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Perspective

Design of Automotive Control Systems in a Vehicle

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ABOUT THE STUDY

The century-old automobile, which has long been the main form of personal mobility in developed countries, is swiftly evolving into a complicated electromechanical system. Automobiles are being equipped with a variety of modern electromechanical technologies in order to increase operating safety, reduce congestion and energy consumption, and reduce environmental effect [1]. This article describes these trends and gives a quick rundown of the principal vehicle subsystems and automotive control systems, which will be covered in greater depth in following section. In recent decades, the most notable tendency in the evolution of contemporary automobiles has been their rapid transition into complicated electromechanical systems [2].

Engines and control systems

Many innovative features are available in today's vehicles that were not commonly available a few decades ago. Hybrid turbo engines, electronic engine and gearbox controls, cruise control, antilock brakes, differential braking, and active/semi active suspensions are all examples of control systems in vehicle. Many of these functions have been accomplished solely through mechanical means [3]. The ability to embed knowledge about the system behavior into the system design, the flexibility inherent in those systems to trade-off between different goals, and the potential to coordinate the functioning of subsystems are the major advantages of electromechanical or mechatronic devices over their purely mechanical counterparts [4]. The design of electromechanical systems involves knowledge of system performance, such as vehicle, engine, or even driver dynamic models, as well as requirements on physical factors. Flexibility allows for environmental adaptation, resulting in more consistent performance under a range of settings. Moreover, while parts may be switched and reused, reprogram ability means a reduced cost. Information sharing allows subsystems to be integrated, resulting in improved performance and functionality that is impossible to achieve with uncoordinated systems [3].

The benefits of central control are most noticeable in the primary areas of car control systems. Consider all the required to operate each of the systems below on the input side. Car controls are the components used for driving and parking in automobiles and other powered road vehicles such as Lorries and buses. While some controls, such as steering wheels and pedals, have existed since the advent of automobiles, others have evolved to meet the needs of drivers. Manual transmissions, for example, have become less prevalent as automated gearbox technology has evolved [5].

- Steering
- Braking
- Throttle control
- Transmission
- Signals and lighting
- Instrumentation
- Starting and running the engine
- Additional controls

CONCLUSION

Even with only three possible domains of vehicle control, it is clear that there are many common requirements. One central control system has the ability to reduce wiring complexity while enhancing control possibilities. This is, in fact, the outputs' advantage. Consider the following scenario for a vehicle experiencing fast and strong acceleration, as well as the possible responses from each of the systems. If each system operates separately, it is feasible that each will not operate optimally in regard to the others to some extent. The timing and fuel quantity, for example, may be adjusted, but the fuel ECU may decide to move down a gear, boosting engine speed. This necessitates a shift in fuel and timing. This results in a decrease in efficiency and an increase in emissions during the transmission stage. All right activities can take place at the most appropriate periods if there is a single control unit or at least communication between these three systems. The complexity of the code, on the other hand, necessitates a significant increase in processing capacity. This is especially true if other car technologies, such as traction control, are used.

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REFERENCES

1. Torngren M. Fundamentals of implementing real-time control applications in distributed computer systems. Real-time systems. 1998;14(3):219-250.
2. Uchida K, Shimemura E. Closed-loop properties of the infinite-time linear-quadratic optimal regulator for systems with delays. Int J Control. 1986; 43(3):773-779.
3. Tateno S, Zhu Y, Meng F. In-Vehicle Device Control System by Hand Posture Recognition with Movement Detection Using Infrared Array Sensor. SICE JCMSI. 2020;13(3):148-156.
4. Kerridge J, Armitage A, Binnie D, Lei L, Sumpter N. Using low-cost infrared detectors to monitor movement of pedestrians: initial findings. Transp Res Rec. 2004;1878(1):11-18.
5. Li T, Leng J, Kong L, Guo S, Bai G, Wang K. DCNR: deep cube CNN with random forest for hyperspectral image classification. Multimed Tools Appl. 2019;78(3):3411-3433.