting goals, technologies and project constraints such as available platforms, cost, and time.

5.AUTOMOTIVE ELECTRONICS

Today, modern automobiles are equipped with many sensors and microprocessors, many physical network modules, many electronic control systems, in-vehicle communications, and hundreds of terabytes of software (Schulze et al., 2016; Lee et al., 2017). Cars are no longer the mechanical devices they used to be. - They have become the best electronic products on wheels. New developments in electric vehicles such as autonomous driving, in-car infotainment system and fully electric vehicle software architecture require a different vision (Tummala et al., 2016). The journey to driverless cars begins with the development of collision prevention/warning and cruise control systems. In fact, these systems require long-term motor function/external control (Vahidi and Eskandarian, 2003). However, it is stated that additional goals can be achieved by combining these systems with other systems. Traditional manufacturing companies and information technology companies have invested heavily in the electric vehicle business (Zheng et al., 2015). The vehicle will be available for sale in 2020. The GPS antennas used in these vehicles provide location information with an accuracy of up to one centimeter. - The car must be able to decide how to get where it wants to go. LiDAR (Light Detection and Ranging) is used to achieve this. Lidar emits pulsed laser light and creates a 3D map of the environment using the reflected pulses. The car also needs to detect pedestrians, other vehicles, obstacles, lanes, crosswalks, and acceleration (Zhu et al., 2017). To overcome these challenges, high-resolution cameras, radar sensors and driving algorithms are used.

Fig.01 Sensors and technologies used in an autonomous vehicle

6.Conclusion

This article discusses the importance of software engineering and its relationship with automotive engineering. In particular, we highlight software product line engineering, global software development, service-oriented architecture, and software engineering as areas that we believe will have a significant impact on the machine. We highlight the unique challenges in these areas and suggest ways and research directions to solve them. Our future work will include further development and expansion of these methods, their evaluation and development in industry.

Although it is seen as a traditional business, it should not be forgotten that the international automobile industry is the largest locomotive of the global economy (Marchiá et al., 2014). Total global light vehicle sales are expected to reach 93.5 million units in 2017 (IHS Markit, 2017). In 2017, FEV production accounted for only 0.7% of new truck production in the world.

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