AUTONOMOUS VEHICLE COMPUTING CONSORTIUM

AVCC2024

FARMINGTON HILLS, MICHIGAN
OCTOBER 8-9, 2024

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ABOUT US

The Autonomous Vehicle Computing Consortium (AVCC) is an industry collaboration aimed at advancing autonomous and assisted driving technology.

The Autonomous Vehicle Computing Consortium (AVCC®) is a group of automotive and technology industry leaders, OEMs, and automotive industry suppliers and players coming together to help accelerate the mass production of safe and affordable vehicles with automated and assisted driving solutions. All automotive and technology companies are encouraged and welcome to join AVCC.

Defining Non-Differentiable Building Blocks

AVCC has broken down technology into common (non-differentiable) and customized (differentiable) IP. Focusing on the common IP, AVCC brings together its members and other industry organizations to act as a catalyst of discussion and developer of common building blocks and then partners with organizations that run customized solutions through testing and certification.

Accelerating Development & Deployment

The path to delivering autonomous vehicles is long and complex, and bigger than any one company. Leading companies are working together in the AVCC to address the technological complexities and obstacles that need to be overcome for the deployment of autonomous vehicles. AVCC members work together to deliver a conceptual compute platform that addresses these challenges.

The Results Will Benefit Everyone

The AVCC is defining, educating and publishing for the benefit of all. The consortium brings together the expertise, knowledge and innovation with a shared goal and focused strategy. Developing an autonomous ecosystem will help the automotive industry to work together. The AVCC facilitates and manages working groups to share ideas and study common technological challenges.

2024 SO FAR

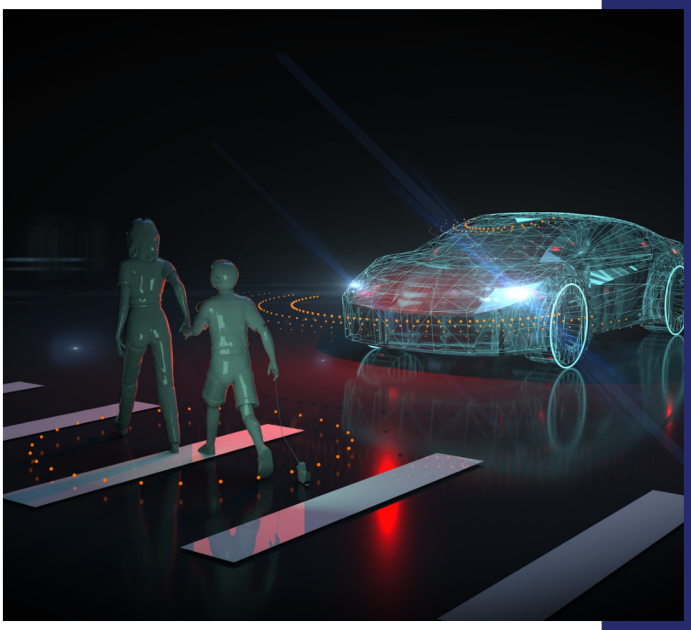
This year has been an exciting and transformative one for the Autonomous Vehicle Computing Consortium (AVCC) as we continued to drive innovation in the automotive industry, particularly in AI, cybersecurity, and machine learning.

Key Highlights from This Year:

1. **Webinars on Cutting-Edge Technologies**:
   - **Data-Oriented Architecture for Software Defined Vehicles**: This informative session delved into the growing need for scalable and efficient data architectures in modern software-defined vehicles, highlighting advancements in vehicle computing.
   - **Revolutionizing Automotive AI with MLPerf Automotive Benchmark**: We explored the role of MLPerf, the leading benchmark for evaluating AI performance, in transforming the automotive sector through robust machine learning applications.
2. **Leadership Expansion**:
   - We proudly welcomed **Neil Banerjee as our Chief Evangelist**, further solidifying our commitment to thought leadership in autonomous vehicle computing. Neil's deep industry experience is already helping to shape our strategic direction and increase member engagement.
4. **Innovation in AI and Cybersecurity**:
   - The **AI Cybersecurity Subgroup was launched**, underscoring our focus on securing AI-driven systems for automated and assisted driving. This new subgroup brings together industry experts to address emerging threats and cybersecurity challenges in AI-enhanced vehicle systems.
5. **Industry Collaboration and Benchmarking**:
   - In collaboration with MLCommons, we released a **Proof-of-Concept for the Automotive Benchmark**, marking a significant milestone in standardizing performance evaluations for AI in vehicles.
   - We also published two influential technical reports:
     - **TR007: Compute Scenarios for Benchmarking Machine Learning for Automated and Assisted Driving Systems**, providing key insights into how machine learning models can be effectively benchmarked for driving systems.
     - **TR006: Baseline Cybersecurity for Automated and Assisted Driving Systems,** offering foundational cybersecurity guidelines tailored to autonomous and semi-autonomous vehicles.
6. Community Engagement:
   - We hosted the **AVCC Spring 2024 Virtual Members' Meeting**, bringing together leaders from across the automotive, AI, and computing industries. This meeting facilitated invaluable discussions on the future of vehicle computing, AI safety, and cross-industry collaboration.

As we reflect on the year's accomplishments, we remain dedicated to pushing the boundaries of what is possible in autonomous vehicle computing and AI. We look forward to building on this year's momentum and continuing to shape the future of the automotive industry.

AVCC2024



What you can expect at our second annual conference....

INDUSTRY LEADERS PRESENTING THEIR THOUGHTS

AVCC 2024 will showcase a distinguished lineup of thought leaders and innovators from across the automotive, AI, and technology sectors. Attendees will gain insights into the latest advancements and strategies in autonomous vehicle computing from the industry's brightest minds.

Presenters come from: AVCC, Bosch, PG Mobility, IEEE, RTI, Arm, Qualcomm, Siemens and more!

WORKING GROUPS MEETING TO FURTHER THE INDUSTRY

Using this opportunity for in-person and virtual collaboration - the working groups are launching their new initiatives. Join one or more of the meetings to discuss topics like:

- Total Cost of Ownership
- System Level Benchmarks
- Pre-Silicon workings
- Baseline models
- Foundation models
- AI Cybersecurity
- And more!

And, a huge thank you to Bosch Group for hosting AVCC2024!

38000 Hills Tech Dr, Farmington Hills, MI 48331

WHERE TO STAY...

USE THIS LINK FOR THE FULL TRAVEL GUIDE

HOLIDAY INN EXPRESS & SUITES

DETROIT-NOVI

Welcome to the NEWLY RENOVATED Holiday Inn Express Novi. We are less than 1 mile from the Twelve Oaks Mall and centrally located in between Novi, Farmington Hills, and Wixom corporate companies.

Average Room Rate: $119 per night

RESIDENCE INN

FARMINGTON HILLS

Set a pace that suits you at Residence Inn by Marriott Detroit Farmington Hills. Whether you're with us for a few days, weeks or even a month, your daily routine matters. You'll thrive at our Farmington Hills hotel with the conveniences you need, like spacious studio, one- and two-bedroom suites with separate living and sleeping areas, and a fully equipped kitchen ready for your favorite cuisine.

Average Room Rate: $164 per night

HAMPTON INN

COMMERCE NOVI

Find us off 14 Mile Road in Commerce Township, just eight minutes from Twelve Oaks Shopping Mall. Shenandoah Country Club and Robert H. Long Nature Park are nine minutes away. Suburban Collection Showplace is eight miles from our doorstep. Enjoy daily free hot breakfast, free WiFi, and our indoor pool and fitness center.

Average Room Rate: $100 per night

WHAT'S AROUND

Some options Bosch recommends:

- P.F. Chang's
- Steven Lelli's Inn on the Green
- La Pecora Nera
- Grand Tavern Farmington
- Peterlins
- Blueberry Brunch
- La Marsa Farmington Hills
- Princess Grills of Farmington Hills
- Breakfast Club
- The Pines
- Blue Moose Tavern
- Sidecar Slider Bar Farmington
- Mitten & Boot Cafe & Fine Food
- Upscale Cuisine
- Village Grill of Farmington Hills

Some things to do in Farmington Hills:

- Heritage Park
- Marvin's Marvelous Mechanical Museum
- Zekelman Holocaust Center

Some options to do nearby:

- Henry Ford Museum
- Greenfield Village
- McDonalds in Dearborn, MI

TUESDAY, OCTOBER 8

EVENT ITINERARY

8:30-9:00 AM	Check In & Breakfast Networking		
9:00-9:15 AM	Opening Remarks & Welcome to AVCC2024	Elizabeth Kao, Board Chair, AVCC	Room: 127 Pres B
9:20-10:20 AM	Chiplets: Transforming Automotive Computing Through Collaboration	Joern - Ole Godbersen, Director Engineering E/E Architecture (ME/NE-EE)	Room: 127 Pres B
10:20-10:30 AM	Coffee Break		
10:30-11:00 AM	Autonomous mobility - a look at the rearview mirror and exploration of the path forward	Partha Goswami, Principal at PG Mobility	Room: 127 Pres B
11:00-11:45 AM	Building Zonal Data-Oriented Software System Architectures	Dr. Rajive Joshi, Chair, Software Portability AVCC & Principal Solution Architect at RTI	Room: 127 Pres B
11:45 AM-12:15 PM	Working Group Updates & Call for Participation: Join the Conversation and Shape the Future	Stephen Miller, Technical Chair of AVCC & Product Management for Driver Assistance	Room: 127 Pres B
12:15-1:00 PM	Lunch		
1:00-1:30 PM	Exploring the Pre-Silicon Benchmarks moderated by Nicolai Behmann*	Introduction to the AI Cybersecurity Working Group presented by Jonathan Petit	Software Portability Working Group Overview & Status Update presented by Rajive Joshi
1:30-2:00 PM		AI Security Benchmarking for AD moderated by Jonathan Petit	ISO 21350 -An Open Talk moderated by Daniel Riedl and Volker Niemz
2:00-2:30 PM			
2:30-3:00 PM			
3:00-3:30 PM	Coffee Break		
3:30-4:00 PM	System-Level Benchmarks moderated by Stephen Miller	Workshop time for AI Security Benchmarking moderated by Jonathan Petit	Towards a Common Baseline Data Model moderated by Rajive Joshi
4:00-4:30 PM			
4:30-5:00 PM			

*Presented virtually

JOERN-OLE GODBERSEN

CHIPLETS: TRANSFORMING AUTOMOTIVE COMPUTING THROUGH COLLABORATION

The automotive industry faces computing challenges due to increasing demands for ADAS, infotainment, and autonomous driving, with current SoC designs struggling with cost and scalability. Chiplets offer a solution by modularizing SoCs for better cost efficiency, flexibility, and performance, while an open ecosystem for automotive chiplets can further drive innovation and collaboration. By adopting Automotive Chiplet Systems (ACS) and establishing open standards, the industry can reduce costs, accelerate innovation, and promote competition among suppliers.

PARTHA GOSWANI

SESSION AUTONOMOUS MOBILITY - A LOOK AT THE REARVIEW MIRROR AND EXPLORATION OF THE PATH FORWARD

The DARPA challenge at the turn of the century and the Google Firefly pod a decade later sparked the imagination of both the industry, innovators and investors, inspiring them to dream of and build robotic transportation that could combine the perception and reflex of an ultra-precise machine and AI matching the judgement of a human. However, a new technology or a concept often goes through a hype cycle. The more complex or ambitious the technology, the greater the anticipation. This hype is typically followed by a phase of "disillusionment". Eventually, key challenges are addressed, leading to commercialization and wider adoption. Over the past decade, the idea of autonomous vehicles (AV) has arguably gone through this crest of anticipation and trough of disillusionment and is now creeping up the trajectory towards a mature and meaningful future. This presentation will look at the decade old ups and downs, the impact of defining levels of autonomy, and discuss the current challenges and plausible future, in the context of the new software-centric product development in the auto industry. Session inforamtion

DR. RAJIVE JOSHI

BUILDING ZONAL DATA-ORIENTED SOFTWARE SYSTEM ARCHITECTURES

Vehicle E/E architectures are moving from domain-based to zonal, reducing hardware costs, weight, and enabling over-the-air updates with multi-function ECUs and ethernet connections. Pairing this with a data-oriented software architecture using DDS databus effectively creates “software wiring” that shares state and ensures a single source of truth across ECUs, updated continuously in real-time. This combination creates a stable, scalable, fault-tolerant foundation for modern vehicle systems.

DR. STEPHEN MILLER

WORKING GROUP UPDATES & CALL FOR PARTICIPATION: JOIN THE CONVERSATION AND SHAPE THE FUTURE

An overview of AVCC’s recent developments, including the expansion of the Benchmark Working Group into two subgroups focused on pre-silicon and system-level benchmarks, and the launch of the AI Cybersecurity subgroup. We’ll also discuss the Software Portability Working Group's work on total cost of ownership, soon to become its own subgroup.And more!

SPEAKERS

WEDNESDAY, OCTOBER 9

EVENT ITINERARY

8:30-9:00 AM	Check In & Breakfast Networking		
9:00-10:00 AM	Addressing Automotive Functional Safety Challenges with Silicon Lifecycle Management	Jyotika Athavale, President, IEEE Computer Society Director, Engineering Architecture, Synopsys	Room: 127 Pres B
10:00-10:30 AM	Autonomy is Like Happiness	Stan Schneider, AVCC Board Member & CEO of Real-Time Innovations (RTI)	Room: 127 Pres B
10:30-10:45 AM	Coffee Break		
10:45-11;15 AM	Navigating Complexity: Challenges and Innovations in Launching New Vehicles	Neil Banerjee, Advanced EE & ADAS, Fisker & Chief Evangelist, AVCC	Room: 127 Pres B
11:15-11:45 AM	Crafting the Perfect Chip : Designed for Automotive Domain Fusion	Auston Payyapilly, Product Management/Architect - ADAS & Cockpit domain computers, Bosch	Room: 127 Pres B
11:30-12:15	Challenges in the land of Automotive High-Performance Computing: Chiplets to the Rescue	Bart Plackle, VP Automotive, imec	Room: 127 Pres B
12:15-1:00 PM	Lunch		
1:00-1:30 PM	Benchmark Systems moderated by Stephen Miller	Overflow if necessary from Day 1	TCO Initial Responses presented by Volker Niemz
1:30-2:00 PM			TCO Report planning moderated by Volker Niemz
2:00-2:30 PM	Multi-Modal Foundation Model moderated by Predrag Djurdjevic*		
2:30-3:00 PM			
3:00-3:30 PM	Overflow if necessary		
3:30-4:00 PM	Coffee Break		
4:00-4:30 PM	Closing Plenary	Elizabeth Kao, Board Chair, AVCC	Room: 127 Pres B
4:30-5:00 PM			

*Presented virtually

JYOTIKA ATHAVALE

ADDRESSING AUTOMOTIVE FUNCTIONAL SAFETY CHALLENGES WITH SILICON LIFECYCLE MANAGEMENT

This talk will describe technology trends for silicon health, and the need for Silicon Lifecycle Management for predictive maintenance in safety-critical automotive systems.

NEIL BANERJEE

NAVIGATING COMPLEXITY: CHALLENGES AND INNOVATIONS IN LAUNCHING NEW VEHICLES

Launching a new vehicle is a monumental task, requiring the seamless integration of advanced technology, stringent regulatory compliance, and shifting market demands. In this talk, Neil Banerjee, a seasoned automotive technology leader with firsthand experience launching two electric vehicles from concept to production, will delve into the critical challenges OEMs face today. From integrating cutting-edge safety systems and software to addressing evolving consumer expectations and sustainability imperatives, Neil will uncover how innovation, strategic partnerships, and adaptability are driving the future of vehicle development. Attendees will gain actionable insights for overcoming hurdles and achieving success in this rapidly changing landscape.

STAN SCHNEIDER

AUTONOMY IS LIKE HAPPINESS

The advent of AI is an epic transition. Most of the hype today focuses on human interaction: chatbots and automating business processes. But there's an even bigger potential impact coming: AI that runs the Real World. AI can and will run cars, traffic control, urban air mobility, trains, renewable energy, hospital devices, surgical robots, naval systems, air defense, avionics, simulation and training. It will make the entire planet run better. Autonomy isn't a matter of "if" – it's a matter of "when". It's also a matter of "how much", because autonomy is a matter of degree, like happiness. You can't be "fully autonomous" any more than you can be "fully happy". There is always room for more happiness. And, there will always be an opportunity for more autonomy. This talk looks at this transition and the AVCC's role in enabling autonomy by defining processor capabilities and software architectures to make it happen.

AUSTON PAYYAPPILLY

CRAFTING THE PERFECT CHIP : DESIGNED FOR AUTOMOTIVE DOMAIN FUSION

Automotive ECUs require robust real-time processing capabilities to manage safety-critical systems and powerful computational capabilities to support advanced features from ADAS and next generation cockpit. They must also interface with various communication protocols, ensuring seamless data sharing between vehicle subsystems with high bandwidth and low latency. Each domain's specific computational demands are met through tailored chip-level designs and interfaces that ensure efficiency, real-time performance, and integration across vehicle systems. How would that change in case of fusion of domains in case of centralization?

BART PLACKLE

CHALLENGES IN THE LAND OF AUTOMOTIVE HIGH-PERFORMANCE COMPUTING: CHIPLETS TO THE RESCUE

The automotive industry is undergoing a major transformation, embracing software-defined vehicles, centralized compute, and electrification, which are driving a surge in computational demands. A key solution lies in shifting from monolithic systems-on-chips to chiplet-based architectures, offering scalable, customizable, and cost-effective compute systems tailored for the needs of the automotive sector.

SPEAKERS

WORKING GROUP SESSIONS

TUESDAY

Benchmarks WG

Exploring the Pre-Silicon Benchmarks
Moderated by Nicolai Behmann
The session will cover how pre-silicon benchmarking enables "shift-left" design, allowing OEMs and Tier-1 suppliers to confidently meet performance, power, and cost targets early in the architectural phase, while also standardizing comparisons and reducing efforts for IP/SoC vendors through a forthcoming technical report on best practices for benchmarking in IVI, AD, and ADAS systems.

System-Level Benchmarks
Moderated by Stephen Miller
This session will explore the need for system-level benchmarking (SLB), addressing key questions around performance bottlenecks, variance in compute, scope, scalability across different levels of automation, and how to design effective benchmarks for real-world stressors and hardware setups.

Cybersecurity WG

Introduction to the Cybersecurity AI Working Group
Presented by Jonathan Petit
This session will introduce the AI Cybersecurity Working Group, launched in July, to explore top cybersecurity solutions for AI in ADAS and develop industry benchmarks and feedback.

AI Security Benchmarking for AD
Moderated by Jonathan Petit
This session will survey the state-of-the-art AI systems in autonomous driving, explore potential attacker models and security threats, review relevant datasets and tools, and discuss possible mitigation strategies.

Workshop time
Moderated by Jonathan Petit
This time will be used to work on the the security benchmarking and explore new projects.

Software Portability WG

Software Portability WG Overview & Status Update
Presented by Rajive Joshi
Welcome to the Software Portability Working Group. We will introduce the working group goals, provide an overview of the two active work streams: Data Architecture, and Total Cost of Ownership (TCO); and summarize the deliverables completed, in progress, and being planned.

ISO23150. -An Open Talk
Moderated by Daniel Riedl & Volker Niemz
We plan to exchange on observations and opinions based on working with the ISO.

Towards a Common Baseline Data Model
Moderated by Rajive Joshi
This is a working session, where we will use the AVCC Conceptual System Architecture (TR-001) as a starting point to guide, plan, and prioritize the use cases for developing a common baseline data model for software component communication, using the DDS vernacular. We will also discuss the "practical how-to" aspects for advancing the common communication data model ecosystem, with selected use cases as the focal points.

WEDNESDAY

WORKING GROUP SESSIONS

Benchmarks WG

System-Level Benchmarks, continued
Moderated by Stephen Miller
This session will explore the need for system-level benchmarking (SLB), addressing key questions around performance bottlenecks, variance in compute, scope, scalability across different levels of automation, and how to design effective benchmarks for real-world stressors and hardware setups.

Multi-Modal Foundation Models
Moderated by Predrag Djurdjevic
This session will explore the advancements in perception, prediction, and planning models, focusing on multimodal models like BEV and vision-language models (VLMs), and their potential to improve situational awareness, performance, and safety in autonomous driving, while also discussing models for the next AVCC recommendation update.

Cybersecurity WG

IWorkshop time, if needed
Moderated by Jonathan Petit
Based on discussions during Day 1, this time will be used to continue the work. Otherwise this is unscheduled time.

Software Portability WG

TCO Initial Responses
Presented by Volker Niemz
Explore the early results from the Total Cost of Ownership Survey launched by the group in early September. We'll also use this time to discuss how to get the best exposure and share the survey throughout the industry. If you have not already taken this anonymous survey, please do so using this QR Code.

TCO Report Planning
Moderated by Volker Niemz
Join us in outlining and planning how to report the findings of our Total Cost of Ownership Survey.

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