

Autonomous Driving: the missing piece

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Outline



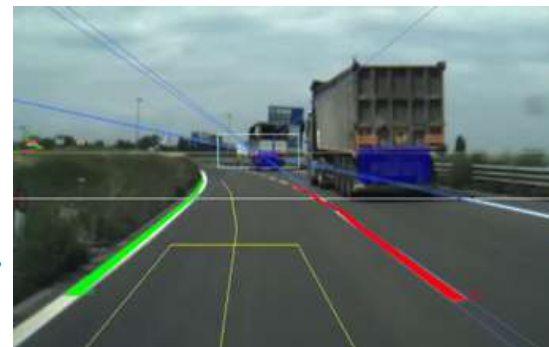
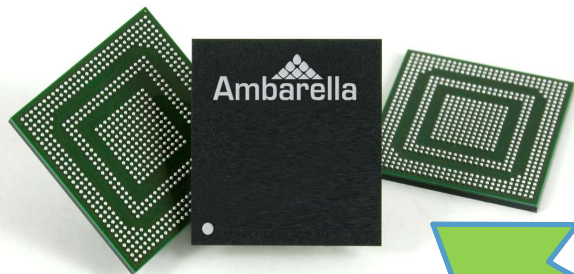
1. Company introduction
2. Autonomous Driving technology
3. Current directions

- Early '90s: University research group
- 2009: Spin-off created
- 2015: VisLab acquired by Ambarella Inc.

Ambarella

+

VisLab



Chip Design



- Designing specialized chips for **computer vision & AI**



- How to make sure our products match the customers' needs?

Chip validation



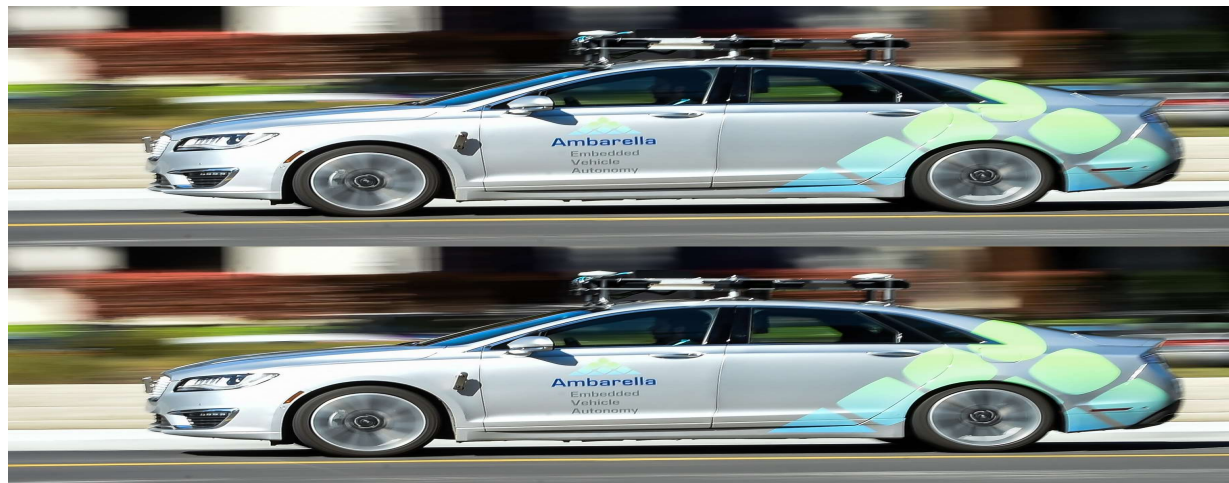
- Develop the **complete** Autonomous Driving stack, incl:

SW: perception, decision making, vehicle actuation

HW: chip, cameras, cabling, vehicles fleets

Tools: mapping, recording, ground truth collection

Capabilities: test drivers/operators, safety procedures, regulations



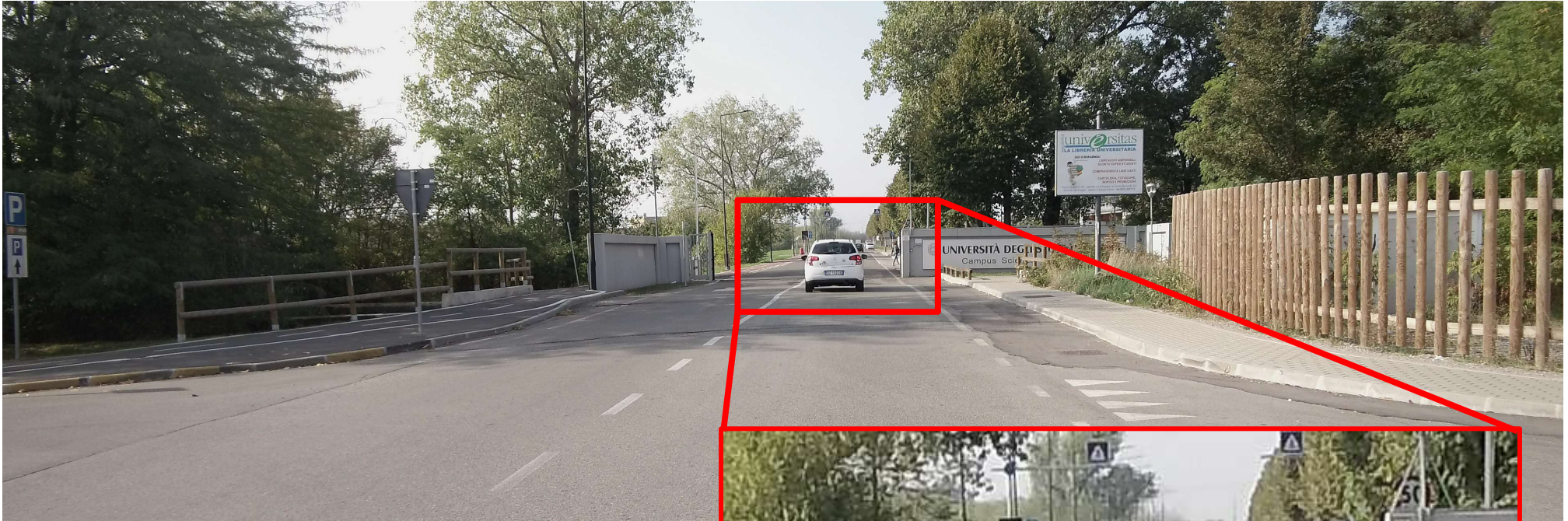
Sensing technology



- Choosing the sensing technology... Lidar?



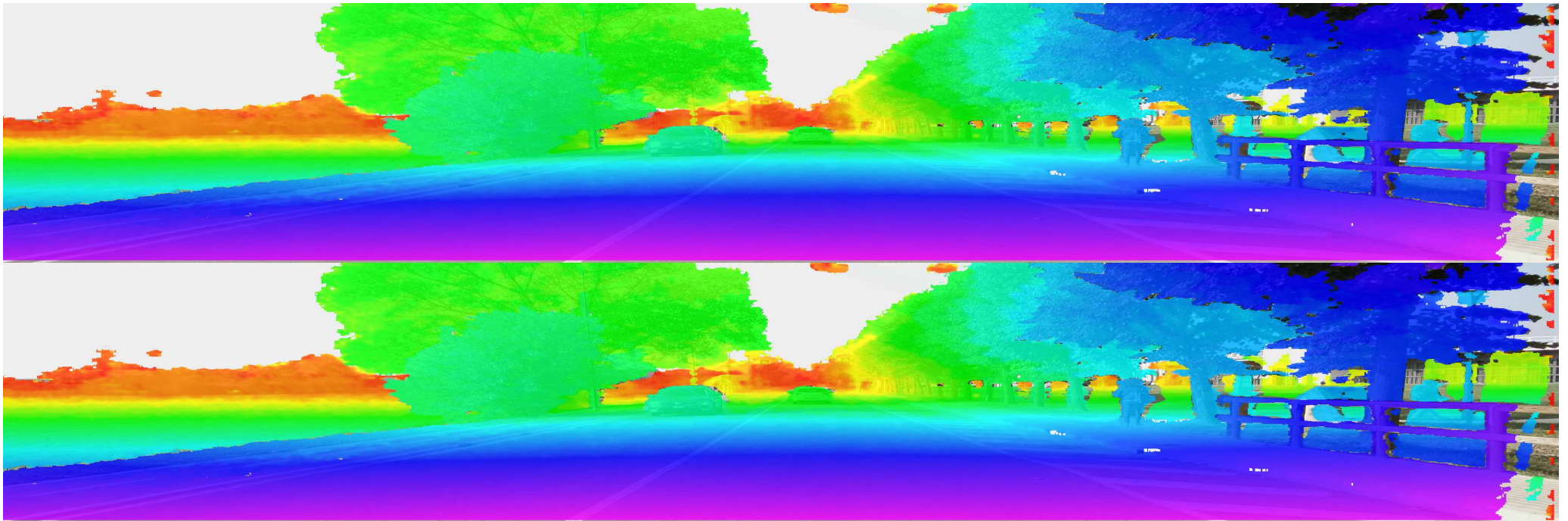
4k Image Resolution



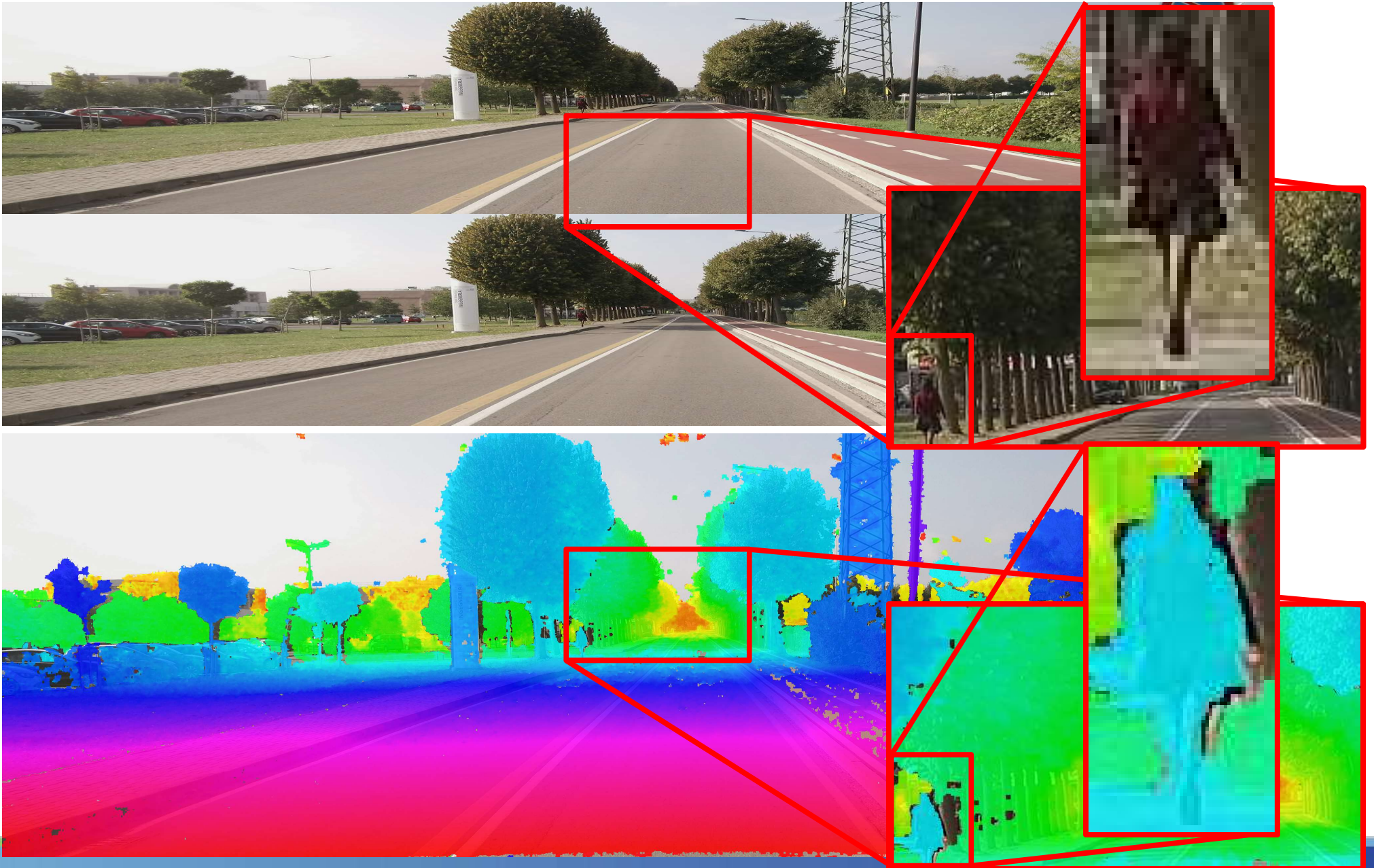
4k, cropped (3840 x 1280)
~70 deg horizontal Field Of View



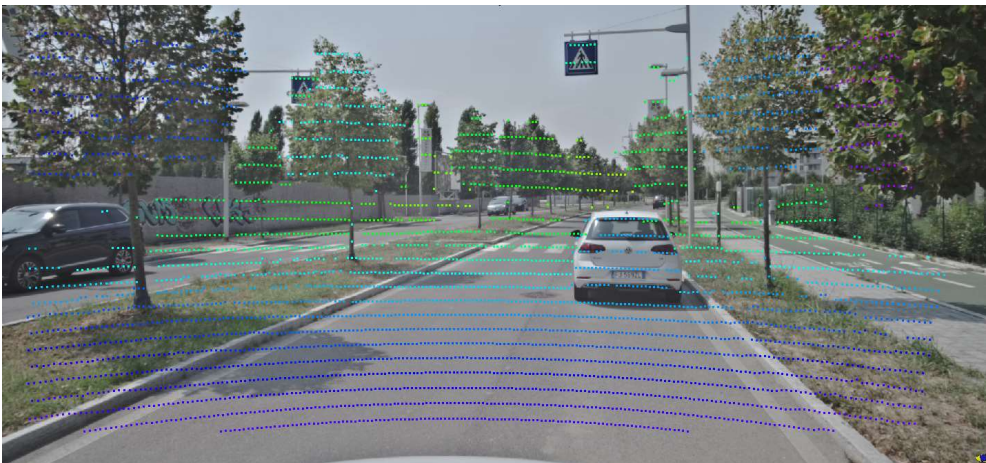
Stereovision



4k Stereo Vision



Stereo vs Lidar



Stereo vs Lidar



Stereo vs Lidar



Chip design



- Stereo vision is hardcoded into our chip family



CNNs



- Deep Learning techniques are providing stunning results



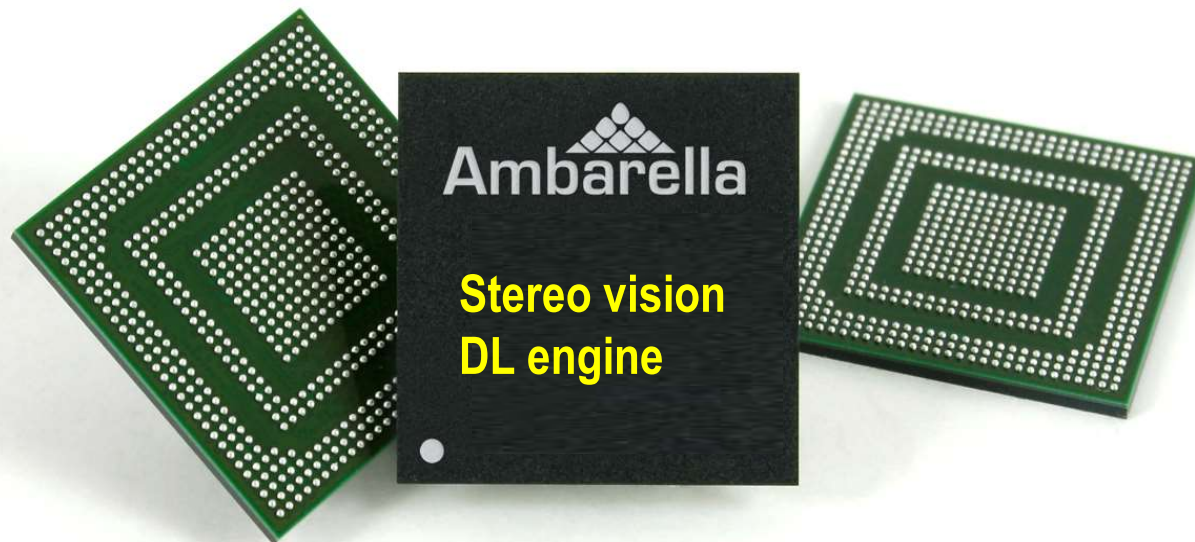
Taken from www.youtube.com/watch?v=rB1BmBOKKTW

- From smart algorithms to extremely large datasets involving training systems and on-board processing

Chip design



- Stereo vision is hardcoded into our chip family
- Engines for CNNs are also hardcoded



Chip design

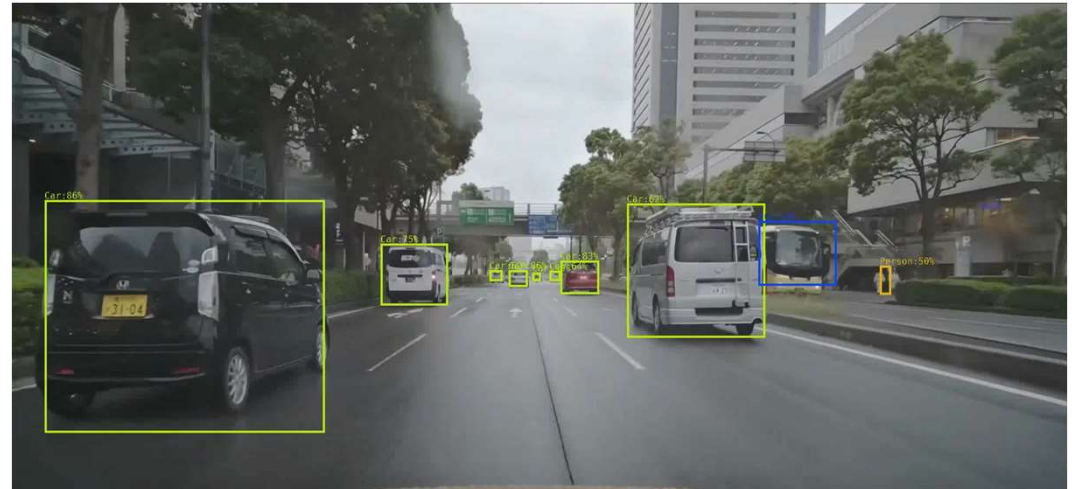
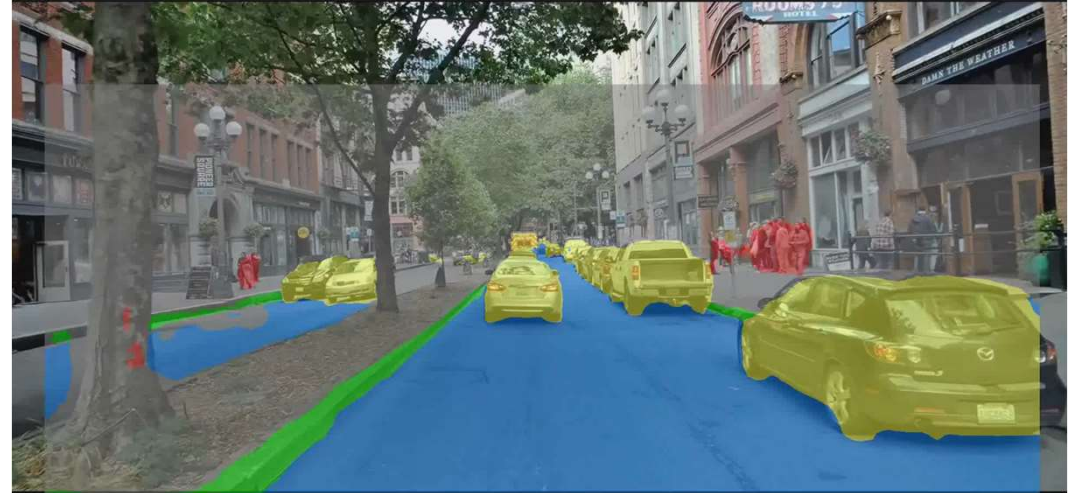


- Stereo vision is hardcoded into our chip family
- Engines for CNNs are also hardcoded



- Low Power consumption
- Hi-res image processing at video rate

Examples



Conclusion



- Autonomous Driving is extremely hot
- AD players started focusing on sw techniques
- As technology matures and production nears, full solutions (hw+sw) are required
- Extremely powerful and efficient *edge processing* (on board) is a requirement for series production