

Deploying efficient Deep Neural Networks for mass-produced vehicles

Case Study

Company snapshot

Name: **DeepScale**
Vertical: **Automotive**
HQ: **California, United States**
Founded: **2015**

Goal

Identifying and deploying the most efficient and affordable deep learning and computer vision that can be applied to autonomous vehicles, helping to bring automated vehicles to the mass market.

Challenge

Modern deep learning can bring great improvements to perception accuracy, however real-time Deep Neural Networks (DNNs) often require hundreds or even thousands of watts of GPU computing, leading to a trunk full of expensive, power-hungry servers in autonomous vehicles. Kilowatts in the trunk need to be reduced to tens of watts in order for the industry to bring autonomous vehicles efficiently and affordably to the mass market.

Solution

DeepScale uses small, efficient Deep Neural Networks on low-cost, automotive grade processors and can leverage Armv8 cores found on most automotive SoCs for DNN inference. With this technology, DeepScale is looking to get more deep learning capability out of embedded processors to bridge the gap between accuracy and cost, making these systems commercially viable.

Benefits

- + DeepScale's deep learning software is sensor agnostic, allowing the company's customers to use their preferred sensor suites to achieve significant savings compared to existing solutions
- + A modular approach to perception allows DeepScale's customers to select the appropriate DNNs for their use case and scale their offerings from ADAS to fully autonomous solutions
- + Portability across a variety of SoCs by optimizing DNNs for GPU, accelerators and CPU, including Arm's Armv8 architecture family
- + Extensive object detection and semantic segmentation capabilities that are robust to long distances or difficult angles
- + Introducing 3D environmental modelling into low cost vehicles

DeepScale Carver

FULL FUNCTION ADAS PRODUCT



Tiny DNN models bring AI to embedded systems at price points that fit mass production commercial targets



Real-time inference on perception tasks like object detection, tracking, distance estimation, lane recognition, etc.



Proprietary DNN framework enables flexible deployment on various SoCs (NXP, Renesas, NVIDIA, Arm processors, etc.)



State-of-the-art accuracies specialized for automotive applications

Automotive applications

- + ADAS and automated systems
- + Perception stack for Level 4+ autonomy

Why Arm

Arm's leading position and widespread use across the automotive market allows DeepScale to optimize their software for a variety of leading automotive SoCs. Arm has created an ecosystem of IP that is used across many edge processors. Being able to run DNNs on Arm CPUs enables DeepScale to achieve out-of-the-box performance on a variety of SoCs. This opens the door for leveraging other processor cores like accelerators and GPUs for heterogeneous DNN implementation, bringing more efficient solutions to market more quickly.

For more information on DeepScale:

www.deepscale.ai/

[Carver21 ADAS software product](#)

See these related links for more information:

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[Arm Safety Ready](#)

[Arm Cortex-A53](#)

[Arm Cortex-A72](#)

[Arm Cortex-A57](#)