



Introduction to Today's Program – How to Get the Most Out of the Summit

Jeff Bier

Edge AI and Vision Alliance

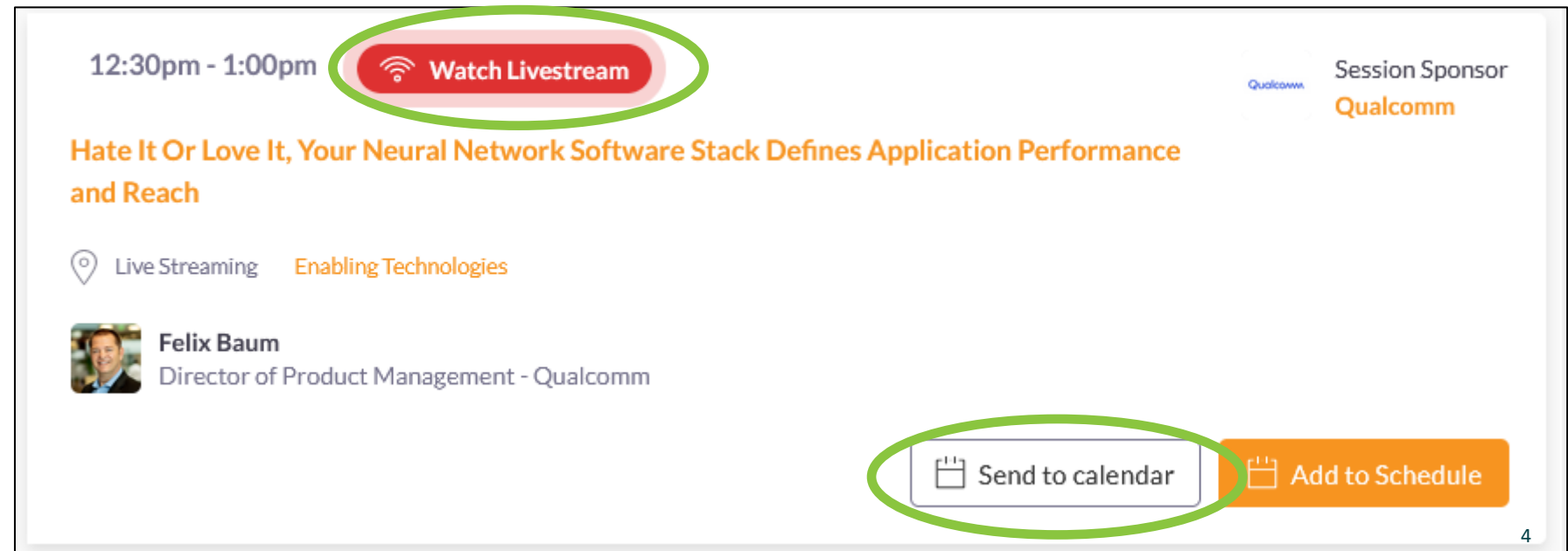
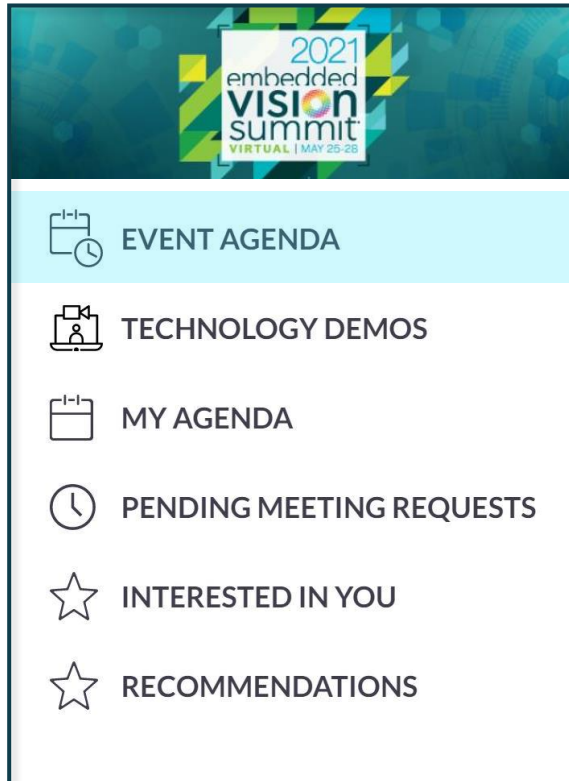
May 28, 2021



edge ai + vision
ALLIANCE

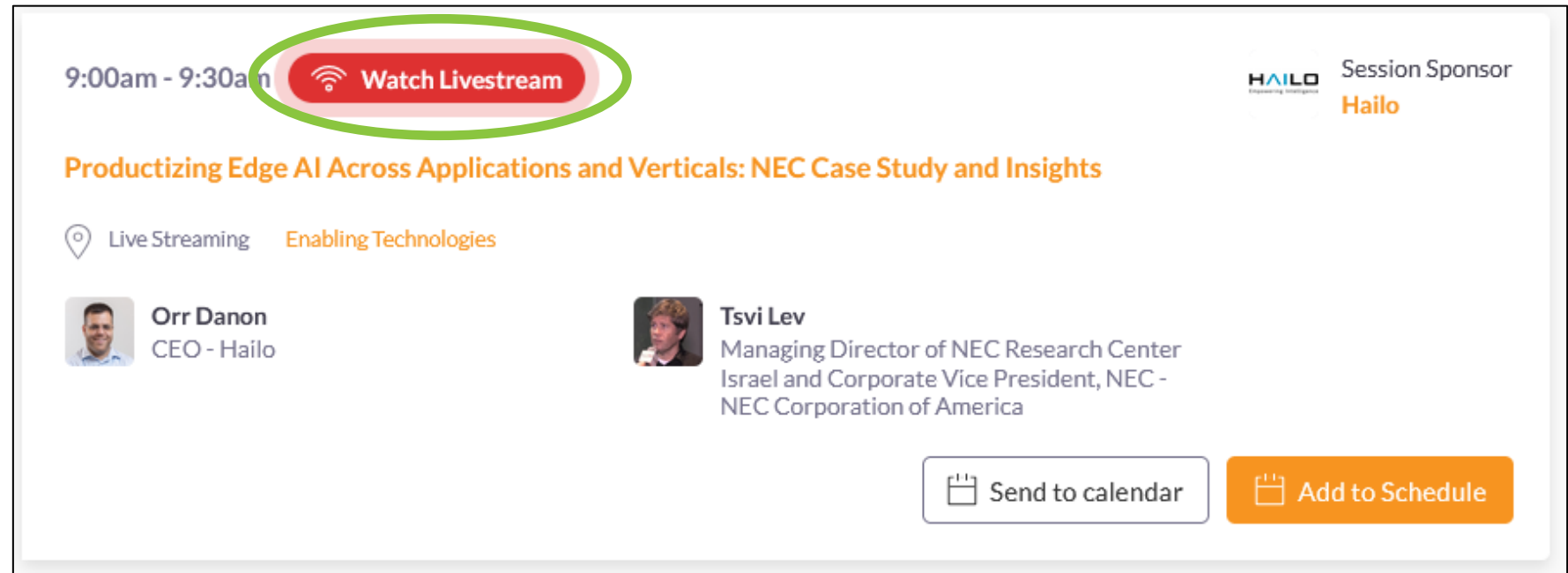
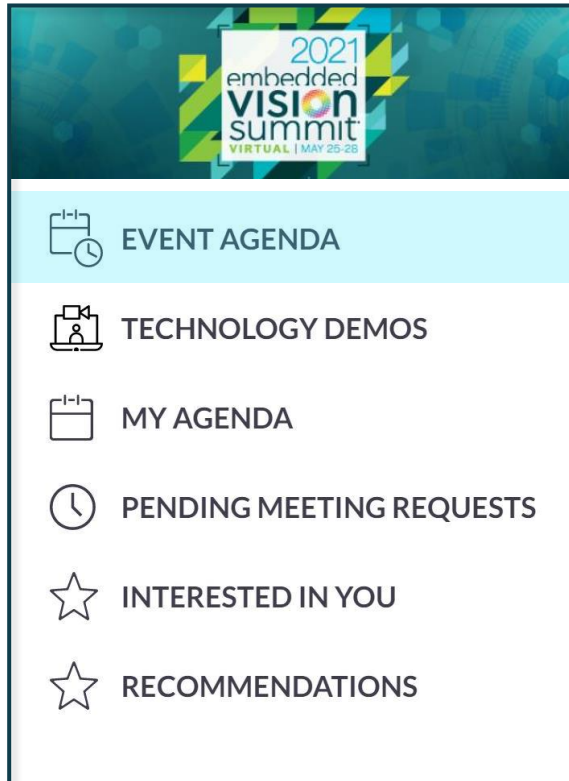
Important Update: Felix Baum (Qualcomm) Session Rescheduled -- 12:30 pm PT Today

Find it on the Event Agenda,
then click on “Send to Calendar” to add
to your Outlook or Google Calendar, or
click on “Watch Livestream”



Important Update: Hailo/NEC Session Rescheduled -- for Now!

Find it on the Event Agenda,
then click on “Watch Livestream”



My Topics

- Thanks and feedback
- Applications
- Technology trends
- Program highlights
- Platform tips

Thank You!

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thanks

Thank You, Moderators!

- Derya Akkaynak
- Randy Allen
- Mark Baker
- Dino Brusco
- Brian Dipert
- Nik Gagvani
- DJ Gilmore
- Nathan Levy
- Craig Lytle
- Doug Perry
- Shweta Shrivastava
- James Smith
- Michael Stewart
- Tom Vogelsong

Edge AI and Vision Alliance Members



Your Feedback



Your Feedback



info@edge-ai-vision.com

Today's Schedule

DAY 4 Friday May 28

9:00 am - 9:30 am PT **Closing Remarks**

9:30 am - 10:00 am PT **Presentations**

10:00 pm - 11:00 am PT **Technology Demos**

11:00 am - 2:00 pm PT **Presentations**

Applications: Smart Spaces



Source: Petcube



Source: cpb.gov



Source: Compology



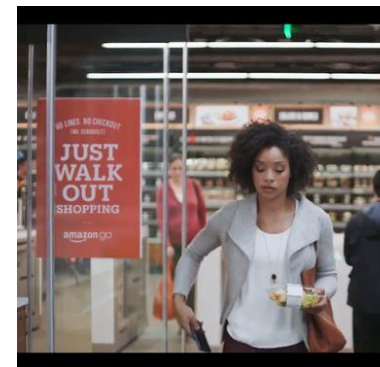
Source: Ringdoorbell.eu



Source: Orbital Insight



Source: Identified Technologies



Source: Amazon



Source: Hortdaily.com

Park Assist: Find an Open Spot; Find Your Car



<https://www.youtube.com/watch?v=mQ6wN0pUsVY>

Smart-Spaces-Related Sessions

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TECHNICAL INSIGHTS

Challenges in Vision-Based Adaptive Traffic Control Systems

**Venkatesh Wadawadagi**
Solution Consultant
Sahaj Software Solutions

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TECHNICAL INSIGHTS

Developing Edge Computer Vision Solutions for Applications with Extreme Limitations on Real-World Testing

**Alexander Belugin**
Computer Vision Product Manager
NEDRA

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TECHNICAL INSIGHTS

Interview: Developing and Deploying a Privacy-Preserving Vision-Based Sensor System for Commercial Real Estate

**Luke Murray**
Co-Founder and CTO
XYSense

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Person Re-Identification and Tracking at the Edge: Challenges and Techniques

**Morteza Biglari-Abhari**
Senior Lecturer
University of Auckland

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ENABLING TECHNOLOGIES

Productizing Edge AI Across Applications and Verticals: NEC Case Study and Insights

**Orr Danon**
CEO
Hailo

**Tsvi Lev**
Managing Director of NEC Research Center Israel and Corporate Vice President, NEC
NEC Research Center Israel and NEC

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BUSINESS INSIGHTS

Computer Vision for the Built Environment

**David Greschler**
CEO
Nomad Go

Depth Sensing Proliferates



Image: appleinsider.com



Image: Skydio via highways.today

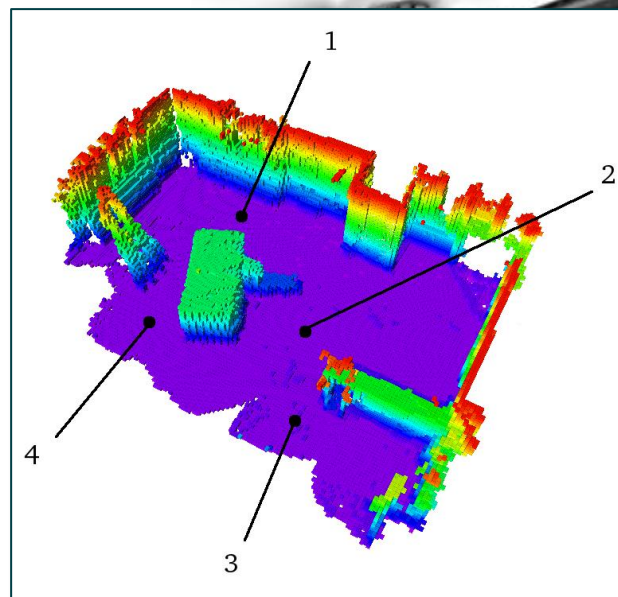
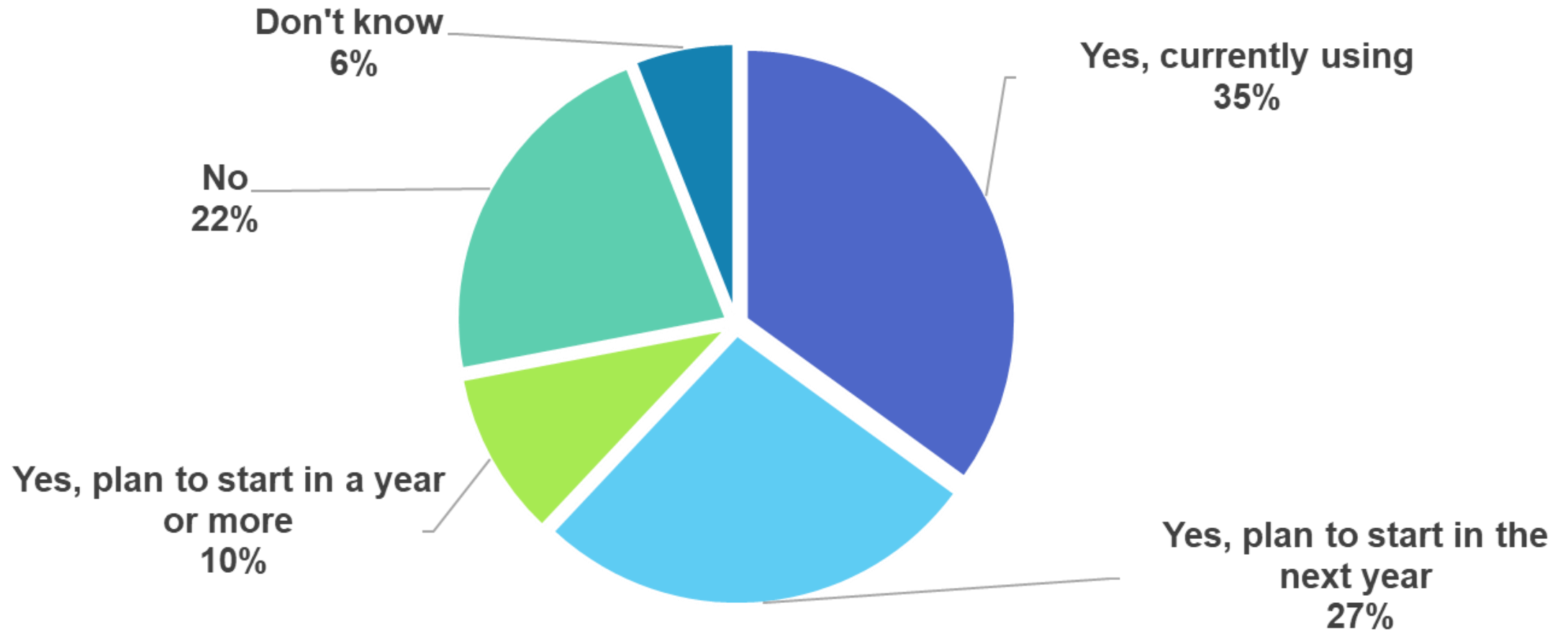



Image: pcc.disam.etsii.upm.es

Use of 3D Perception in Vision Products




Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, Nov. 2020

Depth-Sensing-Related Sessions



FUNDAMENTALS

When 2D Is Not Enough: An Overview of Optical Depth Sensing Technologies



Dinesh Balasubramaniam
Senior Manager
Product Marketing
Ambarella



TECHNICAL INSIGHTS

Efficient Deep Learning for 3D Point Cloud Understanding



Bichen Wu
Research Scientist
Facebook Reality Labs



ENABLING TECHNOLOGIES

DepthAI: Embedded, Performant Spatial AI and CV



Brandon Gilles
CEO
Luxonis



FUNDAMENTALS

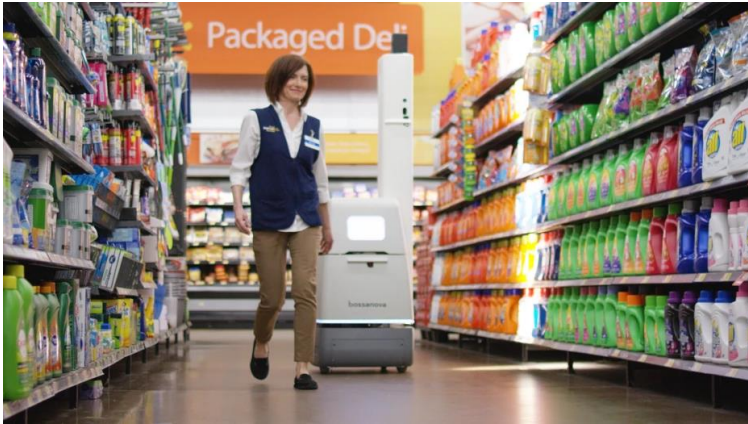
Introduction to Simultaneous Localization and Mapping (SLAM)



Gareth Cross
Independent Video Game Developer

Autonomous Machines

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Source: Bossa Nova Robotics



Source: Seegrid



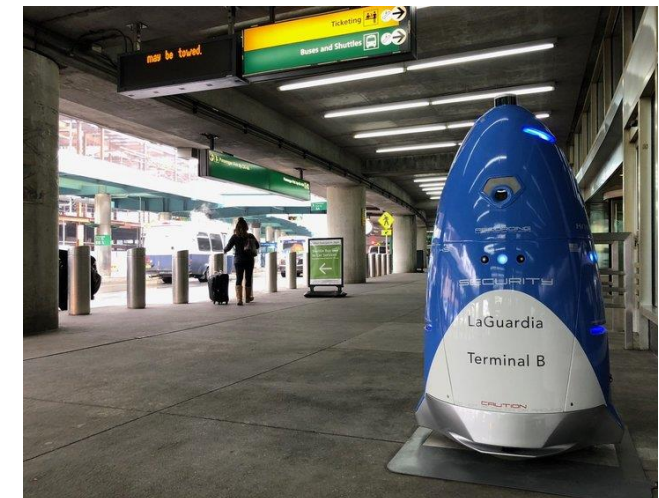
Source: iRobot



Source: Restoration Robotics



Source: Blue River Technology



Source: Knightscope

Autonomous Flight

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TECHNICAL INSIGHTS

Building an Autonomous Detect-and-Avoid System for Commercial Drones



Alejandro Galindo
Head of Research and Development
Iris Automation



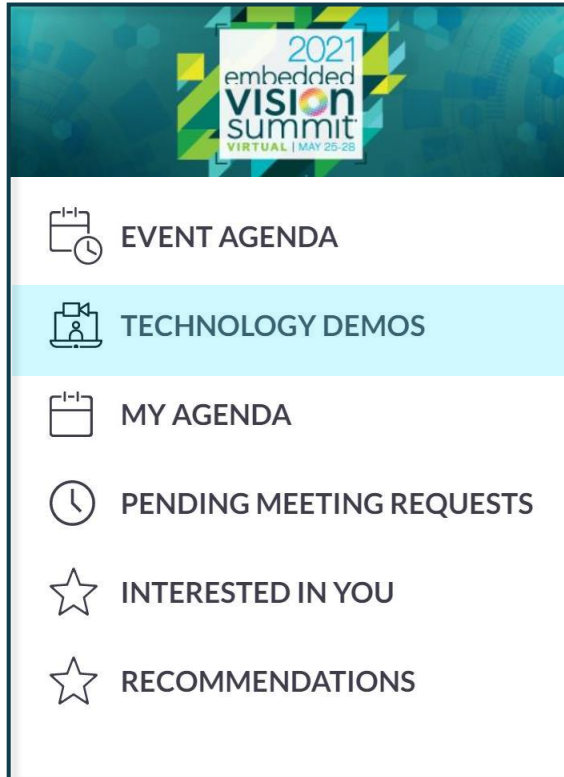
TECHNICAL INSIGHTS

Productizing Complex Visual AI Systems for Autonomous Flight



Carlo Dal Mutto
Director of Engineering
Airbus

Fast-Paced Live Technology Demos

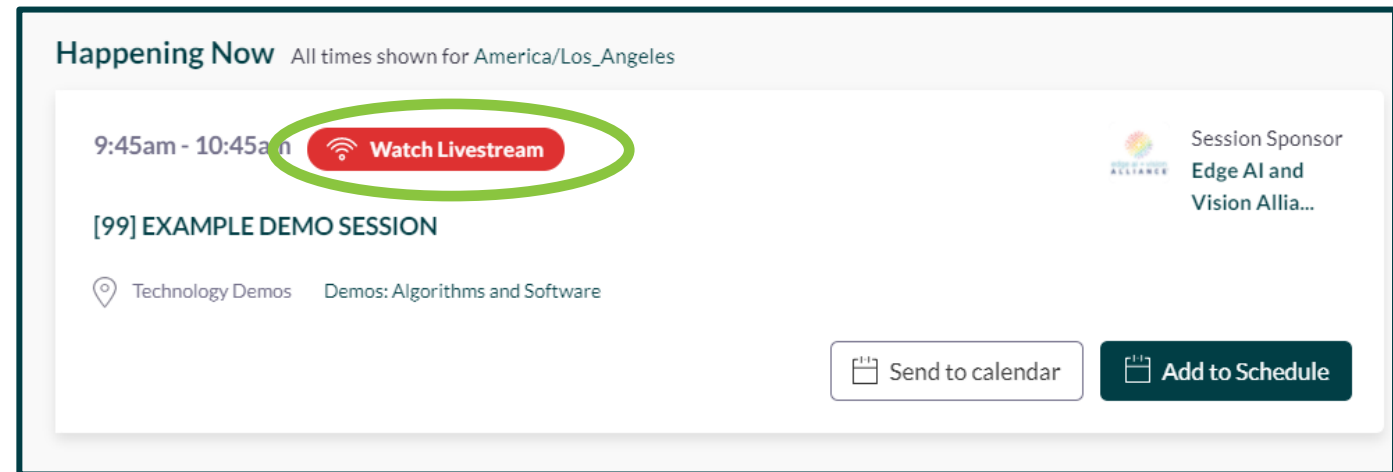
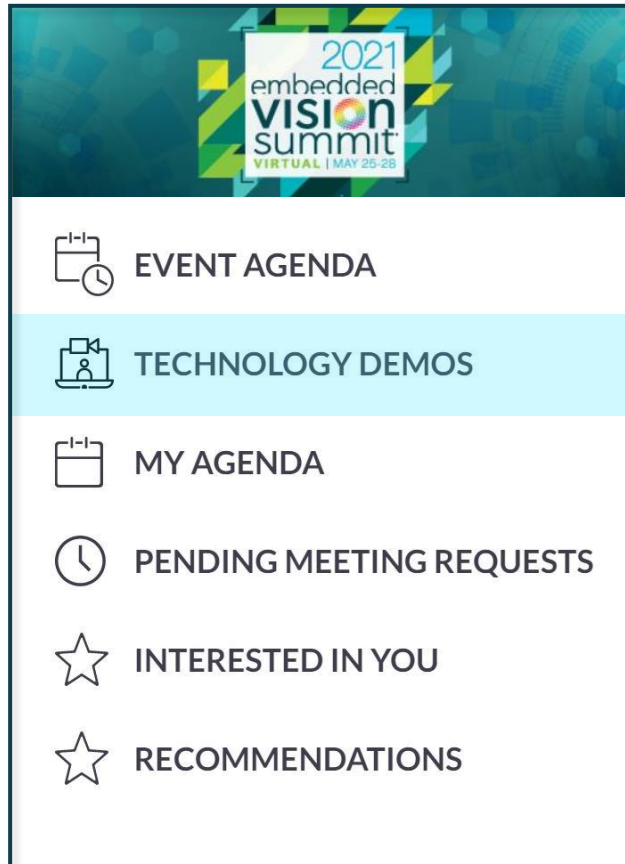


Find the building block technologies **you need with fast-paced, live Technology Demos!**

Last Chance – TODAY!
10:00 am – 11:00 am PT

Demos Repeat Every 15 Minutes

Demos will repeat every 15 minutes within their scheduled one-hour live blocks each day. Most demos appear every day of the event.



Are You a Safari User?

Safari users will experience problems connecting to Zoom audio.

Please use a different browser to visit the live Technology Demos.



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an ASUS assoc. co.

 **algolux**

 **ALLEGRO**
Digital Video Technology

 **Ambarella**

AMD 

arm

 **BASF**
We create chemistry

BDTi

 **blaize**[®]

 **brainchip**^{*}
The Neuromorphic Computing Company

cā dence[®]

CEVA[®]

 **Chips Media**[™]

 **codeplay**[®]

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 **Connect Tech**

D3 Engineering

 **Deeplite**

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 **morpho**

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 **nextchip**

nota
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 **NVIDIA**

 **openfive**

 **Perceive**

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 **UNITX**[®]

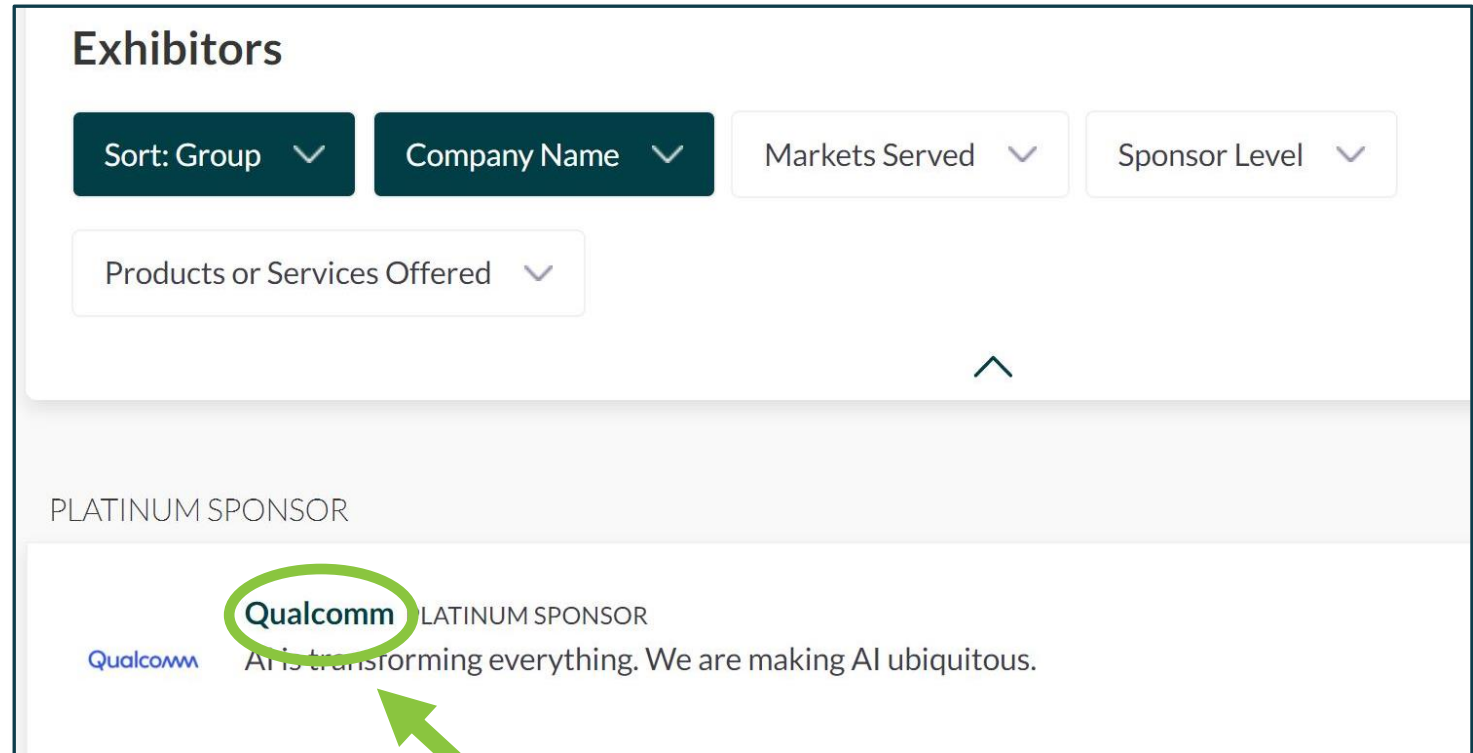
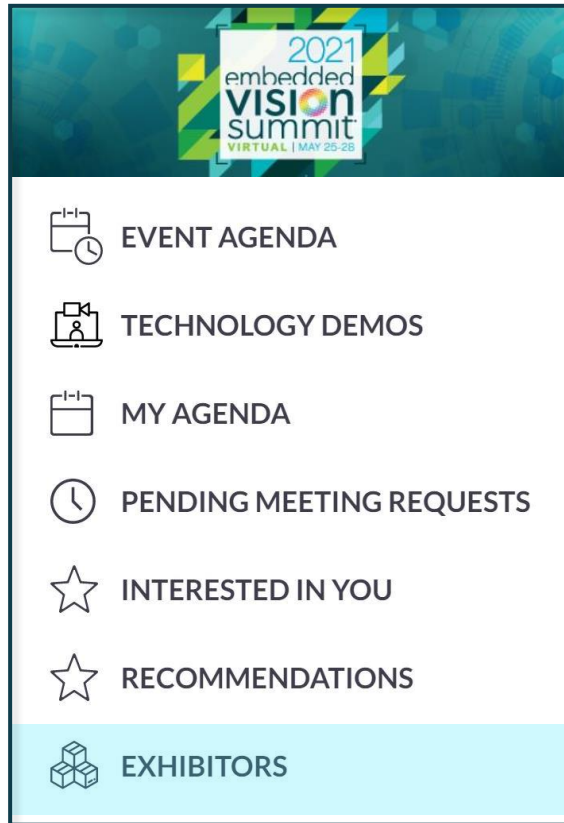
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Products or Services Offered
Processor Boards and Modules, Silicon IP, ICs and SoCs, Development Tools, Standards and Camera Modules

Meetings with Qualcomm

View As: [Amy Ardzrooni](#) ▾

Qualcomm Representative: [Ben Cohen](#) ▾

[+ Request a meeting](#) ^

Invitees
[Ben Cohen](#) +

Date
Monday 05/24/2021 ▾

Time
5:15pm - 5:30pm (America/Los_Angeles) ▾

Location
Virtual Meeting Room ▾

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25 meeting requests left until you reach the pending meeting limit.

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**Request a meeting
to efficiently
get expert answers
to your questions!**

Download Session Slides

23:17

Video not working? Try opening the stream in a new tab.

Recording Available

On-Demand - Fundamentals

Friday 28 May 2021 5:00pm - 5:30pm (America/Los_Angeles)

Add to Schedule

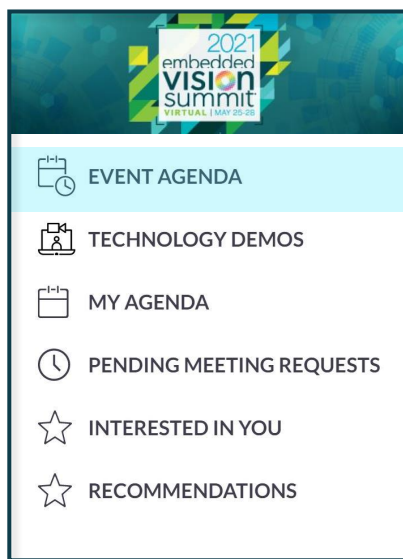
Get Session Content

Computer vision requires vision. This is why companies that use computer vision often decide they need to create a custom camera module (and perhaps other custom sensors) that

Click the “Get Session Content” button to download slides after the live session.

Recordings of Previous Live Sessions

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To access recordings of sessions previously presented live, click on “Event Agenda,” then scroll up through the agenda.

Event Agenda

Dates ▾

Tracks ▾


Location ▾

Session recording is available to watch now.
5pm [▶ Watch Recording](#)


Happening Now

All times shown for America/Los_Angeles


Tuesday 25 May


9:00am - 10:00am  Livestream


WELCOME AND KEYNOTE: FROM INFERENCE TO ACTION: AI BEYOND PATTERN RECOGNITION


 Live Streaming

Keynote

**Jeff Bier**
Founder, Edge AI and Vision Alliance / President, BDTI - Edge AI and Vision Alliance

**Pieter Abbeel**
Director, Berkeley Robot Learning Lab and Co-Director, Berkeley Artificial Intelligence Lab - University of California, Berkeley

 Send to calendar

 Added to

On-Demand-Only Content

- 28 high-quality sessions in the **On-Demand Only** section!
- Fundamentals, Technical Insights, and Business Insights tracks

INTRODUCTION TO DNN MODEL COMPRESSION TECHNIQUES

On-Demand Fundamentals

Recording Available



Sabina Pokhrel

Customer Success AI Engineer - Xailient

APPLYING THE RIGHT DEEP LEARNING MODEL WITH THE RIGHT DATA FOR YOUR APPLICATION

On-Demand Technical Insights

Recording Available



Hila Blecher-Segev

Computer Vision and AI Research Associate - Vision Elements

THE TRANSFORMATION FROM IMAGING TO SENSING: DRIVING A MARKET REVOLUTION

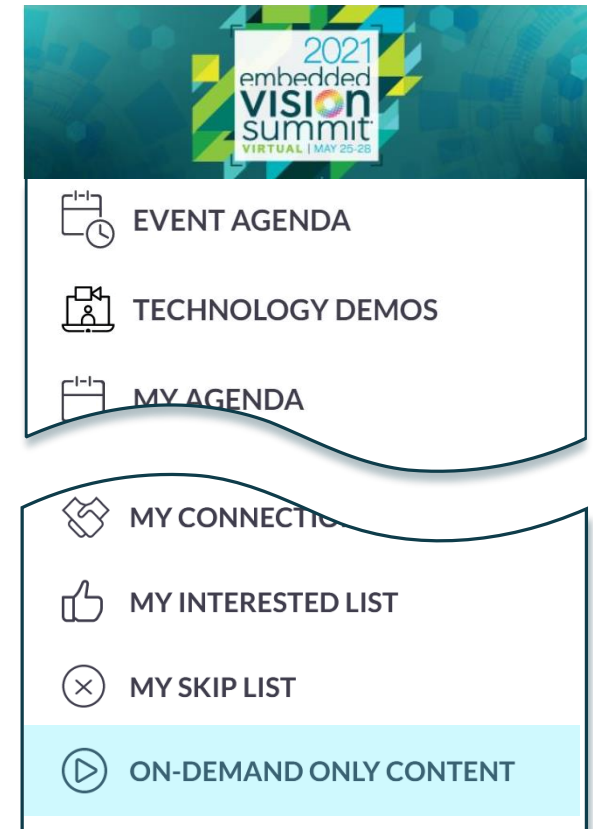
On-Demand Business Insights

Recording Available



Pierre Cambou

Principal Analyst - Yole Développement



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Deeplite
AI DRIVEN OPTIMIZER

EFINIX

EYS3D
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MICROCHIP

morpho

nota
On-device AI

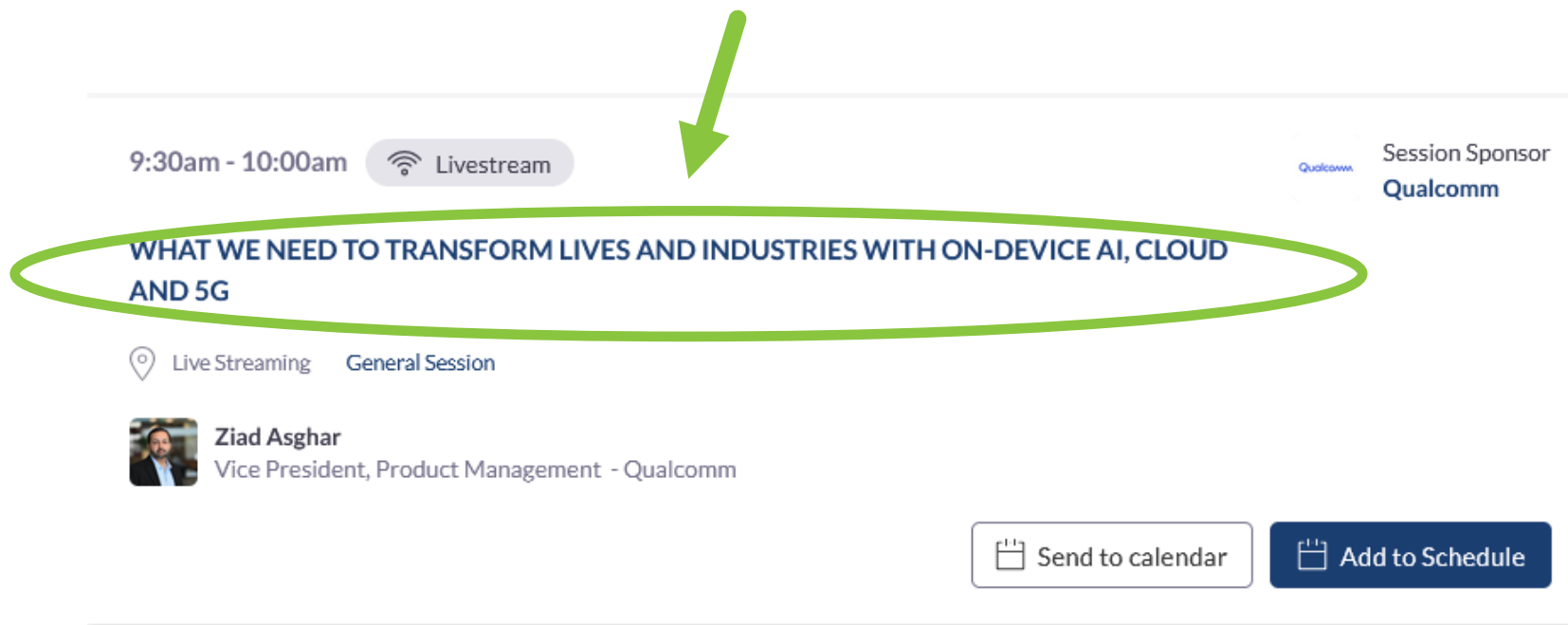
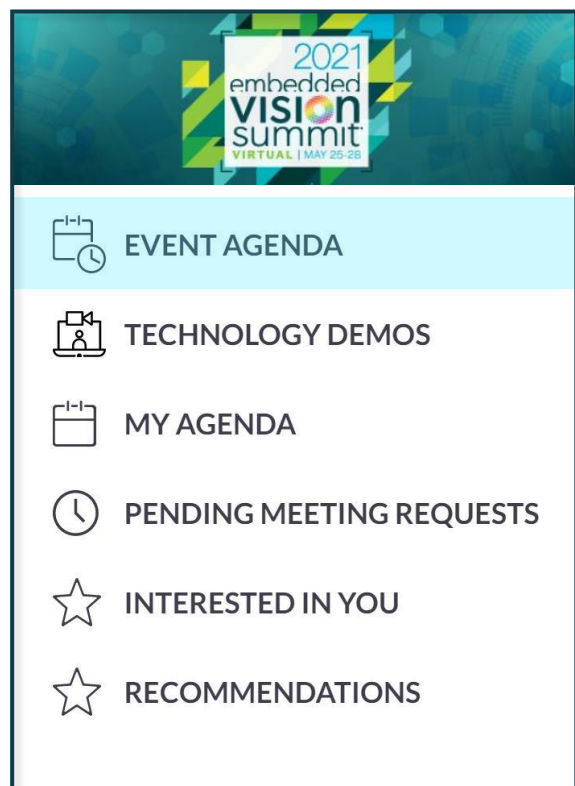
PerceptiLabs

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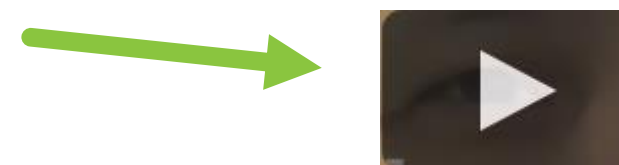
UNITX

Find It on the Agenda

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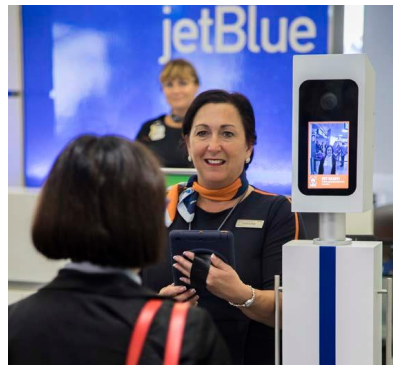
CANDIDATES

Extremely Diverse Applications

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Blue River Technology



cpb.gov



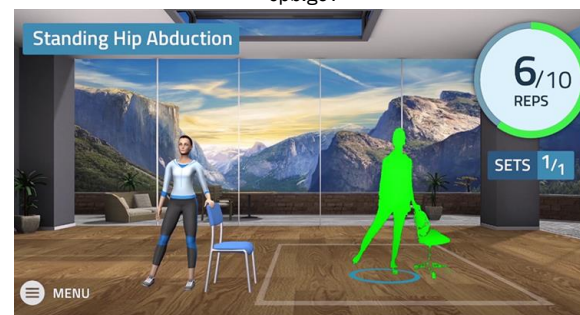
Orcam



Compology



Sight Diagnostics



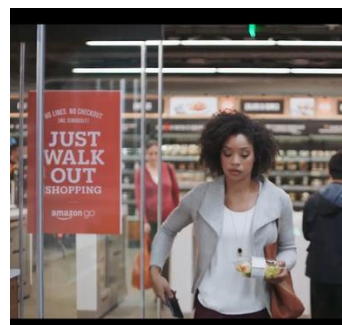
iRobot



ultrasoundtechnicalschools.com



Ringdoorbell.eu



Amazon



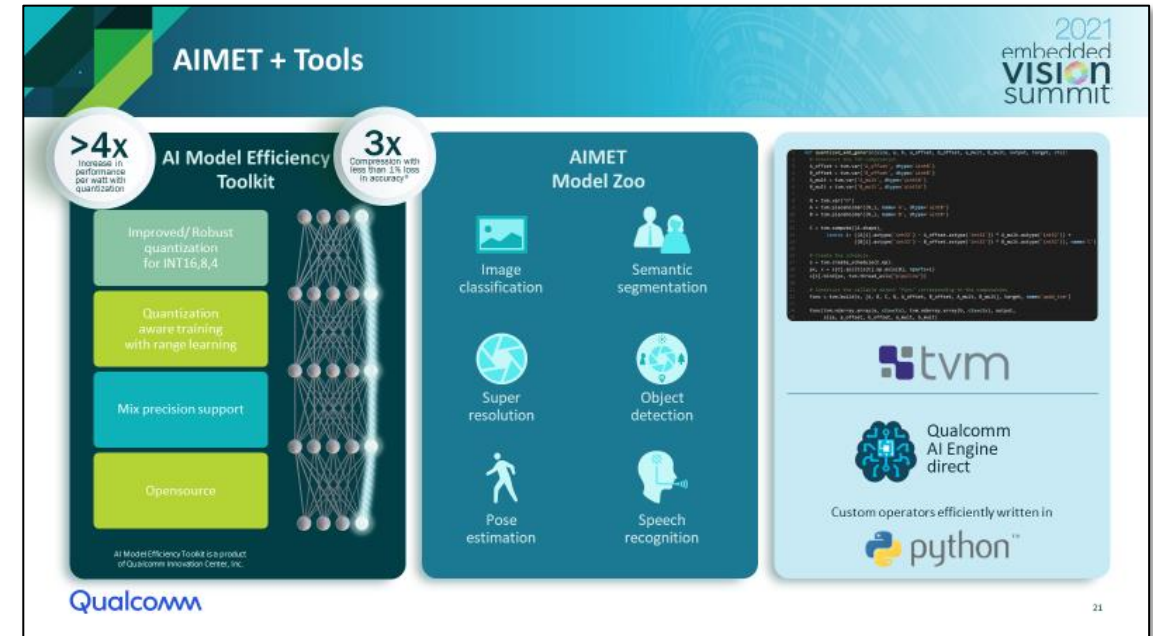
Hortdaily.com



Skydio via Medium

Ziad Asghar – Qualcomm: From Edge to Cloud

- Leveraging smartphone-focused innovation into many other markets
- From low-power, always-on devices like smartphones and earbuds, through IoT and automotive, to data center
- Big investments in software and tools as well as silicon
- Emphasis on advancing techniques for DNN quantization and compression
 - AI Model Efficiency Toolkit (AIMET)
 - Data-free quantization
 - Adaptive rounding



Source: Ziad Asghar, Qualcomm

Applications: Health and Safety

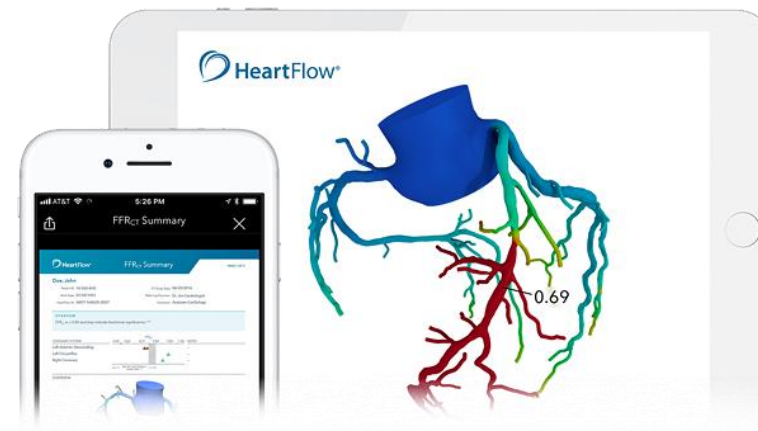
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Source: VirtuSense



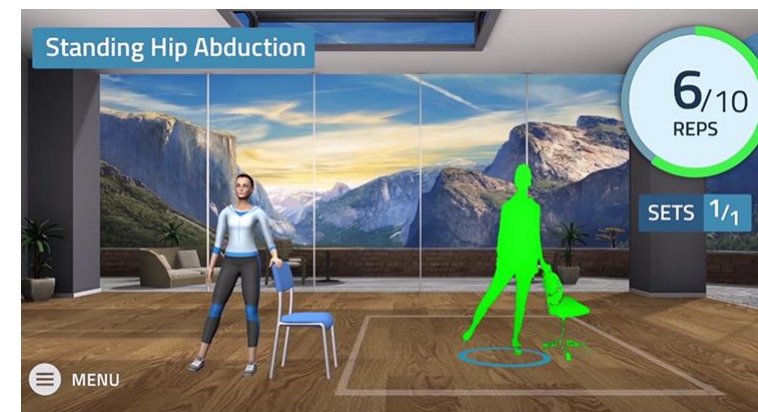
Source: Opternative



Source: HeartFlow



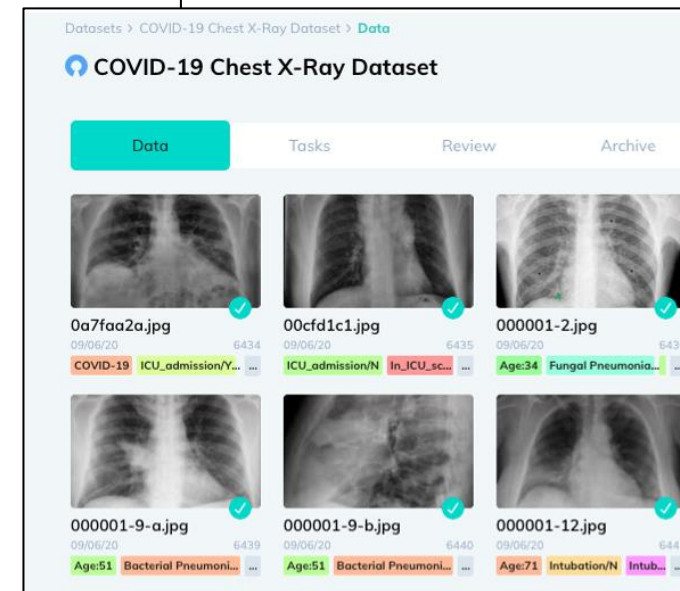
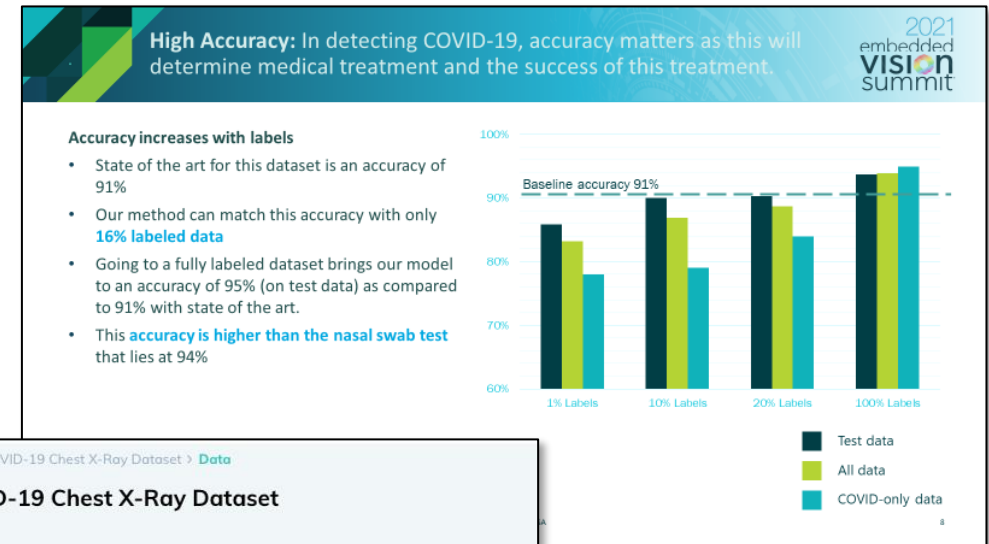
Source: Sight Diagnostics



Source: Reflexion Health

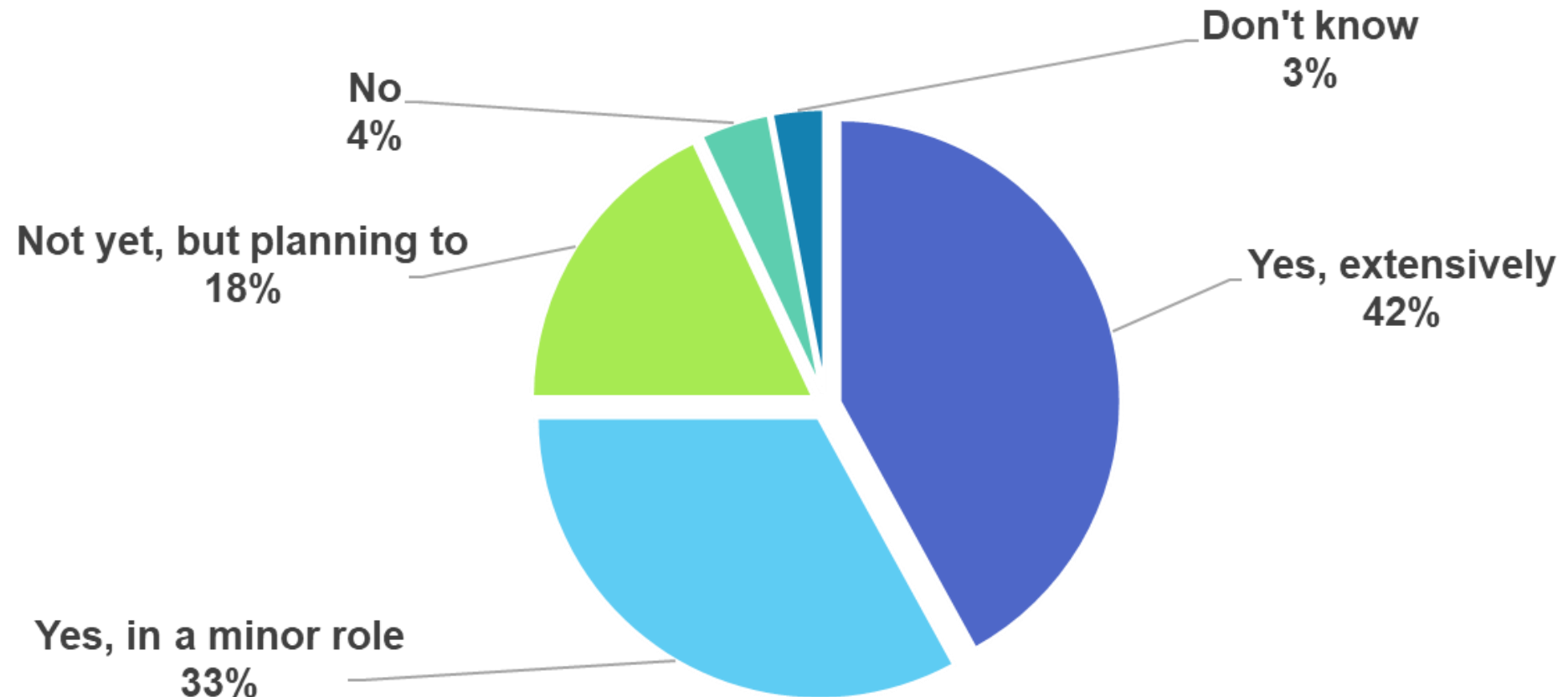
Patrick Bangert (Samsung) – Working with Small Datasets

- Amassing data for medical applications can be challenging due to privacy considerations
- Often, we are looking for rare conditions, so data sets are imbalanced
- Using self-supervised feature extraction approach to improve the learning process when the number of images is small
- 95% accurate in detecting COVID from chest X-rays



Source: Patrick Bangert, Samsung

Use of Neural Networks in Vision Applications



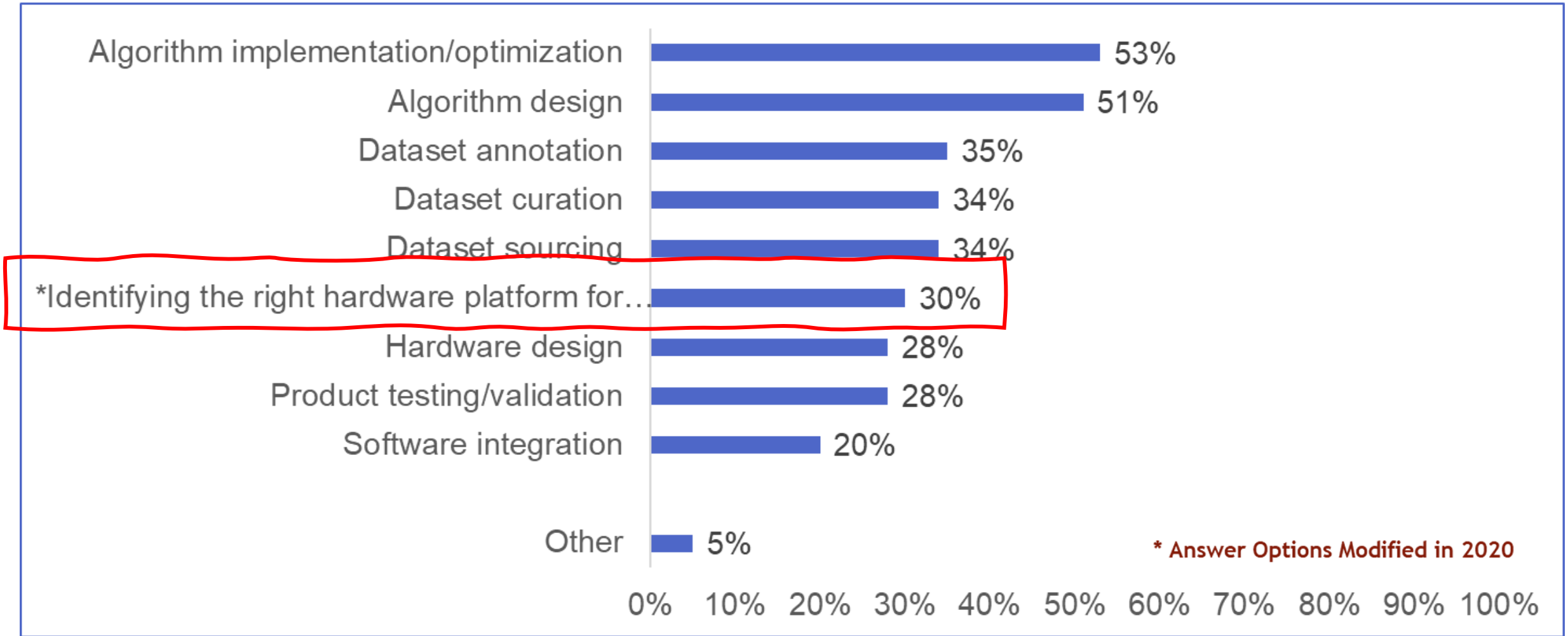
A Golden Era of Embedded AI Processors (From the Embedded Vision and Visual AI Industry Map)

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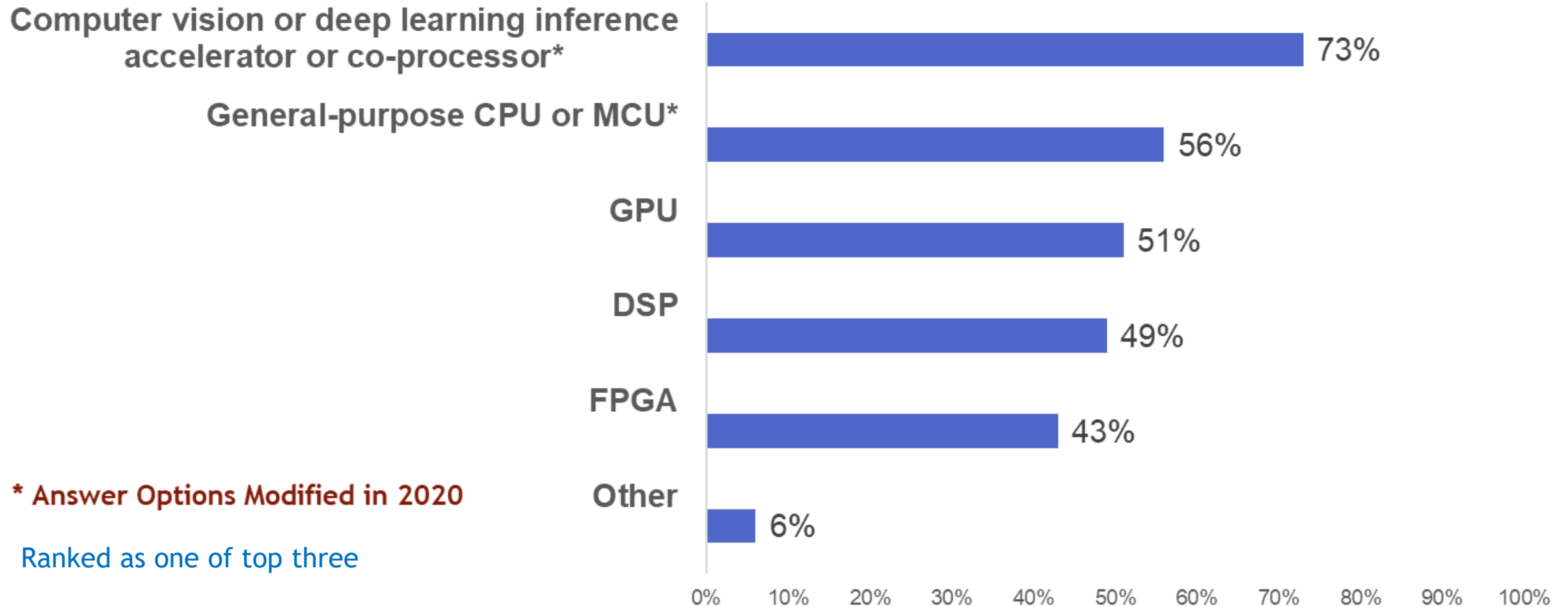
Silicon IP Processors

Most Challenging Areas of Computer Vision Product Development



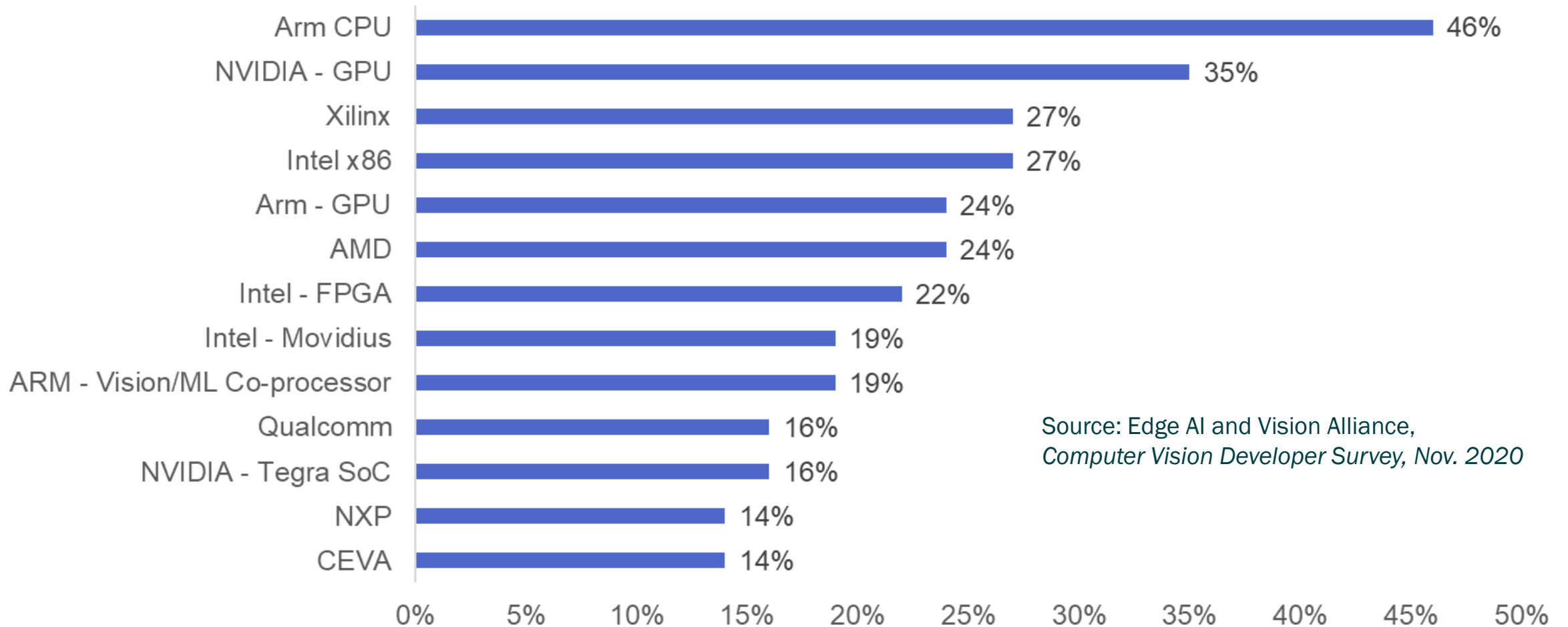
Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, November 2020

Type of Processor Used for Deployment of Vision Tasks



Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, November 2020

Processors Used for Vision Tasks in Industrial Applications



Source: Edge AI and Vision Alliance,
Computer Vision Developer Survey, Nov. 2020

Algorithms — What We Imagine

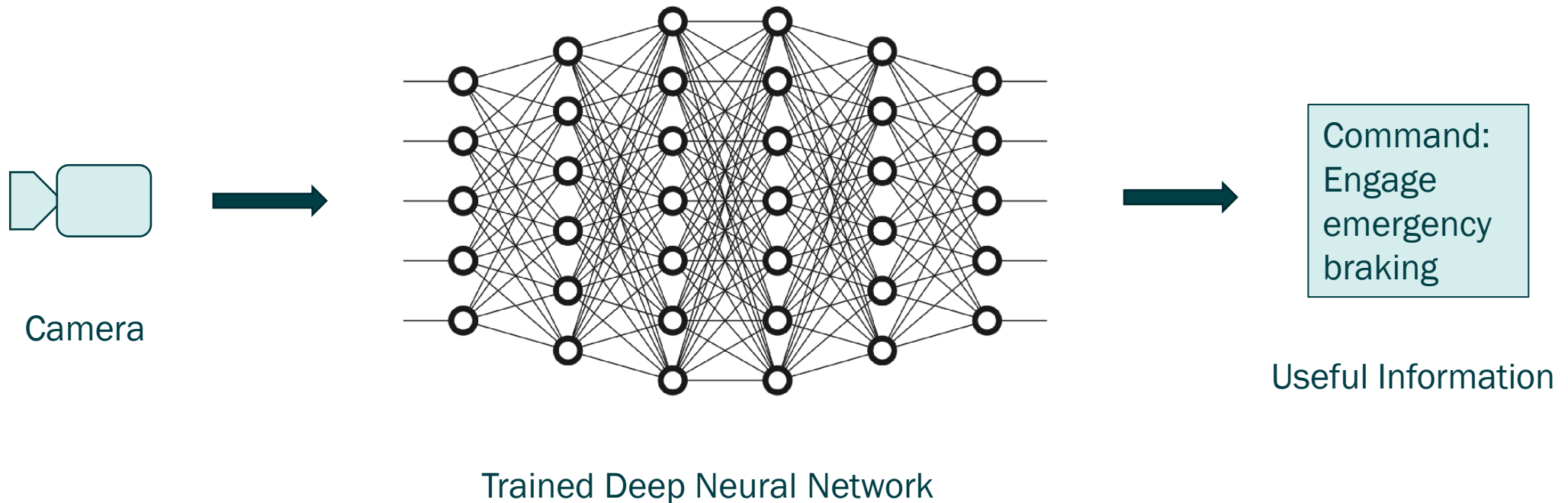
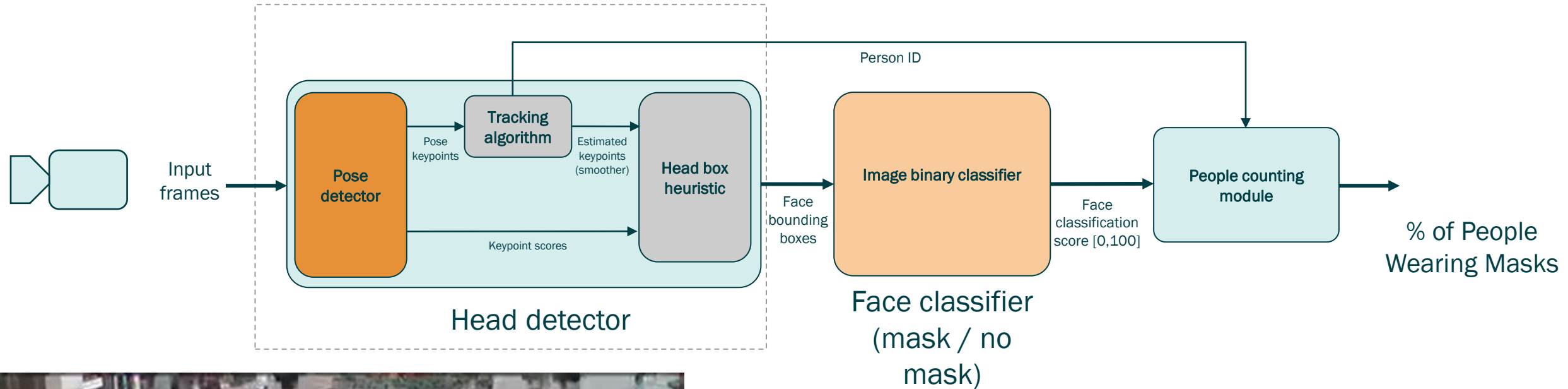


Image: freeCodeCamp.org

Typical Composite Real-World Algorithm

Estimating % of People Wearing Masks

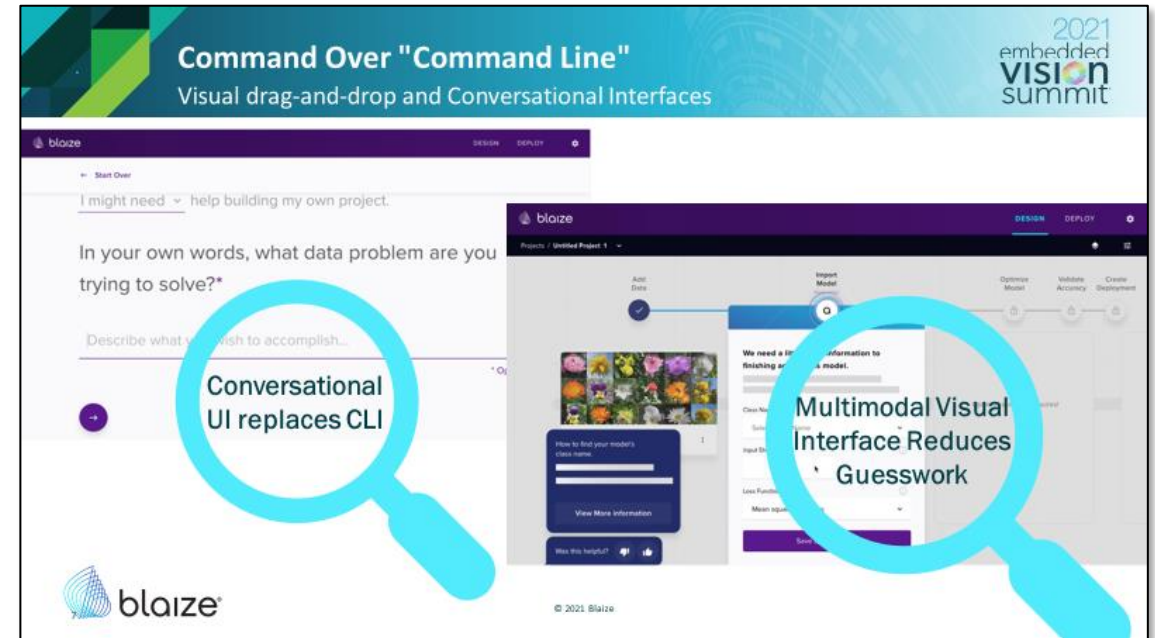




CANDIDATES

Dmitry Zakharchenko (Blaize) – Using AI to Develop AI

- AI chip start-up investing heavily in software tools
- Addressing the full application life cycle
- Utilizing an AI-based conversational and visual user interface

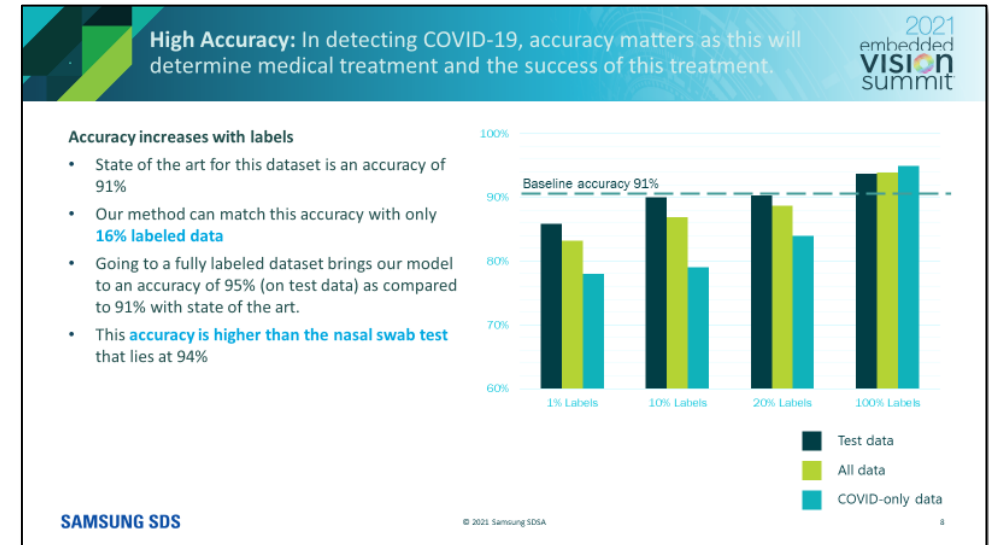


Source: Dmitry Zakharchenko, Blaize

Add an Intel session? [PL reviewing]

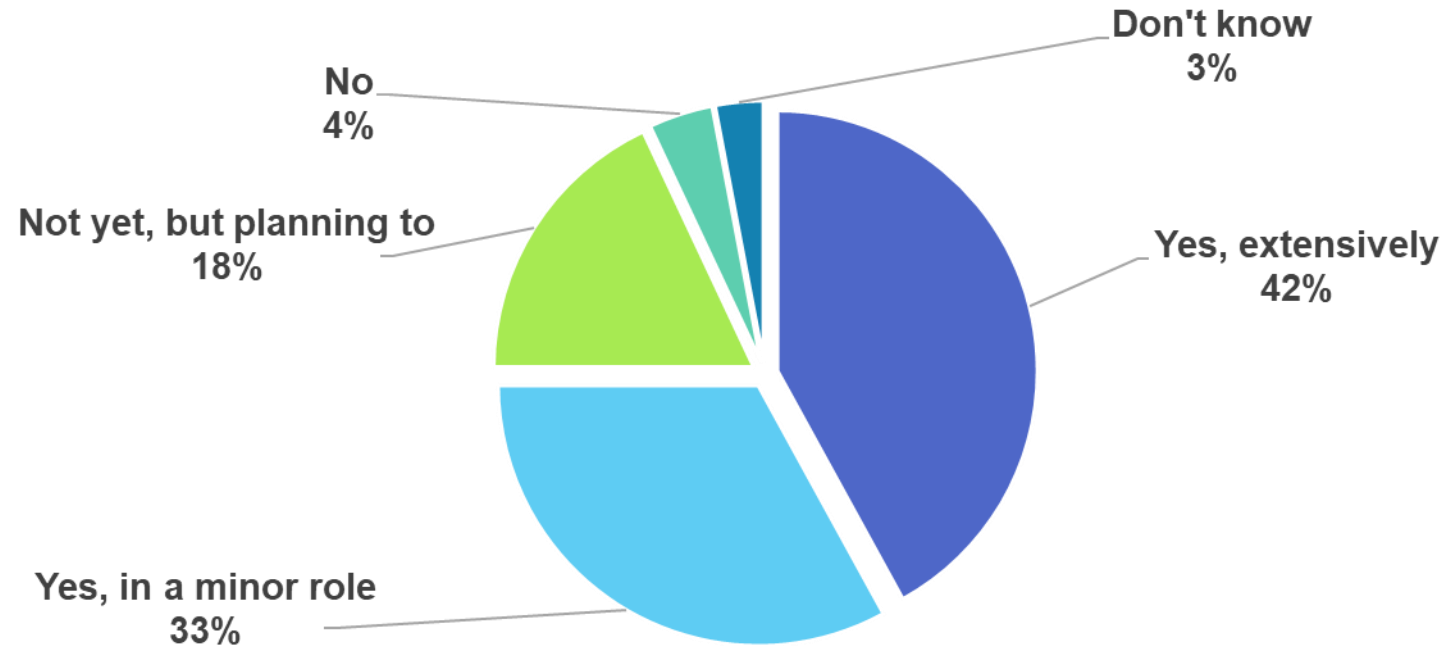
- XXX
- XXX
- XXX
- XXX

Update

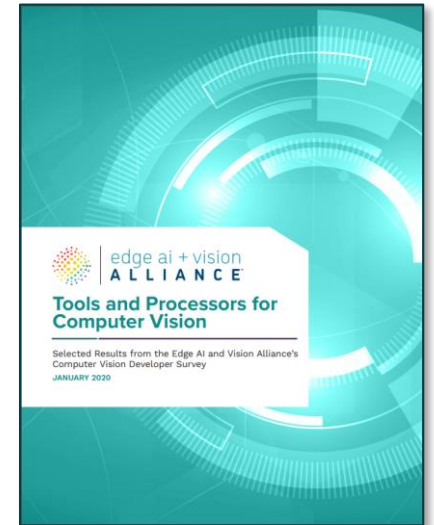


Source: Patrick Bangert, Samsung

Use of Neural Networks in Vision Applications

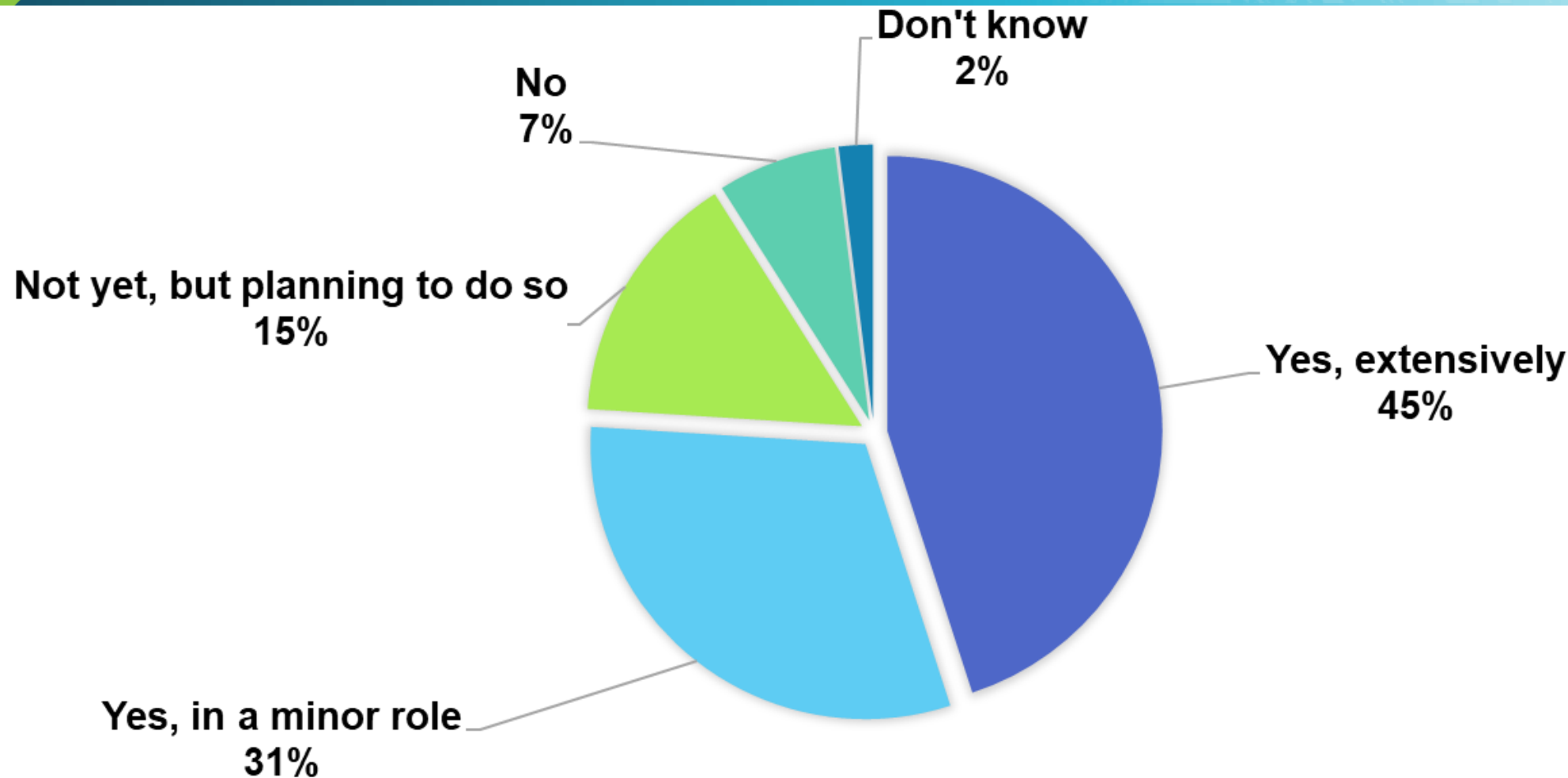


Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, Nov. 2020



[bit.ly/
DeveloperSurvey
WhitePaper2020](https://bit.ly/DeveloperSurveyWhitePaper2020)

Using Non-Neural Network Algorithms to Perform Computer Vision Functions



Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, November 2020

Embedded Vision and Visual AI Industry Map

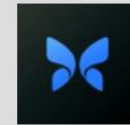
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Home > Systems > Healthcare > Healthcare



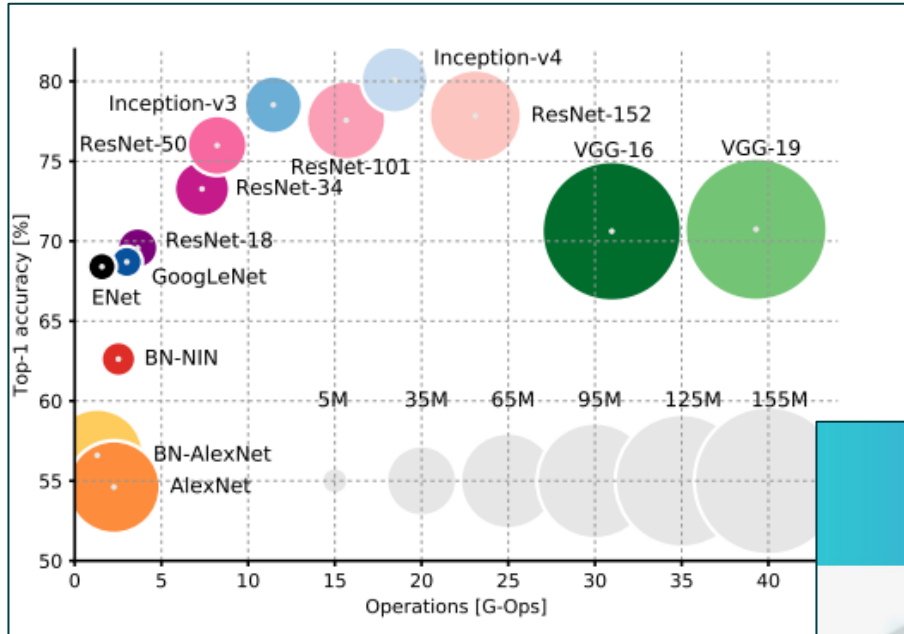
Healthcare





https://youtu.be/0_S1zoYhiP0

Challenge: Many Technology Choices



Top 8 Deep Learning Frameworks



Type of Processor Used for Deployment of Vision Tasks

Computer vision or deep learning inference
accelerator or co-processor*

73%

General-purpose CPU or MCU*

56%

GPU

51%

DSP

49%

FPGA

43%

Other

6%

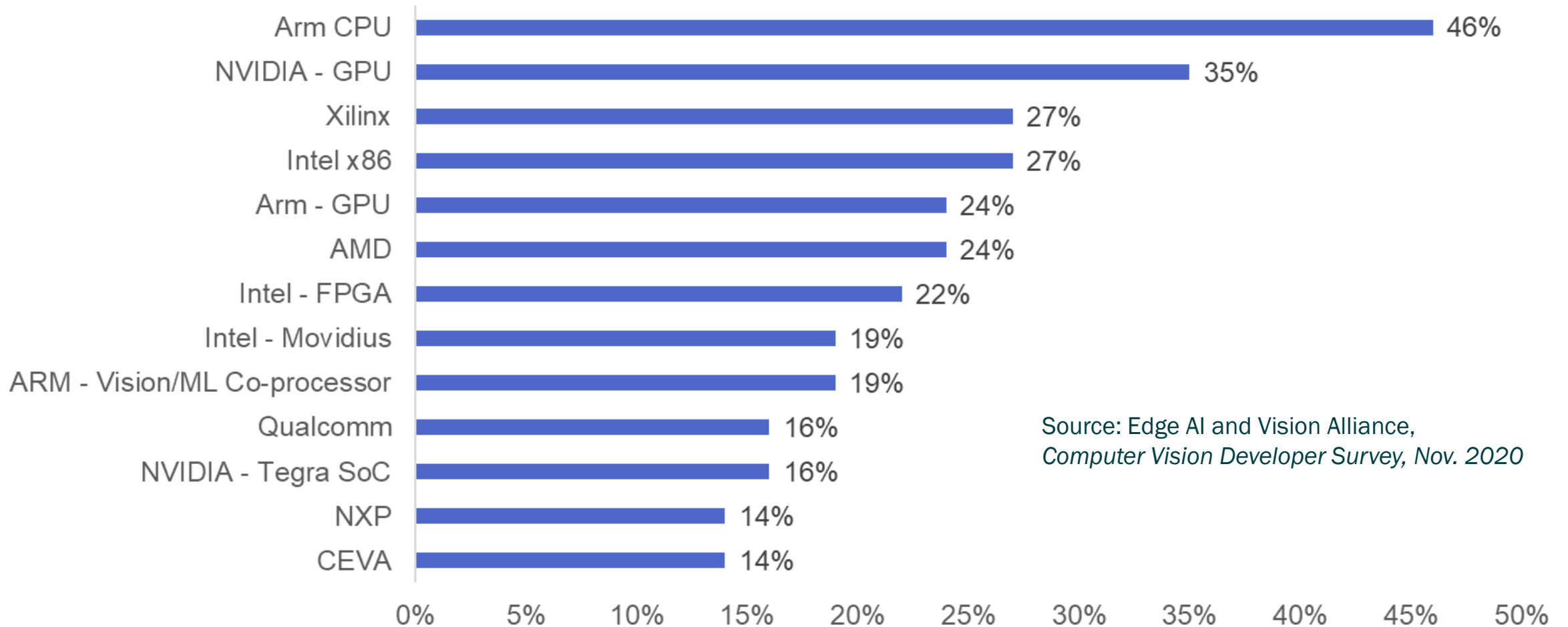
* Answer Options Modified in 2020

Ranked as one of top three

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, November 2020

Processors Used for Vision Tasks in Industrial Applications



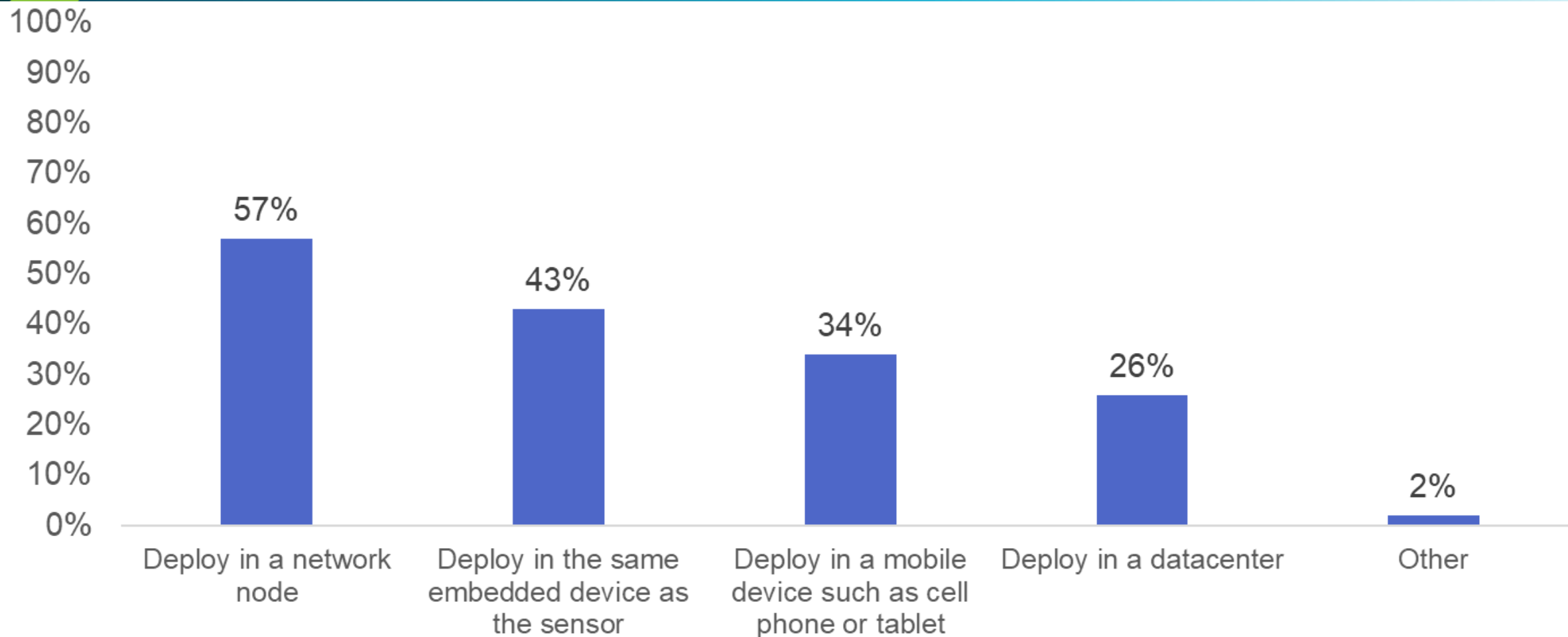
Source: Edge AI and Vision Alliance,
Computer Vision Developer Survey, Nov. 2020

A Golden Era of Embedded AI Processors (From the Embedded Vision and Visual AI Industry Map)



Silicon IP Processors

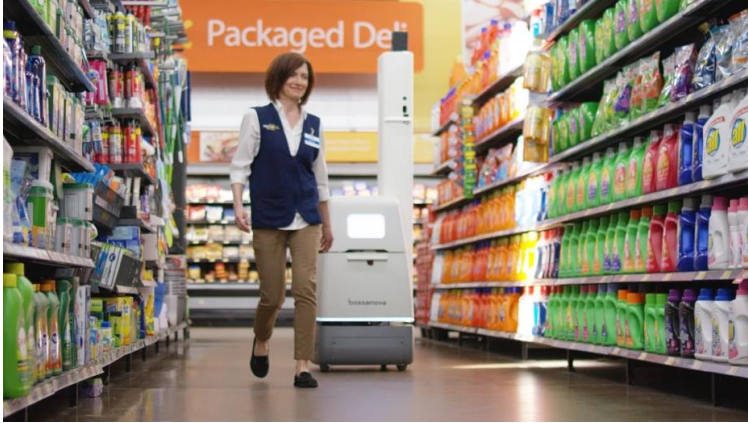
How is Your Neural Network Deployed



Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, November 2020

Applications: Autonomous Machines

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Source: Bossa Nova Robotics



Source: Seegrid



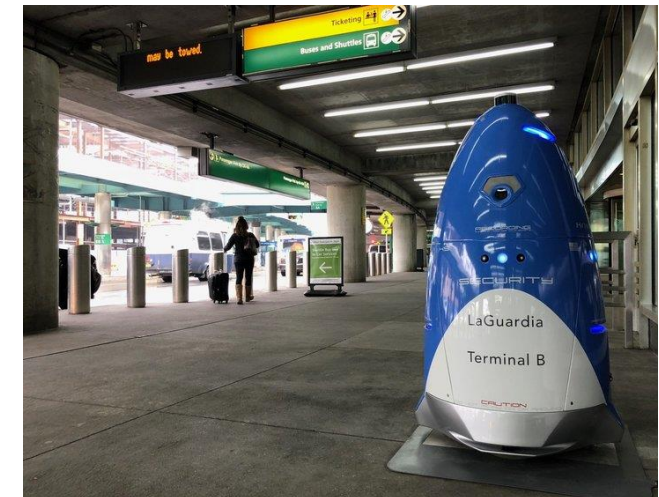
Source: iRobot



Source: Restoration Robotics



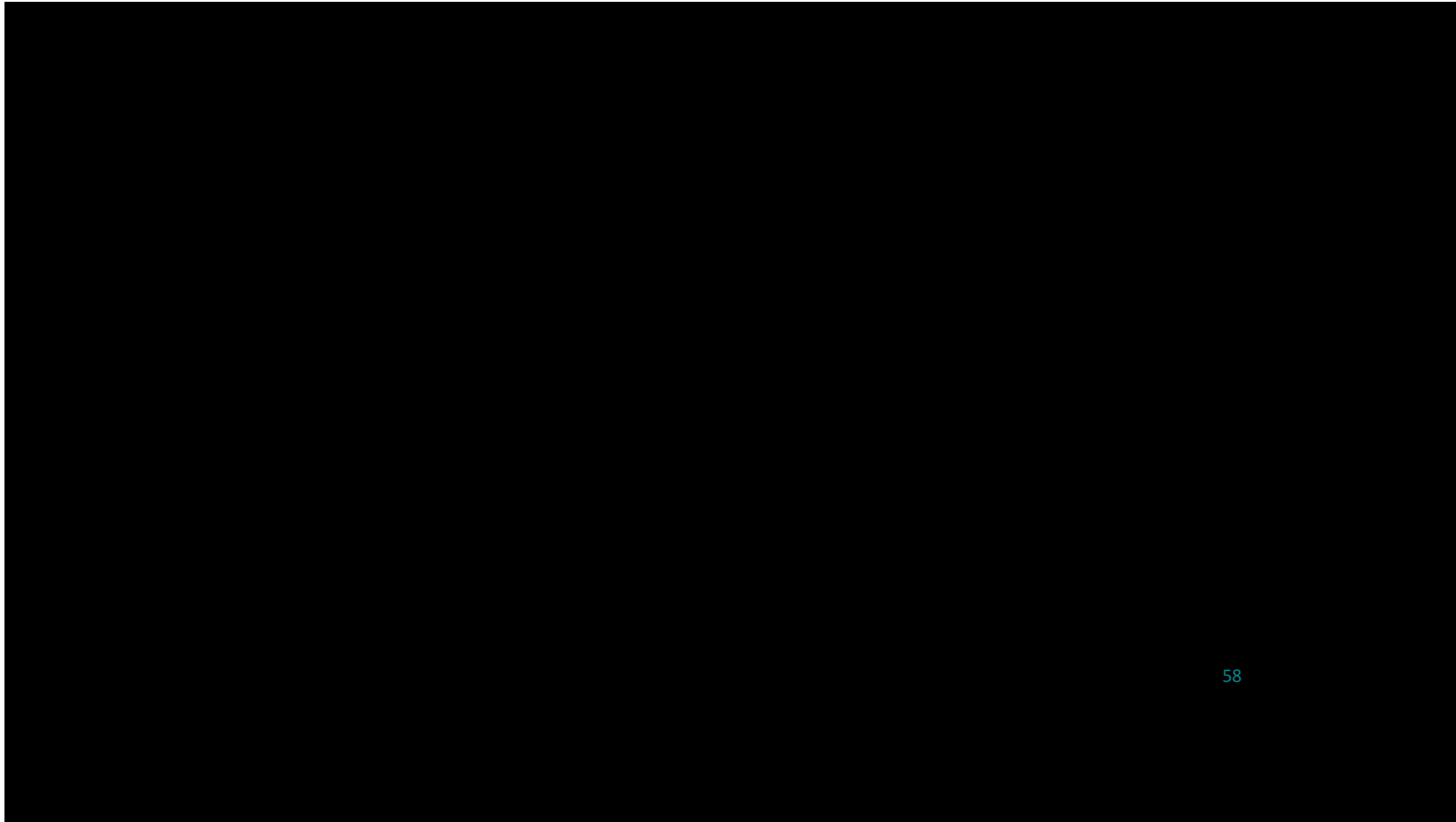
Source: Blue River Technology



Source: Knightscope

Skydio Self-Piloting Drone Surveys Roofs

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https://www.youtube.com/watch?v=MSy_06aOBzg



https://www.youtube.com/watch?v=kcmKD_jl9rc

Applications: Health and Safety

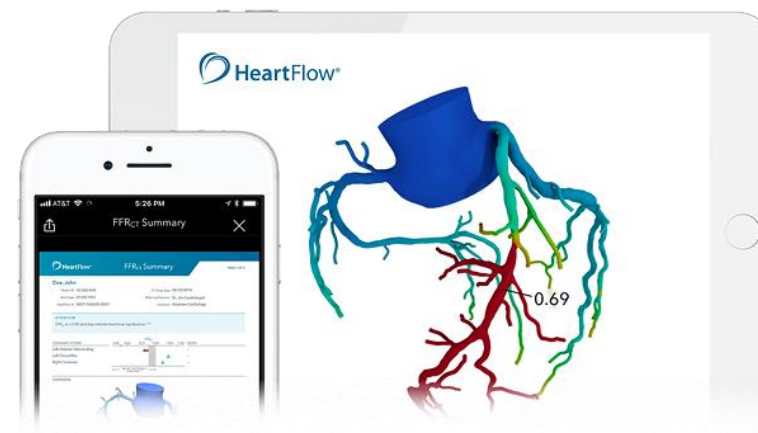
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Source: VirtuSense



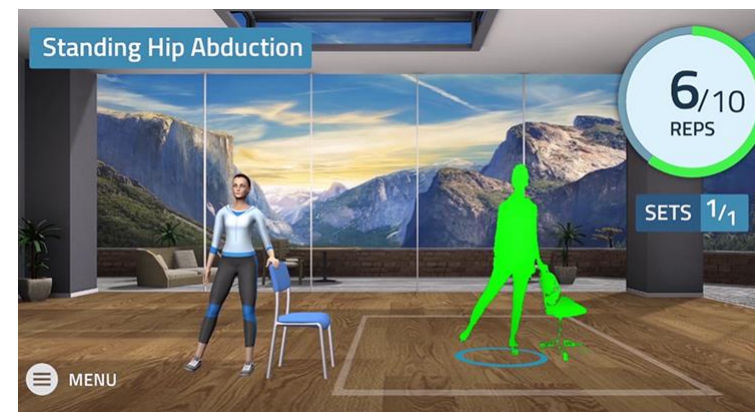
Source: Opternative



Source: HeartFlow



Source: SiGHT Diagnostics



Source: Reflexion Health

Millie Fit: Your AI Pilates Trainer

2021
embedded
VISION
summit



<https://www.youtube.com/watch?v=RYhWvJglcsE>



PARKING LOT

Empowering Product Creators to Harness Edge AI and Vision

2021
embedded
VISION
summit

The Edge AI and Vision Alliance (www.edge-ai-vision.com) is a partnership of ~100 leading edge AI and vision technology and services suppliers, and solutions providers

Mission: To inspire and empower engineers to design products that perceive and understand.

The Alliance provides low-cost, high-quality technical educational resources for product developers

Register for updates at www.edge-ai-vision.com

The Alliance enables edge AI and vision technology providers to grow their businesses through leads, partnerships, and insights

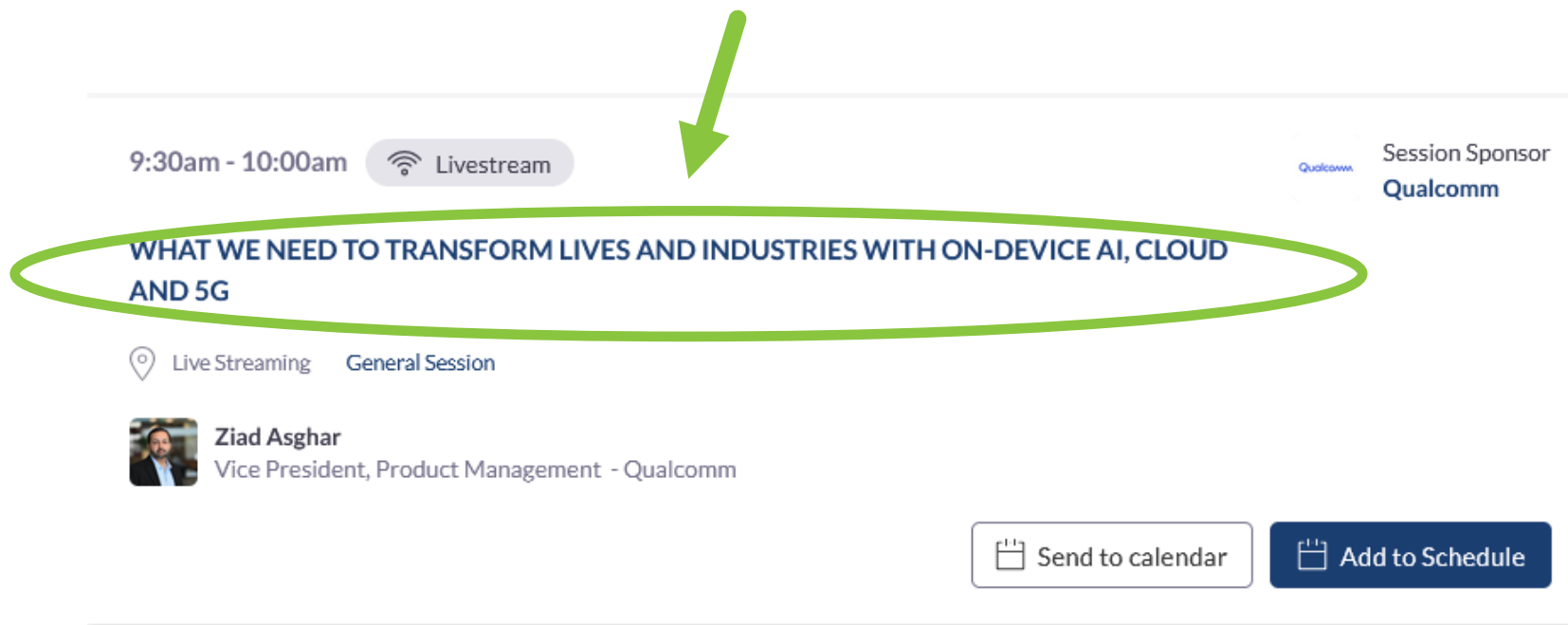
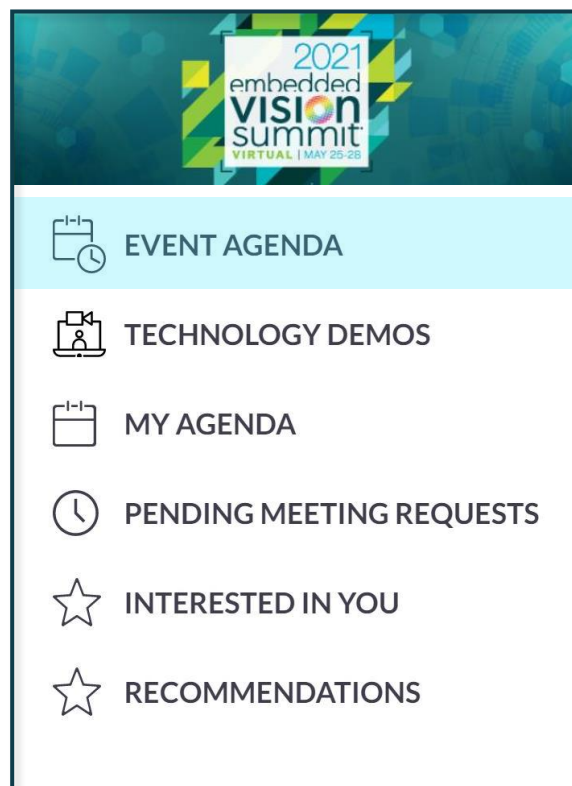
For membership, email us: membership@edge-ai-vision.com



edge ai + vision
A L L I A N C E™

Find It on the Agenda

Click on the session title for details...



...then press the “play” button to launch the stream.



Conference Tracks

2021
embedded
VISION
summit

FUNDAMENTALS

INTRODUCTION TO DNN MODEL COMPRESSION TECHNIQUES

 On-Demand Fundamentals



Sabina Pokhrel
Customer Success AI Engineer - Xailient

TECHNICAL INSIGHTS

A HIGHLY DATA-EFFICIENT DEEP LEARNING APPROACH

 Live Streaming Technical Insights



Patrick Bangert
VP of AI - Samsung SDSA

ENABLING TECHNOLOGIES

EFFICIENT VIDEO PERCEPTION THROUGH AI

 Live Streaming Enabling Technologies



Fatih Porikli
Senior Director - Qualcomm AI Research

BUSINESS INSIGHTS

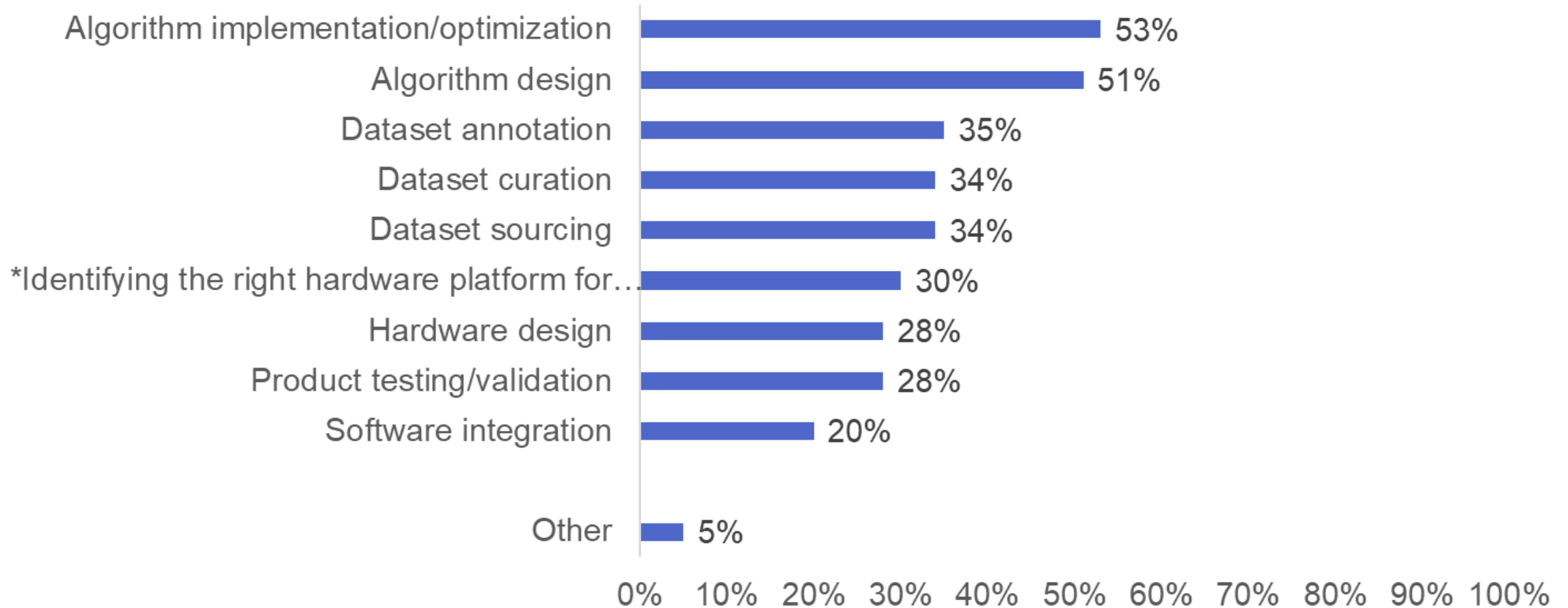
IMPROVING NURSING CARE WITH PRIVACY-SENSITIVE EDGE COMPUTER VISION

 Live Streaming Business Insights



Harro Stokman
Chief Executive Officer and Founder - Kepler Vision Technologies

Most Challenging Areas of Computer Vision Product Development



Source: Edge AI and Vision Alliance, *Computer Vision Developer Survey*, November 2020

CONGRATULATIONS 2021 WINNERS!

2021
EDGE AI + VISION
PRODUCT OF THE YEAR

Best
Edge AI
and Vision
Product



WINNER OF **BEST EDGE AI
SOFTWARE OR
ALGORITHM**

 **BlinkAI**
Night Video



WINNER OF **BEST EDGE AI
DEVELOPER TOOL**

 **EDGE IMPULSE**
Edge Impulse
EON Compiler



WINNER OF **BEST CONSUMER
EDGE AI END
PRODUCT**

 **eyetech**
EyeTech EyeOn



WINNER OF **BEST EDGE
AI PROCESSOR**

HAILO
Hailo-8 AI Processor



WINNER OF **BEST CAMERA
OR SENSOR**



**OpenCV AI Kit
with Depth**



WINNER OF **BEST
AUTOMOTIVE
SOLUTION**

 **MINIEYE**
In-cabin
Sensing Solution



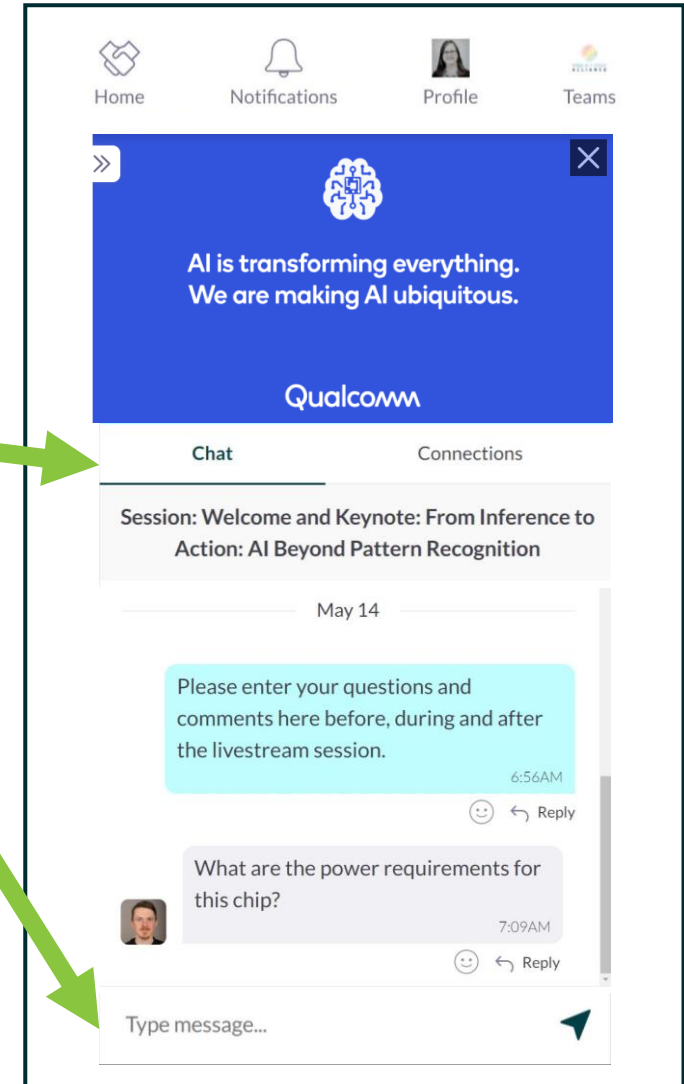
WINNER OF **BEST ENTERPRISE
EDGE AI
END PRODUCT**

simbe
Tally 3.0



Questions for the Speaker?

Ask your questions to our speakers any time using the Chat tab.



Variety of Session Formats



ENABLING TECHNOLOGIES

**For Vision and Edge AI,
Are Today's CPUs
Really Old-School?**



Gary Brown
Director of Edge AI
Marketing
Intel



AJ Frazer
VP Business
Development
Agent Vi



Sheldon Fernandez
CEO
DarWinAI



OVER-THE-SHOULDER

**From Start to Finish:
Build Industrial
Embedded ML Solutions
on CPUs and MCUs**



Daniel Situnayake
Founding TinyML Engineer
Edge Impulse



EXPERT BAR

**Q&A on Qualcomm
Snapdragon Camera
Technologies**



Judd Heape
VP of Product Management
for Camera, Computer Vision
and Video Technology
Qualcomm Technologies, Inc.



TECHNICAL INSIGHTS

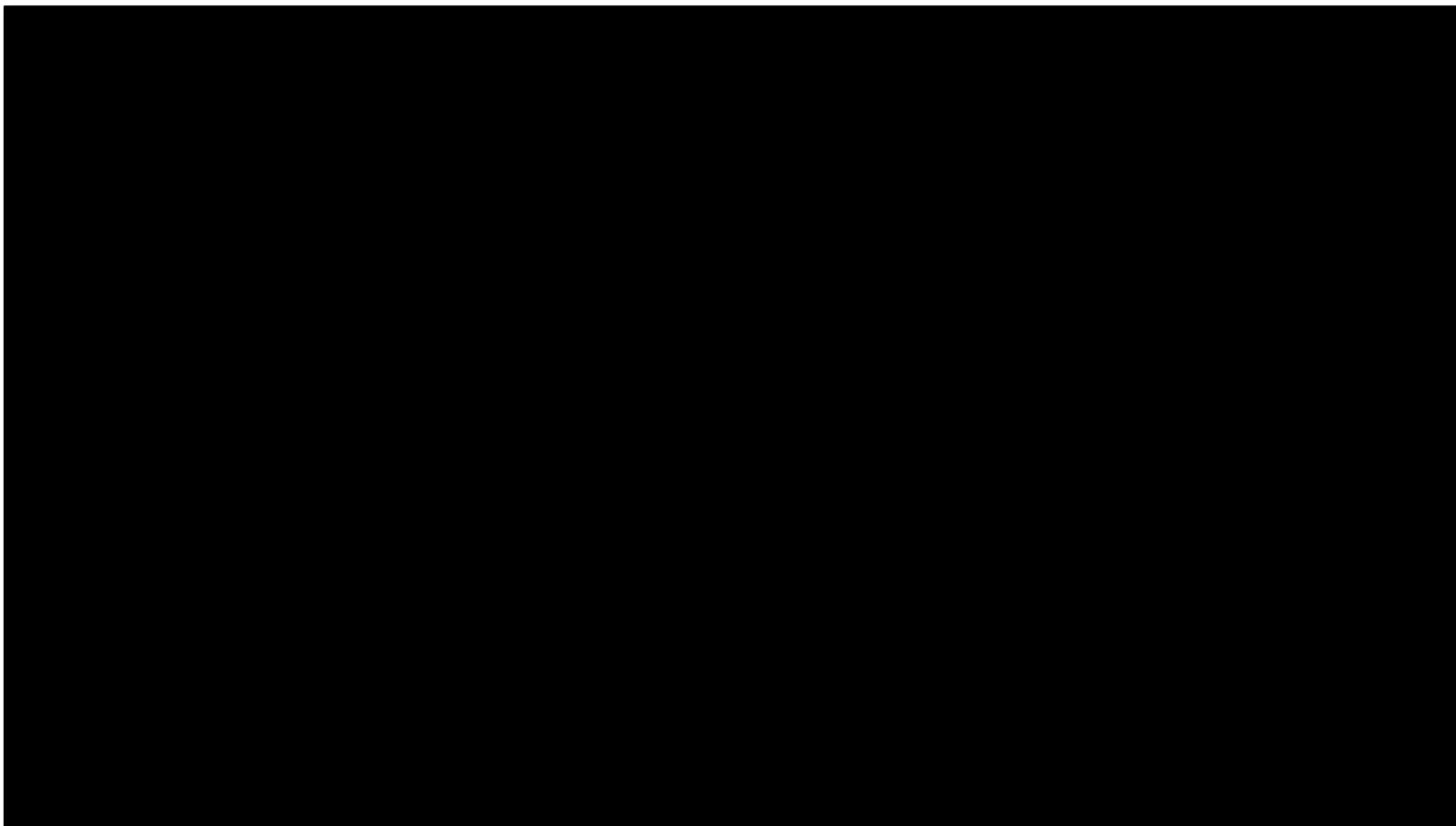
**Interview: Developing and
Deploying a Privacy-
Preserving Vision-Based
Sensor System for
Commercial Real Estate**



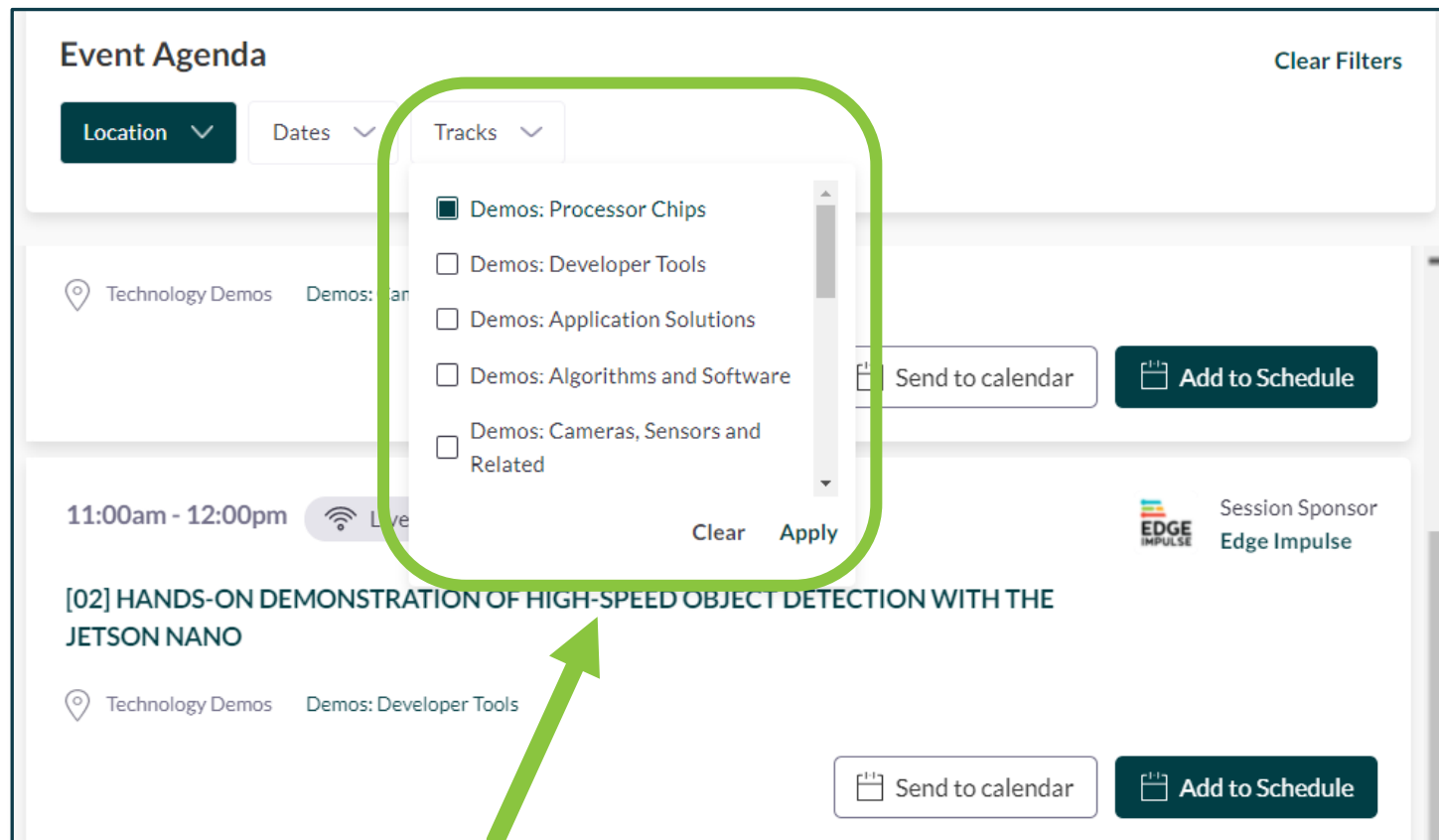
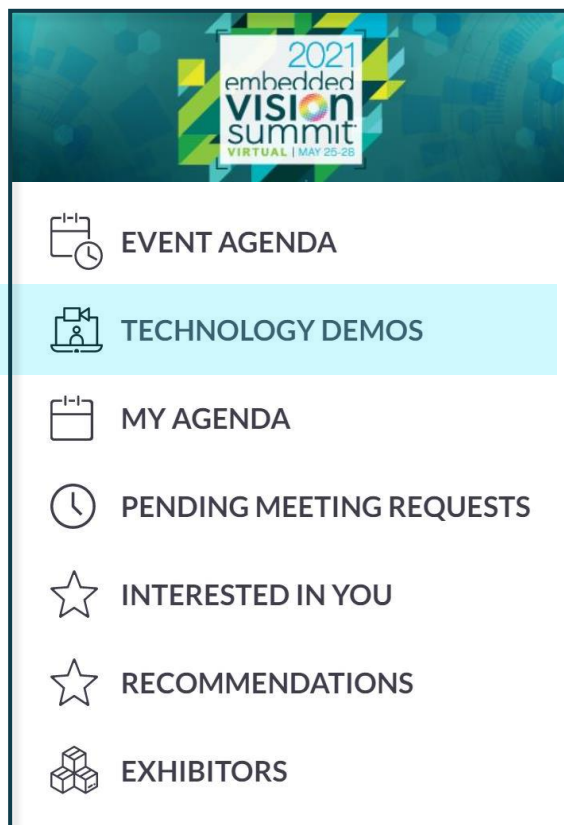
Luke Murray
Co-Founder and CTO
XYSense

Technology Demos Format

2021
embedded
VISION
summit

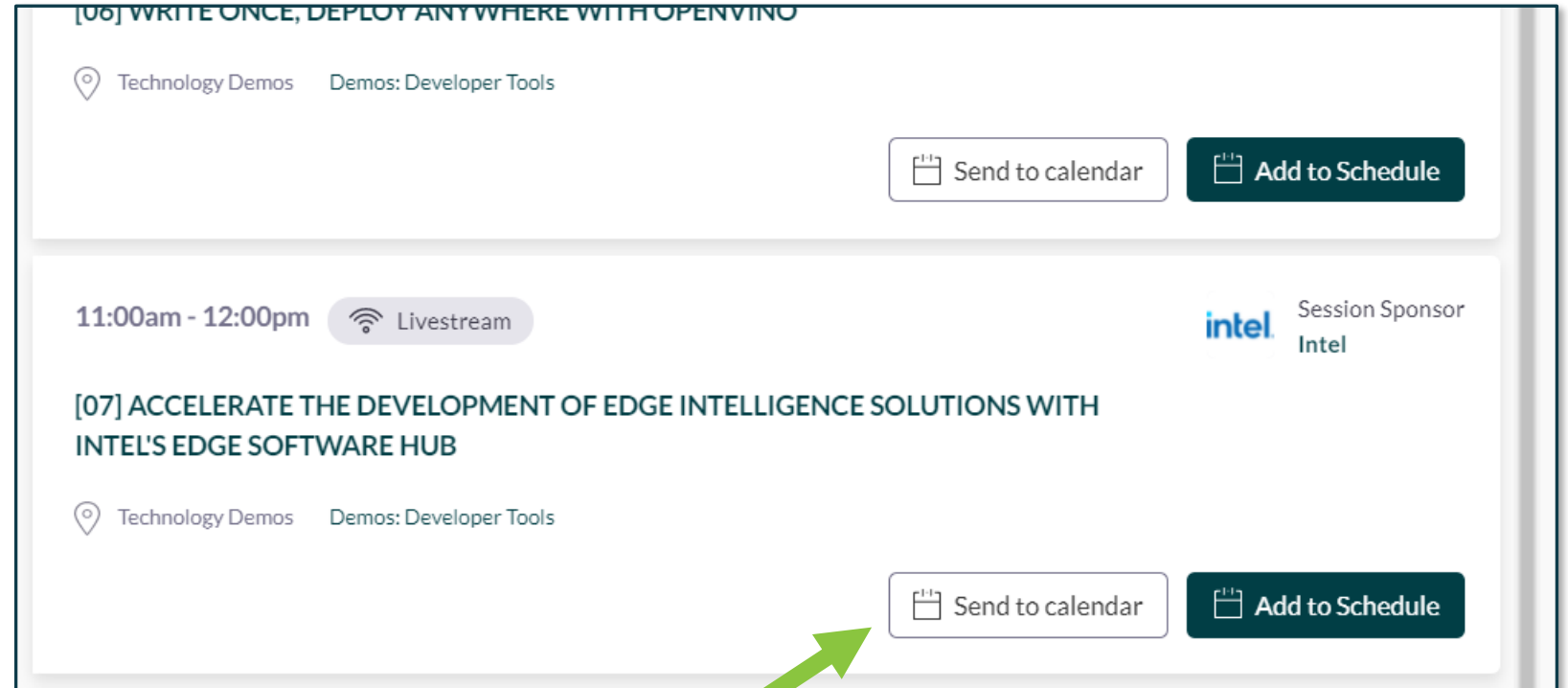
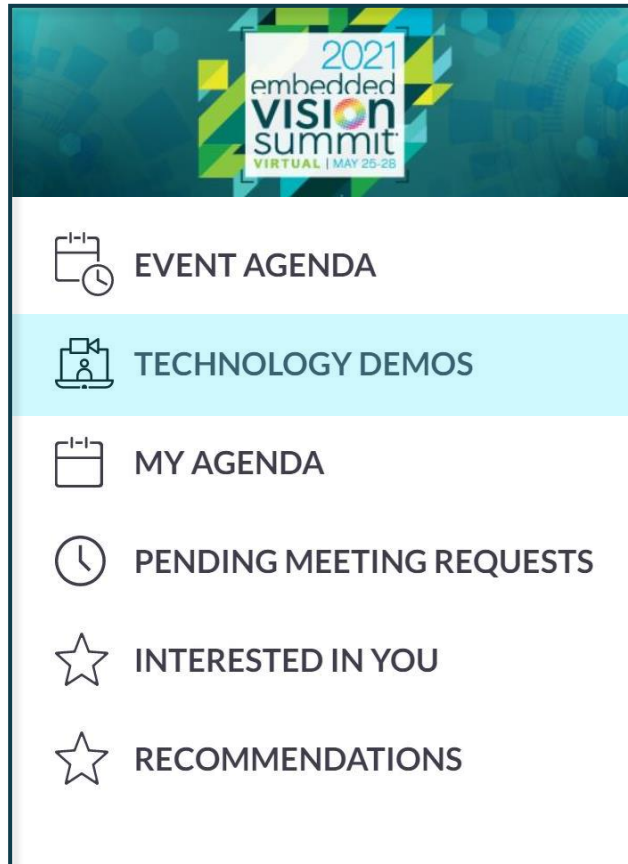


Filter the Demos



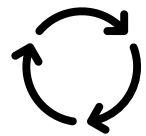
Filter by track to hone in the demos of interest to you

Add Demos to Your Calendar



Click “Send to Calendar” to add to your Outlook or Google calendar.

Problems with audio/video browser permissions?



Refresh your browser window.

Your browser is preventing access to your microphone.
[Learn how to allow access to your microphone.](#)

Still Need Help?


If you're still having trouble...

Reach out to our support team via the Chat or Help icon in the lower left of your screen.



Meet with Exhibitors

2021
embedded
VISION
summit



Qualcomm

Qualcomm Exhibitor
AI is transforming everything. We are making AI ubiquitous.

Qualcomm

[Message](#) [Interested](#)

Details
Products or Services Offered
Processor Boards and Modules, Silicon IP, ICs and SoCs, Development Tools, Standards and Camera Modules

Meetings with Qualcomm

View As: [Amy Ardzrooni](#) ✓
Qualcomm Representative: [Ben Cohen](#) ✓

[+ Request a meeting](#) ^

Invitees
[Ben Cohen](#) +

Date
Monday 05/24/2021 ✓

Time
5:15pm - 5:30pm (America/Los_Angeles) ✓

Location
Virtual Meeting Room ✓

Personal Message
Why would you like to meet? Adding a personal message increases acceptance rates by 30%

25 meeting requests left until you reach the pending meeting limit.

[Cancel](#) [Send](#)

**Request a meeting
to efficiently
get expert answers
to your questions!**

Daily Remarks with Jeff Bier

Update or remove

On **May 28** (Fri.) at 9 am PT I will:

- Recap Summit highlights from the past day or two
- Preview what's coming up next
- Share data and insights, including:
 - Results from the Edge AI and Vision Alliance's *Computer Vision Developer Survey*
 - Observations on key technology and industry challenges
 - "Lighthouse" applications
 - Market research highlights
- Join me!

Thursday 27 May

9:00am - 9:30am

 Livestream

INTRODUCTION TO TODAY'S PROGRAM - HOW TO GET THE MOST OUT OF THE SUMMIT

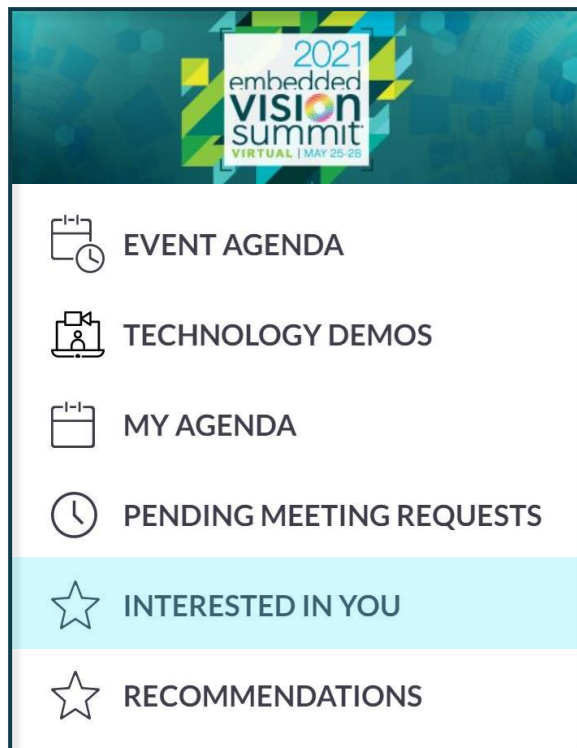
 Live Streaming General Session



Jeff Bier


Founder, Edge AI and Vision Alliance / President, BDTI - Edge AI and Vision Alliance

See Who Wants to Connect With You...





Interested In You


List of profiles who have shown interest in you. By showing interest in these profiles you become connected and will be able to chat.



Chetan Khona Speaker
Director, Industrial, Vision, Healthcare & Sciences - Xilinx

 Show Interest

 Request a meeting ▾

 Skip

Potential Handshake
Chetan Khona is interested in meeting you.

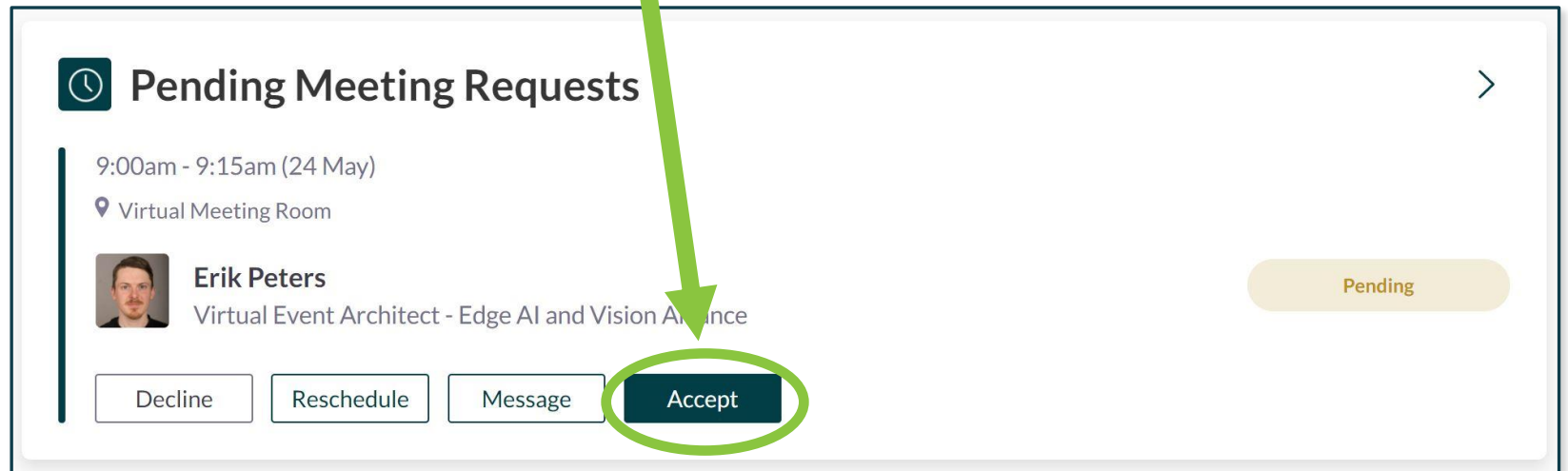
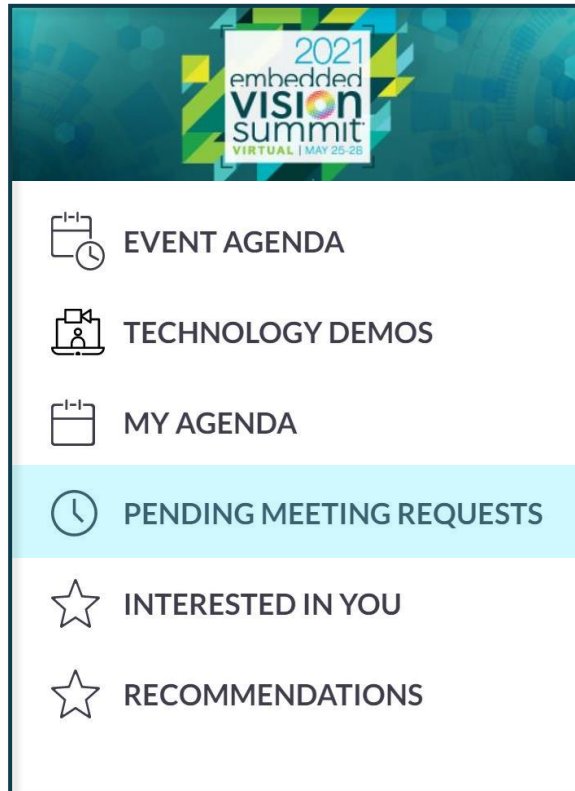
Common Connections
You are both connected to Jeff Bier and 2 others

Common Swipes
You are both interested in Edge AI and Vision Alliance

Click
“Show Interest”
to complete
the connection.

See Who Wants to Meet With You...

Accept meeting requests to schedule live conversations **with colleagues.**



2020 David Patterson Keynote

- Domain-specific architectures (DSAs) are the way forward
- Domain-specific languages are key to exploiting DSAs
- Importance of the software stack
- Raising the hardware/software interface enables processor innovation

Don't have a slide on Patterson – maybe mention in passing.

- Less is more: It's harder to come up with simple solutions, but they accelerate progress
- **Take the time for a quantitative approach**
 - **Good benchmarks are essential**
- The market is impatient!

