S&P Global
Mobility

AutoTechInsight Insights
January 2025

How AI is shaping the future of mobility — Interview with Elektrobit

03-Jan-2025 11:37 GMT

Matthew Beecham
S&P Global
Supply Chain and Technology, Automotive

Q&A with Elektrobit

Source: Getty image/ yevtony

The automotive industry is undergoing a significant transformation through the integration of AI technologies. AI is being leveraged to enhance various aspects of vehicle performance, safety and user experience. One of the most prominent applications is in the development of advanced driver-assistance systems (ADAS), which utilize machine learning algorithms to improve safety features such as adaptive cruise control, lane-keeping assistance and collision avoidance. These systems analyze vast amounts of data from sensors and cameras to make real-time decisions, thereby enhancing overall vehicle safety.

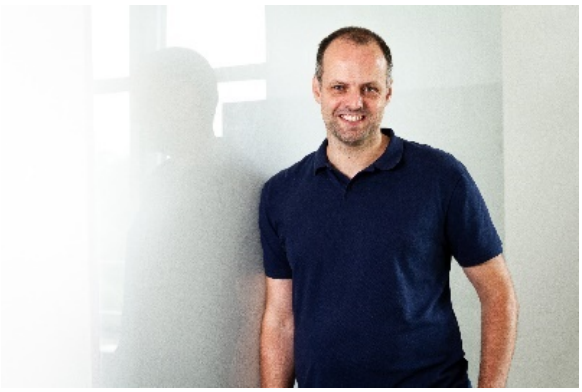
Another key area of AI application is in the personalization of in-car experiences. Automotive companies are increasingly using generative AI models to create tailored interactions for drivers and passengers. This allows for more natural conversational interfaces that can adapt based on user preferences and behaviors. For instance, AI-powered infotainment systems can learn from user interactions, making it easier for drivers to control navigation, music and other features without needing to memorize specific commands.

AI is also streamlining development processes within automotive manufacturing. By employing machine learning techniques, companies can optimize various stages of production, reduce time-to-market for new models and enhance product features that were previously not possible. This not only improves operational efficiency but also allows for greater innovation in product design.

As the industry moves toward more autonomous vehicles, edge computing is becoming increasingly important. This technology enables real-time AI processing within the vehicle, minimizing reliance on cloud connectivity and ensuring that critical functions can operate smoothly even in low-connectivity environments. Reinforcement learning is another emerging trend, particularly in the context of autonomous driving, where AI systems can learn optimal driving behaviors through simulation.

Despite the promise of AI, the automotive sector faces challenges in data management and security. Data fragmentation, privacy concerns and the need for robust cybersecurity measures are significant hurdles. Companies must navigate complex regulatory environments while ensuring that sensitive data remains protected.

To gain further insights into how AI is shaping the future of mobility, S&P Global Mobility's Matthew Beecham spoke with Moritz Neukirchner, senior director of strategic product management at Elektrobit, a provider of embedded and connected software products and services for the automotive sector. In our Q&A, we explore Elektrobit's innovative approaches to integrating AI technologies and their impact on the automotive industry.



(Image source: Elektrobit)

Key takeaways:

- **Personalized in-car experience**: Elektrobit uses generative AI to create tailored in-car interactions, allowing for more natural conversations and improved customer engagement.
- **Improved development efficiency**: By integrating machine learning and generative AI, Elektrobit is streamlining development processes and enabling new product features that were not possible before.
- **Edge computing and reinforcement learning**: The company is focusing on edge computing for real-time AI processing in vehicles and sees reinforcement learning as key for enhancing ADAS and autonomous driving.
- **Safety and data protection**: Elektrobit is implementing AI in safety-critical systems while ensuring data protection. Their new Linux platform supports safe AI execution in vehicles, and they are addressing data ownership and privacy concerns effectively.

The following is an edited transcript of the conversation.

S&P Global Mobility: How is Elektrobit currently integrating AI technologies into automotive solutions, and what specific areas are showing significant measurable improvements in efficiency, performance and customer interactions?

Moritz Neukirchner: Elektrobit integrates AI in many ways, leveraging both established and emerging technologies. For example, we utilize generative AI models from providers like Google and OpenAI to personalize the in-car user experience. This extends beyond simple voice assistants and chatbots. Generative AI allows for more natural conversational interfaces and enables intuitive and personalized interactions with the vehicle's infotainment and control systems. Instead of having to explicitly program every command, the system is able to learn from user interactions, adapting and improving over time. Beyond Generative AI, we also employ machine learning algorithms in our products.

Examples of how Elektrobit integrates AI:

- Traditional machine learning or Generative AI
- Improvement in development processes, increasing efficiency
- New use cases for the products and product functions previously not possible
- Examples include our next-generation cockpit

What emerging AI technologies or trends do you foresee shaping the future of the

automotive industry, and how is your company preparing to address these changes while enhancing user experience?

The automotive industry is on the cusp of a transformative shift driven by AI. Generative AI is a key player, offering personalized experiences while also streamlining development processes. However, we also see significant potential in reinforcement learning for ADAS and autonomous driving. Reinforcement learning allows AI systems to learn optimal driving behaviors through trial and error in simulated environments, leading to safer and more efficient driving. Also, the increasing integration of edge computing will be crucial for enabling real-time AI processing within the vehicle, minimizing reliance on cloud connectivity. Elektrobit is preparing for this scenario by investing heavily in research and development across these areas. We are developing tools and platforms that support the deployment of diverse AI algorithms within the constrained environment of a vehicle; we are also focusing on the development of robust and secure AI systems that comply with stringent automotive safety standards. Our focus remains on enhancing the user experience through seamless integration and intuitive interaction.

Examples of the AI technologies/trends we foresee shaping the future of the automotive industry:

- Generative AI as mega trend
- External and internal perspectives
- Products with AI leading to improved developer and customer experiences

What role does Elektrobit play in integrating AI for safety systems, particularly in ADAS and cybersecurity measures for connected vehicles, and how do these innovations contribute to regulatory compliance?

AI will get a stronger foothold on the edge, i.e., being executed within the car and not just streaming from the cloud. All current AI solutions run natively on Linux. Elektrobit's new EB corbos Linux for Safety Applications now also provides the fundamental building block to enable execution of AI on the edge for safety purposes. Of course, the overall functionality still must be validated according to state-of-the-art safety processes, but Linux for safety applications supporting mixed criticality execution creates the fundamental base to execute such functions within the car.

AI is also used in Elektrobit solutions including EB Assist (recognition) and EB robinos (eHorizon).

What primary challenges do you face in implementing AI solutions within the automotive sector, especially regarding data management and analysis, and how are you addressing these?

When using AI-based solutions to improve development efficiency in automotive software development, the question of ownership of data/IP to train AI-based tools is complicated. Given the fragmented supply chain, understanding whether existing code and process artifacts may be used without potentially exposing IP of third parties is particularly difficult. Access and permission rights to process existing development artifacts is a significant hurdle.

Data protection is also critical and should be kept on the device (discussion could be very personal), and Elektrobit is establishing processes, together with cloud and AI providers, to keep the data protected and private.

There are many challenges — and solutions — in implementing AI, including:

1. Data sources and collection

Challenges:

- Data fragmentation: Data is often scattered across different systems and departments, making it difficult to consolidate and integrate.
- Data heterogeneity: Data from various sources can have different formats and structures, complicating integration.
- Data quality: Ensuring data is accurate, complete, and consistent is crucial for effective AI analysis.
- Data silos: Isolated data repositories hinder seamless information flow and integration.

Solutions:

- IoT integration: IoT devices to collect and standardize data from various sources.
- Data partnerships: Collaborating with other organizations to share and integrate data.
- Data augmentation: Enhancing data quality through techniques like data cleaning and normalization.
- Proof of concept (PoC) testing: Conducting PoC tests to validate data integration methods before full-scale implementation.

2. Data privacy and security

Challenges:

- Data privacy: Compliance with regulations like GDPR is essential to protect personal data.
- Data security: Protecting data from cyberthreats and ensuring its integrity is critical.

Solutions:

- Robust data governance: Implementing comprehensive data governance frameworks and clear policies.
- Cybersecurity measures: Using encryption, access controls and regular vulnerability assessments to protect data.

3. Infrastructure and resource requirements

Challenges:

- Data storage: Managing large volumes of data requires scalable and high-capacity storage solutions.
- Networking Infrastructure: Ensuring robust and low-latency networking capabilities for real-time data processing.

Solutions:

- Scalable storage solutions: Investing in both on-premises and cloud-based storage options.
- High-performance computing: Utilizing advanced computing infrastructure to handle data processing demands.

4. Workforce skill development

Challenges:

- Skill gaps: There is often a lack of skilled personnel capable of effectively leveraging AI

technologies.

Solutions:

- Training programs: Implementing training and development programs to upskill the workforce.
- Hiring experts: Recruiting AI and data science experts to bridge the skill gap.

Have any unexpected use cases for AI emerged recently?

No. Many jumped on the bandwagon of AI chatbot integration in the cockpit — a functionality that is unlikely to create large new revenue pools. Interesting use-cases are around the intelligent management of fleets and around highly automated driving. Completely new use-cases that unlock new revenue pools that were not addressable before are scarce/non-existent so far.

CONTACTS

The Americas
+1 877 863 1306

Europe, Middle East & Africa
+44 20 7176 1234

Asia-Pacific
+852 2533 3565

www.spglobal.com/mobility