

# edge ai + vision A L L I A N C E

# **Tools and Processors for Computer Vision**

Selected Results from the Edge AI and Vision Alliance's Computer Vision Developer Survey

**JANUARY 2020** 



#### **Executive Summary**

Since 2015, the Edge AI and Vision Alliance<sup>™</sup> (formerly the Embedded Vision Alliance<sup>®</sup>) has surveyed computer vision developers regarding the products they are working on and the hardware, software and tools they are using in their projects.

This white paper provides selected results from our most recent survey, conducted in October 2019. We received responses from 705 computer vision developers across a wide range of industries, organizations, geographical locations and job types. We have focused our analysis on the 381 respondents whose organizations are developing end products for consumers, businesses or governments (vs. organizations that are providing services, or providing components, subsystems or software for incorporation into new products). The overwhelming majority of respondents are using or planning to use computer vision in their products or services.

We hope these selected results provide insight into the popular hardware and software platforms being used today for vision-enabled end products.

Full survey results are available for Alliance Member companies. Please email **info@embedded-vision**. **com** for more information.

**Note:** Percentages add up to more than 100% in many of the charts presented in this white paper. This is because many of the questions allowed respondents to select more than one option.

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# **Type of Processors Used for Vision Tasks**

Ranked as one of top three



\* Answer option added in 2019

**CPUs and GPUs remain mainstays for computer vision processing.** That said, approximately 40% of respondents are now using dedicated computer vision or deep learning processors—product categories that only recently came into existence.

#### Programming Languages Used for Designing and Implementing Non-Neural-Network Vision Algorithms

Ranked as one of top three



\* Answer option added in 2019

**Note:** The survey asks two separate questions regarding vision algorithms: one about algorithm design and one about algorithm implementation. Since OpenGL, Halcon and Halide are generally implementation languages, they were not answer options for the algorithm design question.



<sup>40%</sup> of respondents are currently using 3D perception in their products, with another 20% planning to start using it in the next year; **the total currently using or planning to start in the next year is up almost 20 percentage points from last year.** 

# **Use of Neural Networks**



An astonishing 94% of respondents are using or planning to use neural networks in their applications—a truly remarkable trajectory for a technology that was mainly of academic interest less than a decade ago.



# **Functions Served by Neural Networks**

All that apply



### Machine Learning Frameworks Used for Designing, Training or Evaluating Neural Networks for Vision Tasks

Ranked as one of top three



Despite a significant drop in popularity from last year, **TensorFlow remains the leader** in neural network design, training and evaluation.

### Software Used for Deploying Neural Network Vision Tasks

Ranked as one of top three



\* Answer option added in 2019



### **About the Alliance**

The Edge AI and Vision Alliance (formerly the Embedded Vision Alliance) is a global partnership that brings together technology providers with end product and system developers who are enabling innovative, practical applications of edge AI and computer vision.

Our mission is to inspire and empower product creators to incorporate edge AI and visual intelligence into new products and applications, and enable member companies to accelerate success by:

- Bringing together suppliers, endproduct designers and partners to speed the adoption of edge AI and computer vision in products
- Delivering timely insights into market research, technology trends, standards and application requirements
- Enabling companies to become more visible as thought leaders

For information on joining the Alliance, please visit **www.embedded-vision.com**.

#### Vision Accelerator Program

The Vision Accelerator Program helps companies quickly understand and navigate the technical and business complexity of incorporating visual perception capabilities so they can more quickly and confidently plan, develop and deliver their products. It is a service available to members of the Edge AI and Vision Alliance who are developing end products and systems with visual perception capabilities.

The Vision Accelerator Program helps companies:

- ✓ Make decisions in a fast-changing market where areas like deep learning and 3D sensing are rapidly moving from research into practical use
- ✓ Understand the tradeoffs for low-power, low-cost devices and cloud processing
- ✓ Know what vision software standards, open source tools and algorithms are gaining traction
- Identify which startups, suppliers, partners and experts have relevant vision technologies and know-how
- $\checkmark$  Build skills and recruit the right talent
- Access and develop a network of experts, suppliers and partners

For more information on the Vision Accelerator Program, email **accelerate@embedded-vision.com**.



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