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Technology is fueling an automotive evolution

By Haaike van der Merwe

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The automotive industry is racing towards a technological transformation. Car manufacturers are no longer only differentiating themselves by the engine or exterior designs to sell their cars - but also by software. Artificial intelligence, onboard sensors, driver assistance systems, connectivity, and other software-based features are all fuelling this automotive evolution. The result? Smart cars are getting even smarter, electric and hybrid cars are becoming increasingly viable, and a future of self-driving cars is fast becoming a reality.

With the rise of software-defined vehicles comes another fundamental shift in the making. Car manufacturers that are becoming more software-focused are also rethinking their approach to the software ecosystem. For many years, the automotive industry lagged in innovation while other tech-driven industries were developing and deploying more advanced software in shorter lifecycles. Car manufacturers began to rethink their software strategies, and the open-source approach is now helping many of them advance their technology through collaboration, achieve shorter time-to-revenue cycles, and bring standardisation to a fragmented software environment.

Reinventing the wheel

In 1911, Henry Ford appealed a patent for a proprietary two-cylinder engine design. Ford won the lawsuit, and this became one of the first examples of openly shared technological innovation. The free sharing of patents became more widespread in the industry and continues to play a role in automotive innovation to this day. In fact, open source technology is now a common standard among automotive manufacturers, and most cars today run on Linux – an open source operating system.

It's estimated that the software for your average high-end car contains upwards of 100 million lines of code, and the complexity of modern software-defined vehicles can make innovation difficult. Automotive software and hardware are often tightly coupled and vertically integrated with other subsystems, limiting the ability to develop and integrate new functionalities. By running a vehicle's operating system on a horizontal software platform that leverages open source's vibrant ecosystem, manufacturers could increase the speed and reduce the costs of designing, maintaining, and improving

vehicle software.

There have also been significant collaborations that have paved the way forward for a more open automotive industry. The Linux Foundation's ELISA (Enabling Linux in Safety Applications) project has brought original equipment manufacturers (OEMs) and chip manufactures together to develop standardisation to open source safety-critical systems. More notably, their Automotive Grade Linux (AGL) project is building an open source platform that enables automotive developers to "accelerate the development and adoption of a fully open software stack for the connected car." This project is intended to accelerate the development of new features and technologies.

Accelerating innovation

A 2020 survey by McKinsey found that 37% of respondents would switch to car brands that offer improvements in connectivity. Connected cars are highly sought after as they can improve driver safety as well as the overall driving experience. For example, car sensors are being used for blind spot detection and engine management. Smart functionalities also allow drivers to stream their favourite music or locate the nearest fuel station. When the software that enables these kinds of features is open source and easy to integrate with other systems, everyone benefits.

Cars are also becoming increasingly reliant on data to deliver new services and capabilities. Autonomous vehicles are even more data hungry, and manufacturers need millions of kilometres' worth of datasets to develop driving algorithms and prove that they are safe and reliable. When these datasets are openly shared across the automotive industry, different manufacturers are provided with the bigger picture and will be able to solve problems more quickly through collaboration. Open data not only improves car manufacturers' ability to innovate, but also benefits consumers by making cars safer with more reliable data.

The cars of the future

When today's car manufacturers look under the hood, they are not just paying attention to the engine anymore. The software inside our vehicles is redefining the way we commute, connecting us with our surroundings and making our roads safer with more advanced (and even AI-powered) driving assistance. With the open source approach bringing standardisation and rapid development to software in the automotive industry, the cars of the future may be closer than we think.

ABOUT THE AUTHOR

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