

CES 2025: Physical AI Is Here

Arelis Agosto
aagosto@globalxetfs.com

Tejas Dessai
tdessai@globalxetfs.com

Madeline Ruid
mruid@globalxetfs.com

Ido Caspi
icaspi@globalxetfs.com

Date: January 16, 2025
Topic: **Thematic**

AI dominated the 2025 Consumer Electronics Show (CES), framing the technology not as a distant vision but as a transformative force actively reshaping our world. From consumer devices to industrial robotics, AI is redefining how we work, manufacture goods, treat patients, and produce food.

Nvidia set the tone for the week with a packed stadium for its keynote address. CEO Jensen Huang presented groundbreaking advancements in personal AI computing and robotics, showcasing a range of high-performance chips and platforms designed to power AI applications in the physical world. The rest of the week showcased a myriad of ways to leverage growing computing capabilities to drive automation in the physical world. Among such demos, companies Hyundai, BMW, Xpeng displayed rapidly improving self-driving capabilities.

Disruptive startups like Agility Robotics showcased how cutting-edge AI enables new capabilities in industrial robotics, an industry at the cusp of an inflection point amid growing reshoring efforts. Lastly, John Deere and Caterpillar showed how AI is revolutionizing mining, agriculture, and construction, cutting costs and boosting productivity, while enabling broad electrification of commercial vehicle fleets.

Our team hit the ground at CES - here's what we learned about where tech is headed.

Key Takeaways

- AI is rapidly expanding beyond software into the physical world, as companies across industries harness it to create smarter robots and automated systems that drive unprecedented efficiency, precision, and scalability.
- The mobility sector continues to evolve, incorporating advanced autonomous features that improve safety, performance, and user experience.
- Electrification is gaining momentum across industries, with innovators like John Deere and Caterpillar meeting growing demands for sustainable, automated, and energy-efficient solutions in areas like mining, agriculture, and transportation.

AI Computing and Automation Continues to Mature

In line with our expectations, CES demonstrated that AI is evolving rapidly and is increasingly embedded into products and services consumers use daily. Nvidia CEO Jensen Huang's keynote was the highlight of the event, where he unveiled a suite of new products and services within personal computing, gaming, robotics, and self-driving vehicles.

Among the significant announcements was the introduction of Cosmos foundation models, which can generate photo-realistic video that developers can use to train their autonomous robots and vehicles at a lower cost than traditional data collection methods. These models are intended to produce synthetic training data, which will allow machines to understand the physical world, like how large language models (LLMs) enable chatbots to communicate naturally. We expect this will rapidly advance the development of robotics and autonomous driving as these new models can help alleviate the bottleneck of limited data for robotic and self-driving applications.

On the personal computing side, several of the new innovations were geared toward the goal of democratizing access to AI. The key example was Project DIGITS, a personal AI supercomputer the size of a modern laptop. It can run 200 billion parameter LLMs, giving everyday professionals and students easy access to the power of the Nvidia Grace Hopper platform. The new system also enables users to develop and run inference on models using their own desktop system and seamlessly deploy those models in the cloud or on data center infrastructure.¹

Nvidia also unveiled a project dubbed Nvidia AI Blueprints, which is a system that uses AI agents to build AI apps that can automate enterprise work. These AI agents act as knowledge robots that can reason, plan, and analyze large quantities of data and distill real time insights from various sources like images, videos, and PDFs. Elsewhere, Nvidia also launched its RTX 50 series gaming chips, which incorporate the company's Blackwell AI architecture and are intended to improve gaming graphics to cinematic levels.

AI hardware maturity was visible beyond Nvidia and demonstrated the breadth of competition among industry leaders. AMD showcased its Ryzen AI Max chips for high-powered gaming laptops, and its AI 300 and AI 300 Pro Series chips used for running AI



PC applications for both consumer and enterprise users. Intel showed off its Core Ultra 200V line of chips for enterprise computer systems and Qualcomm introduced its Snapdragon X chip for Windows laptops. Elsewhere, Ambarella, which provides chips for edge computing and Internet of Things (IoT) use cases, introduced a new generation of generative AI chips, which provides on-chip decode of 12 simultaneous video streams, while concurrently processing that video and running a hybrid of multiple multimodal vision-language models.² New AI PC models were also exhibited by companies like Lenovo and Asustek.

Applications Expand Beyond Tech: Novel Hardware and AI Work Together Across Various Industries

As computing power and AI capabilities reach new heights, CES exhibitors demonstrated innovative solutions targeting society's pressing challenges, particularly in addressing workforce shortages and expanding healthcare access.

Heavy-equipment manufacturers John Deere and Caterpillar are bringing further AI and autonomy to hard-to-digitize sectors such as construction, agriculture, commercial landscaping, and mining. John Deere revealed its second-generation autonomy kit at CES, which utilizes AI, cameras, and advanced computer vision to help operate autonomous machinery.³ The first-gen autonomy kit was originally introduced on John Deere's autonomous tractor, and the company is now expanding the technology to its 5ML orchard tractor, articulated dump truck for quarry operations, and battery electric mower for commercial landscaping. Caterpillar also showcased semi-autonomous and autonomous electric machinery for construction and mining operations. These next-gen machines could help address labor shortages while improving agricultural yields and site efficiencies and safety.

John Deere's Autonomous 9RX Tractor for Large-Scale Agriculture Uses

Sources: Global X ETFs with image derived from: John Deere. (2025, Jan 9). CES Presentation.



- In healthcare, there was a heavy emphasis on expanding AI's reach to directly impact patients' day-to-day care. From improved canes for the visually impaired to wearable robots designed to support post-surgery recovery, CES had a myriad of healthcare-focused presentations and exhibits. Privately-held OnMed presented its CareStation, a compact "Clinic-in-a-Box" that only requires a power outlet. The station is equipped with HD cameras, stethoscopes, pulse oximeters, thermal imaging, and beyond to facilitate virtual doctor consultations. If needed, the platform can facilitate e-prescriptions and specialist referrals. The CareStation can be placed in underserved communities, facilitating patient care amid persistent barriers in access to regular clinics and telemedicine. This can be particularly beneficial for the 1 in 10 Americans that live in care deserts.⁴





OnMed's Clinic-in-a-Box Enables Underserved Civilians to Access Rapid Healthcare

Sources: Global X ETFs with image derived from: OnMed. (2025, Jan 7). CES Presentation.



- AgeTech emerged as a major focus at CES, addressing the growing healthcare needs of an aging population. In the U.S., adults 65 and older make up 16% of the population but **account for 37% of healthcare utilization**.^{5,6} With this demographic expected to double by 2053, and AARP projecting AgeTech spending to reach \$96 trillion in the next 30 years, innovators showcased solutions targeting senior care.^{7,8} Breakthrough technologies included AI-powered rehabilitation platforms, smart glasses with built-in closed captioning for the hearing impaired, and on-demand support systems for dementia caregivers.
- There was also notable emphasis on broader wellness and health monitoring. Among these, we saw a myriad of health monitoring devices such as wearable blood pressure monitors, IoT devices to measure sleep quality, and smart clothing to detect athletes' response to temperature. Health monitoring firm Withings, for example, presented its new concept, Omnia, a mirror that can automatically read your vitals and provide a comprehensive health report simply by standing in front of it.

Humanoid Robot Technology Offers Transformative Change

AI advancements are accelerating the robotics industry faster than ever before, enabling the rapid advancement in **humanoid robots**. Once confined to science fiction, these human-like machines were prominently displayed at CES as tangible, market-ready innovations. Humanoids are creating a favorable investment opportunity across a wide value chain including AI chipmakers, sensor developers, IoT systems makers, and essential component and material suppliers.

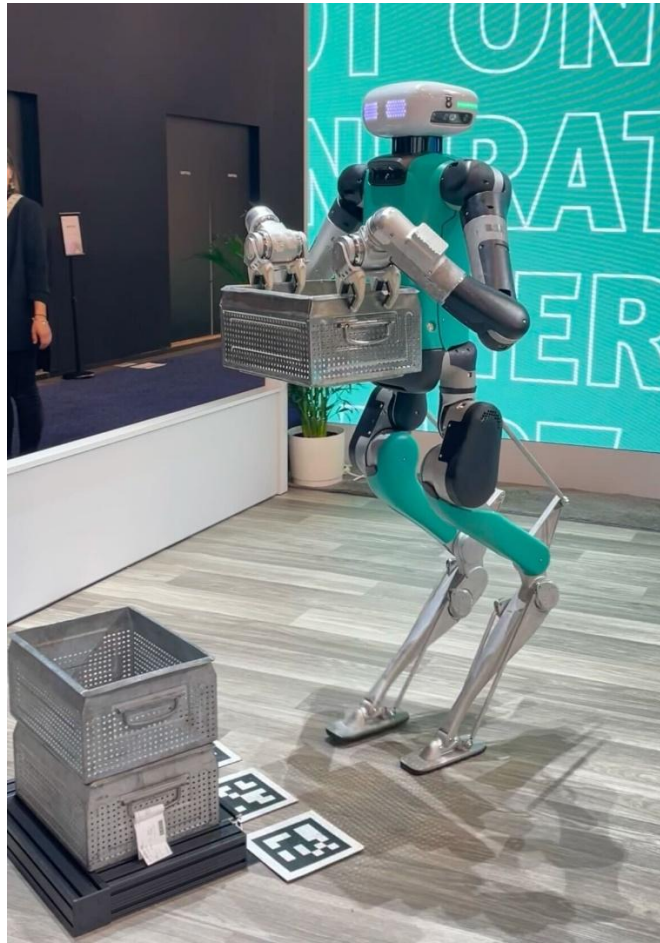
During the show, we visited humanoid exhibitions from several companies, including Schaeffler, Aptronik, SSI Schaeffer, and Unitree. Schaeffler's logistics demonstration proved particularly compelling, showcasing how humanoid robots can handle dangerous and repetitive warehouse tasks, including moving heavy containers. The star of these demonstrations was Digit, Agility Robotics' groundbreaking mobile manipulation robot. Digit was the first commercially available humanoid designed for warehouse tasks and is already being used in pilot programs in Amazon warehouses. The robot's success has driven such high demand that Agility is constructing a dedicated factory targeting annual production of 10,000 units.⁹ Given the massive global manufacturing and industrial workforce, the early adoption of these systems may offer a peek into the large total addressable market available to Agility and similar companies.

We were also impressed by Realbotix's humanoid, Melody, which is an open-source robot designed with upgraded features that can make eye contact, speak, and make a range of human-like movements and gestures. Melody's eyes are equipped with vision systems and micro-cameras, enabling it to track movement, maintain eye contact, and identify objects with precision.



Digit Humanoid Gets to Work on the Assembly Line

Sources: Global X ETFs with image derived from: Schaeffler. (2025, Jan 7). CES Presentation.



Transportation Industry Appears to Be Accelerating Toward Wider Adoption of Level 4 Autonomy

Assisted and autonomous driving technologies were a primary focus for this year's exhibitors within the transportation industry, with autonomous driving appearing to be on the cusp of major advances. Many companies highlighted progress towards level 4 (L4) autonomous driving systems, with a ramp-up in L4 systems closer to reality than ever before. Most of the currently available autonomous systems are L2 requiring human backup. L4 systems, on the other hand, are designed to respond to unpredictable surroundings without the need for human intervention.

Like ongoing deployment of autonomous farming and construction equipment, the long-haul trucking industry is gearing up for an autonomous transformation. Privately-held Kodiak displayed its ongoing work towards L4 [autonomous long-haul trucking](#), with the company recording 50,000 autonomous long-haul trucking miles in August 2024.¹⁰ Additionally, Continental, Nvidia, and Aurora announced a partnership that also aims to accelerate the timeline for the deployment of L4 autonomous semi-trucks. Continental is expected to begin mass producing the system, the Aurora Driver, in 2027.¹¹

Within the ridesharing industry, advancements by companies like Zeekr are bringing the industry towards a more electrified, autonomous future. Zeekr, an EV brand owned by China-based Geely, unveiled its robotaxi, the Zeekr RT, which is being developed with Waymo for future ride-hailing services. The vehicle is expected to be delivered to Waymo later this year for testing in the United States.¹²

LiDAR technology, a cornerstone of autonomous vehicle systems, is experiencing exponential growth in both capability and adoption. CES demonstrations revealed significant price reductions alongside major performance improvements, driving increased integration by automotive manufacturers for both autonomous features and enhanced safety systems. Hesai, the China-based manufacturer, showcased its next-generation automotive LiDAR platform, which delivers 30x higher resolution than current mainstream systems.¹³ With projected prices under \$200, these advanced sensors could soon become standard features in affordable mass-market electric vehicles.¹⁴ There were additional tech solutions on display that could help accelerate the speed of performance enhancements and the commercialization of driverless vehicle systems. A key example was Helm.AI's software solutions, which can create AI-generated LiDAR data from as little as 10 hours of driving. Such advancements could help OEMs drastically accelerate the training and



validation of L3 and L4 autonomous driving applications.¹⁵ For context, vehicles typically need thousands of hours of driving to gather enough data for testing and validation.¹⁶

Conclusion: Innovation Progresses Forward

CES 2025 underscored the rapid acceleration of AI and automation across nearly every industry, showcasing innovations poised to redefine technology's role in our daily lives. From advancements in AI-driven personal computing and robotics to the emergence of humanoid and autonomous driving and machinery, the event highlighted AI's transformative potential. Sectors like healthcare and transportation demonstrated how these technologies are solving real-world challenges, from improving patient care to advancing autonomous driving systems. The emphasis on accessibility and democratization of AI was evident, with tools like Nvidia's Project DIGITS empowering individuals and enterprises alike. As we move forward, the breakthroughs unveiled at CES 2025 set the stage for a future where AI drives innovation, enhances efficiency, and opens possibilities for social change.

Footnotes

1. NVIDIA. (2025, January 6). NVIDIA Puts Grace Blackwell on Everyday Desk and at Every AI Developer's Fingertips.
2. Ambarella. (2025, January 9). CES Presentation.
3. John Deere. (2025, January 6). John Deere Reveals New Autonomous Machines & Technology at CES 2025.
4. OnMed. (2025, January). CES Presentation.
5. Centers for Medicare & Medicaid Services (CMS). (2024, September 10). National Health Expenditures by Age and Sex.
6. United Nations. (2024, July). World Population Prospects 2024.
7. Ibid.
8. AARP. (2024, January). CES Presentation.
9. Axios. (2023, December 5). The first humanoid robot factory is about to open.
10. Kodiak. (2024, August 7). J.B. Hung, Bridgestone and Kodiak Surpass 50,000 Autonomous Long-Haul Trucking Miles In Delivery Collaboration.
11. Aurora. (2025, January 6). Aurora, Continental, an NVIDIA Partner to Deploy Driverless Trucks at Scale.
12. Electrek. (2025, January 7). ZEEKR to deliver multiple EVs in 2025 with NVIDIA Thor tech, including a US model for Waymo.
13. Hesai. (2025, January 8). Two New Products at CES: Hesai Showcases 1440-Channel Autonomotive Lidar and Next Gen Solid-State Lidar.
14. Hesai. (2025, January 8). CES Presentation.
15. Helm.AI. (2025, January 8). CES Presentation.
16. Ibid.

Information provided by Global X Management Company LLC.

Investing involves risk, including the possible loss of principal. Diversification does not ensure a profit nor guarantee against a loss.

This material represents an assessment of the market environment at a specific point in time and is not intended to be a forecast of future events, or a guarantee of future results. This information is not intended to be individual or personalized investment or tax advice and should not be used for trading purposes. Please consult a financial advisor or tax professional for more information regarding your investment and/or tax situation.