Application: 6167

Helm.ai Driver – Predicting self-driving paths using only cameras

Page: General Information

Provide information about the company to be considered for the award. If you will be nominating an individual, specify the nominee's employer.

Name of Organization/Company

Helm.ai

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Additional Contacts

I do not wish to list additional contacts

Page: Entry Information

Entry Title

Helm.ai Driver – Predicting self-driving paths using only cameras

Category

T04. Technology Breakthrough of the Year - Transportation Technology

Technology Breakthrough of the Year Submission Format

Written Answers

a. Briefly describe the organization that achieved the nominated technology breakthrough: its history and past performance (up to 200 words). Required

Helm.ai is a Silicon Valley-based software company pioneering advanced AI for autonomous driving, ADAS, and robotics. Founded in 2016, Helm.ai introduced a novel training paradigm called Deep Teaching™, which enables its models to learn from large-scale real-world data with minimal human labeling. This approach combines mathematical rigor with deep learning to develop scalable and generalizable AI systems.

Helm.ai's AI foundation models support all levels of autonomy—from driver assistance to fully autonomous driving—without relying on expensive HD maps or lidar. Its self-driving software is production-ready, hardware-agnostic, and compatible with a wide range of vehicle platforms and sensor configurations.

The company also develops generative AI simulation tools that produce photorealistic synthetic driving data, significantly reducing the need for costly, fleet-based data collection.

Helm.ai is the first third-party software provider selected to power Level 3 autonomous driving in mass-production vehicles for automotive OEMs, starting with Honda Motor's Zero Series in 2026. The company has also partnered with additional global automakers, including Volkswagen, and has achieved ASPICE Capability Level 2—a key reliability standard in the automotive industry—for its safety-critical software. The company has raised a total of $103 million to date, including its Series C round in 2023.

b. Outline the nominated technology breakthrough. Be sure to describe it in terms that someone with limited knowledge of the technology can understand and appreciate (up to 250 words). Required

Helm.ai Driver is a cutting-edge AI system that predicts where a self-driving vehicle should go in real time—whether navigating city streets, intersections, or highways. Unlike other systems that rely on high-definition (HD) maps or expensive sensors like lidar—as is the case with Alphabet's Waymo and Amazon's Zoox—Helm.ai Driver uses only camera input, much like how a human driver sees the road.

At the core of this breakthrough is a deep neural network (DNN) based on transformer architectures—similar to those powering language models like ChatGPT—but optimized for driving. Trained on real-world driving footage using Helm.ai's proprietary Deep Teaching™ methodology, the model learns how human drivers behave in complex traffic scenarios. This includes understanding when to turn, slow down, pass another vehicle, or avoid obstacles—all without being explicitly programmed.

What makes Helm.ai Driver especially powerful is its real-time operation and seamless integration with Helm.ai's production-grade perception stack. To validate its performance, the system was deployed in a realistic closed-loop simulation environment using the open-source CARLA simulator, with GenSim-2—Helm.ai's generative AI tool—used to re-render the visuals for real-world realism.

The result is a highly interpretable, modular path prediction system that supports applications ranging from assisted driving (Level 2) to fully autonomous (Level 4) vehicles. It combines human-like driving intuition with real-time performance—without requiring expensive infrastructure or hardware.

c. Explain why the technology breakthrough you have highlighted is unique or significant (up to 250 words). Required

Helm.ai Driver is a major step forward in autonomous vehicle development, using a vision-only, AI foundation model approach. Unlike most systems—like those from Waymo or Zoox—that rely on expensive hardware such as lidar, radar, HD maps, and remote teleoperation, Helm.ai Driver needs only input from standard cameras. Traditional setups can cost hundreds of thousands of dollars per vehicle, putting them out of reach for most consumers. Helm.ai Driver removes these cost barriers, making affordable and scalable autonomy possible.

What makes this breakthrough even more significant is the model's ability to exhibit emergent driving behavior. Rather than requiring engineers to manually program every driving rule or scenario, Helm.ai Driver learns how to drive like a human by training on thousands of hours of real-world data. This includes nuanced behaviors like merging, turning, obstacle avoidance, and responding to vehicles that cut in. These behaviors emerge naturally from the learning process—they are not explicitly coded—which dramatically reduces the time, cost, and human effort needed to develop and maintain the system. This approach not only accelerates development but also allows the model to adapt more easily to the complex and unpredictable conditions of real-world driving.

The technology is also modular and production-ready, meaning it can be combined with other validated systems and easily integrated into existing software stacks. Helm.ai Driver offers automakers a cost-effective and scalable solution for bringing autonomy to everyday vehicles.

d. Reference any attachments of supporting materials throughout this nomination and how they provide evidence of the claims you have made in this nomination (up to 250 words). Optional

We've attached a demo video showcasing Helm.ai Driver in a closed-loop simulation using the open-source CARLA platform. In the video, the AI model controls a self-driving vehicle as it navigates complex urban scenarios—merging, turning, and avoiding obstacles in real time. The bottom panel displays a version of the simulation re-rendered by GenSim-2, Helm.ai's proprietary generative AI model, which transforms raw simulation footage into highly realistic camera views.

The demo illustrates several key capabilities:

1) Real-time prediction: The vehicle responds continuously to dynamic traffic conditions.

2) Vision-only input: The model operates using camera-based perception, without HD maps or lidar.

3) Emergent behavior: It makes intuitive decisions—like passing or reacting to cut-ins—without being explicitly programmed to do so.

The video highlights Helm.ai Driver's performance in realistic driving conditions and supports its value for scalable, real-world autonomous driving.

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Supporting Document

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