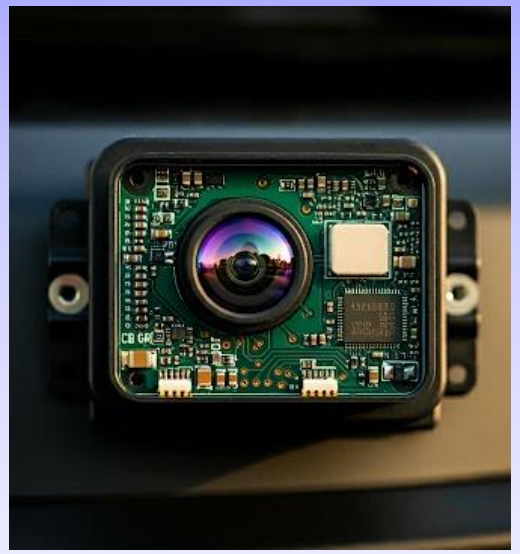

ENABLING
THE NEW ERA OF
AUTOMOTIVE AI
AD2.0

THE CHALLENGE OF AI IN AUTOMOTIVE

Covering Affordable Safety and Autonomous Driving

1 Affordable Safety

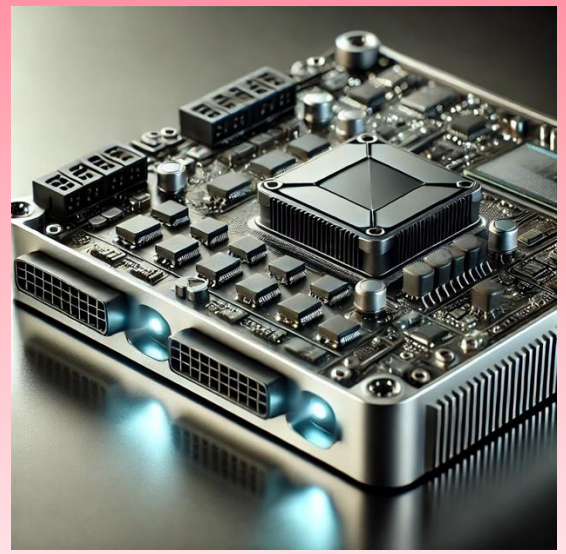
Monopoly



1V(1R) Expensive due to proprietary solution

2 High-Cost ADAS

Saturated “Red Ocean”



Centralized compute with more sensors – no autonomy

3 Robotaxi

Limited geo-fenced fleets

Autonomy, but not affordable for consumers

4 Autonomous Driving

No viable, mature solutions

Affordable autonomy L2++ sensor suite – 7V1R

CURRENT AI APPROACHES

for Autonomous Driving

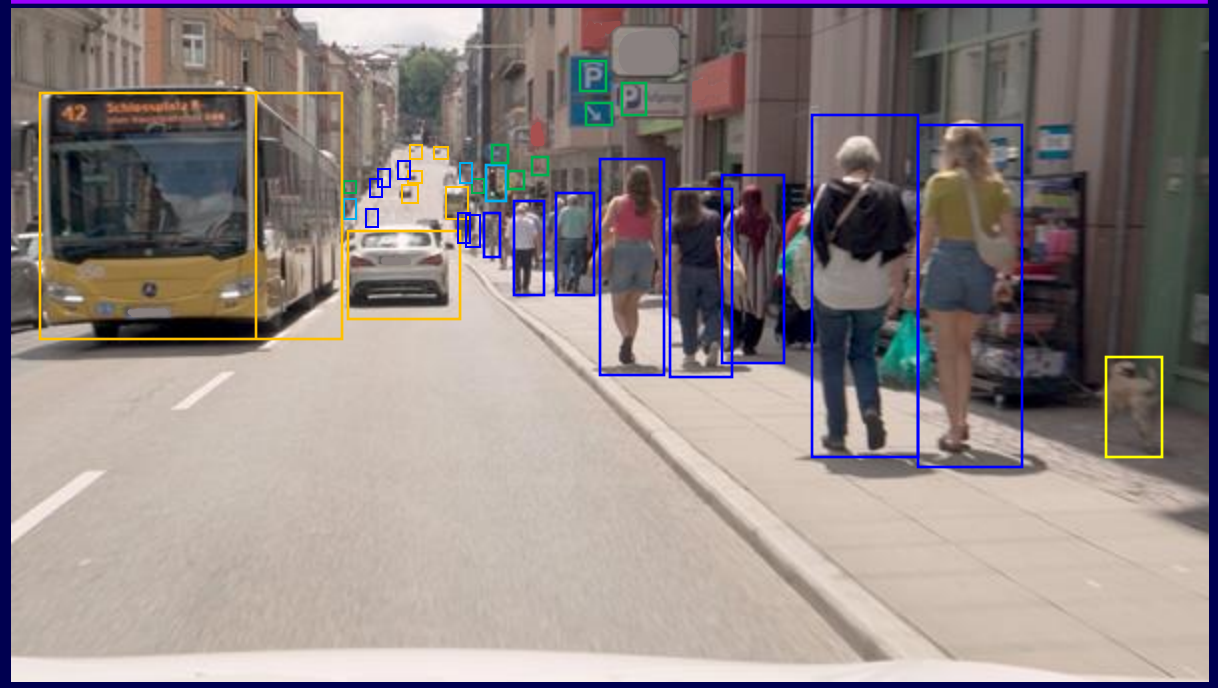
Compound Architecture – e.g. Mobileye

Monolithic End-to-End – e.g. Tesla

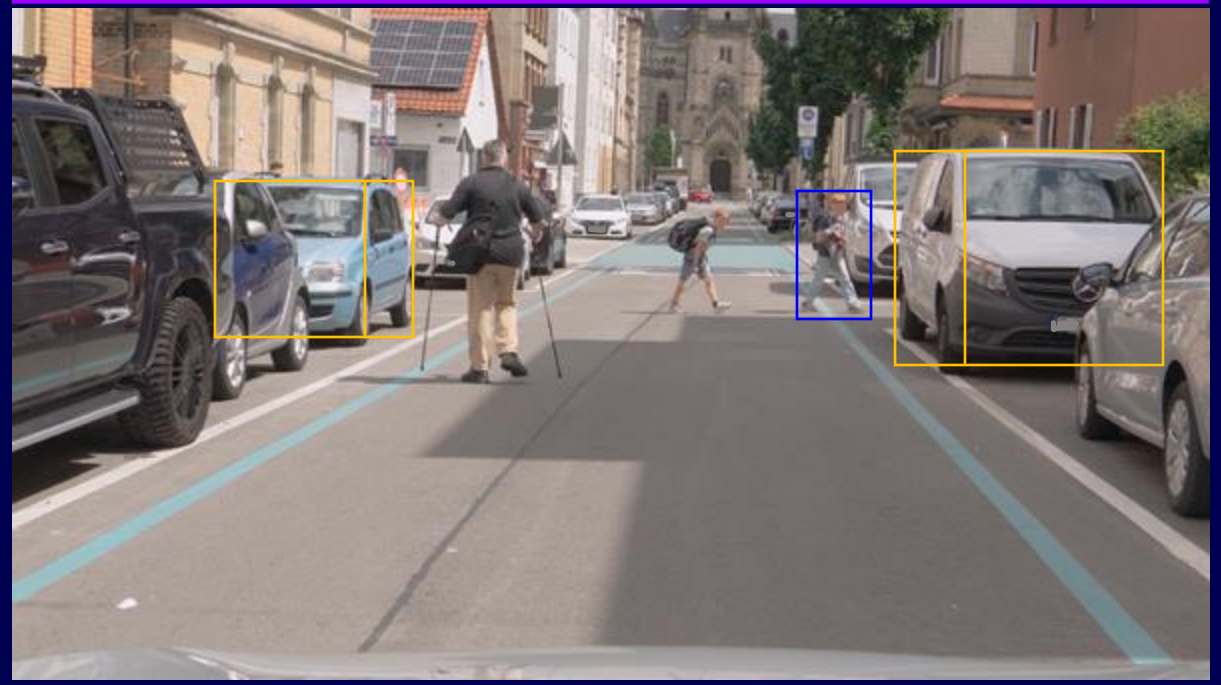
COMPOUND AI LIMITATIONS

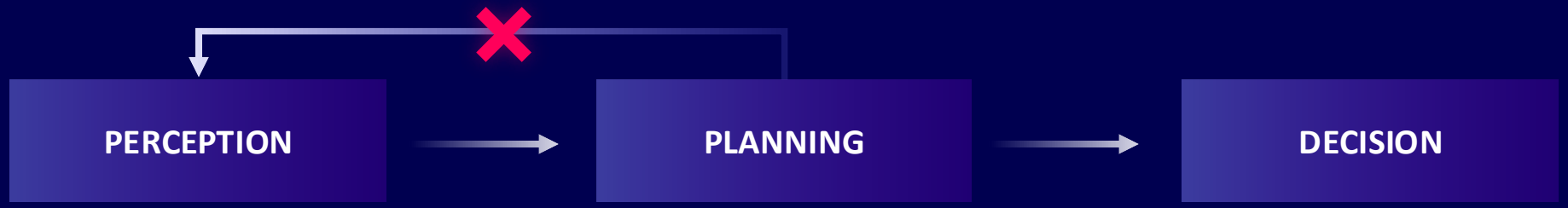
Perception – Decision Information Bottleneck

Too much irrelevant information



Lack of information





COMPOUND AI LIMITATIONS
Cost

Manual Labeling

- **Massive data needs**
- **Labeling costs**
- Prone to human **bias and error**

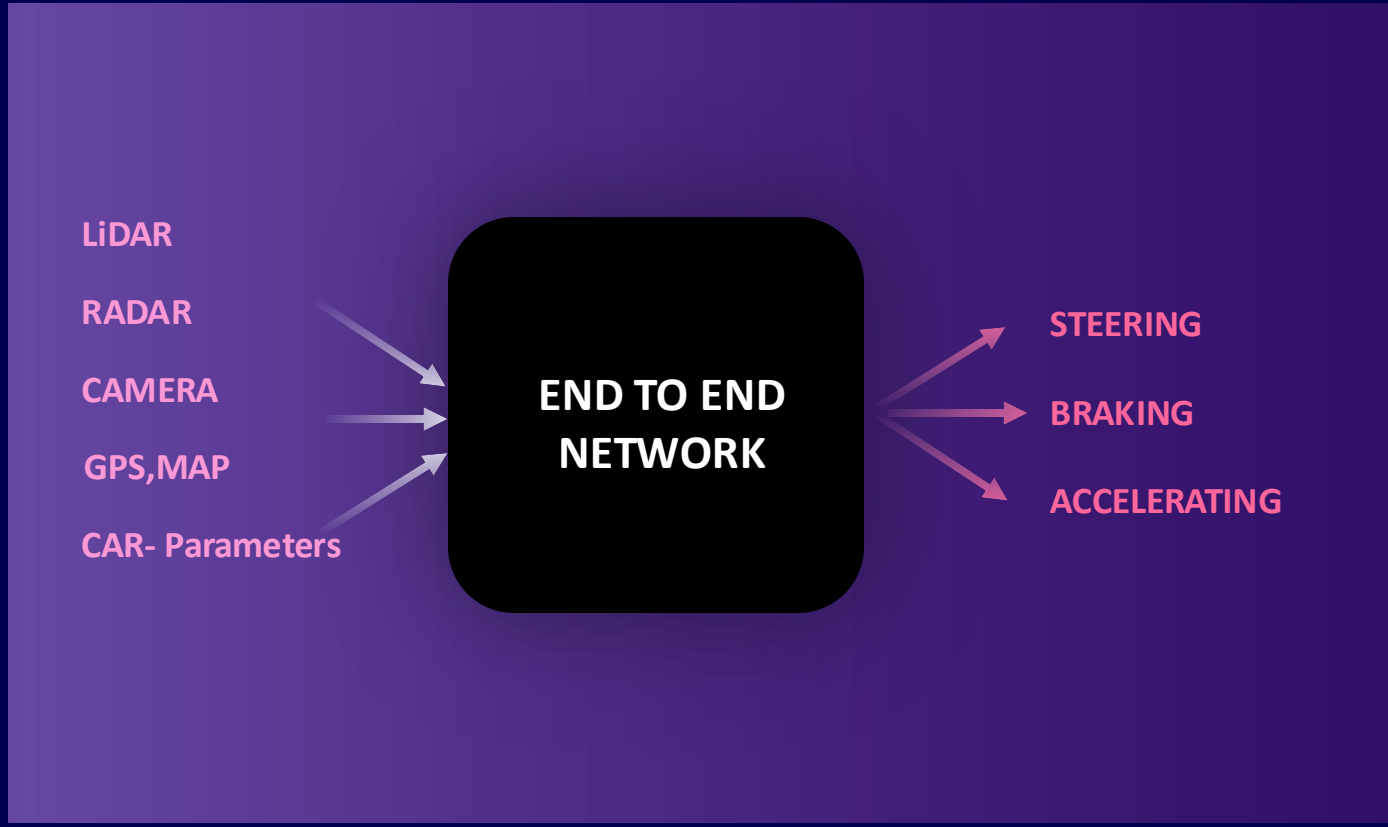
MONOLITHIC END-TO-END AI LIMITATIONS

Black Box

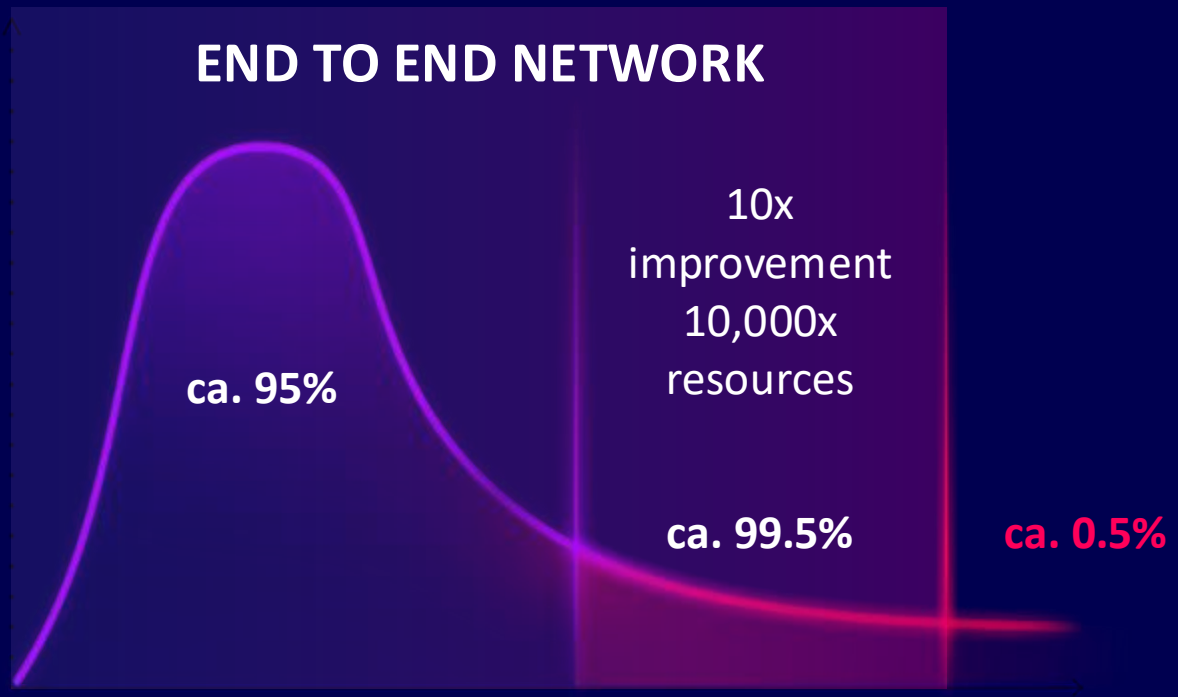
High Complexity Black Box

Lacking

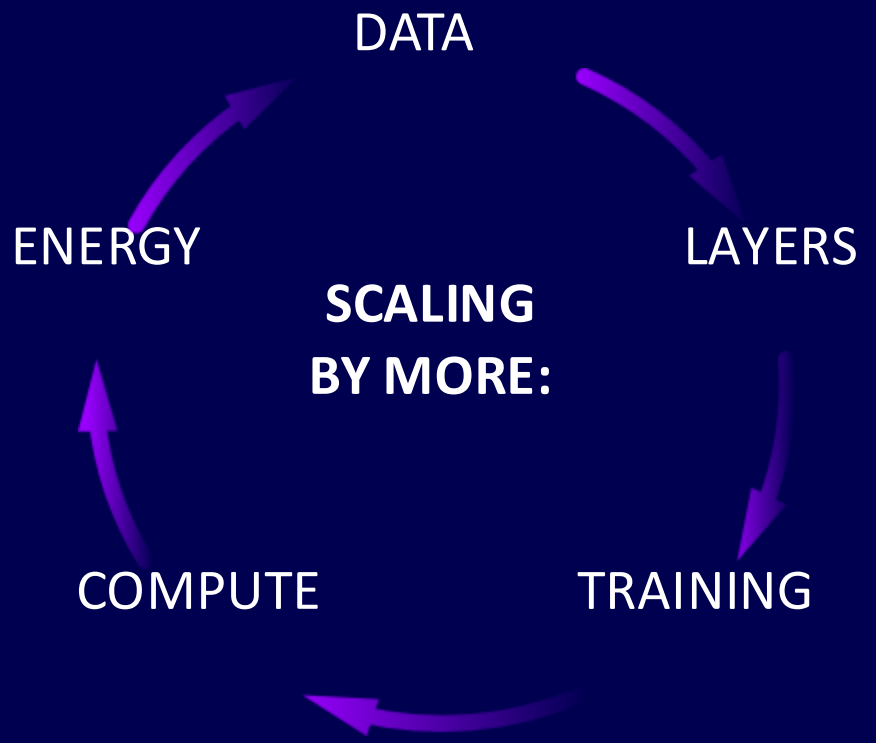
- **Transparency**
- **Explainability**
- **Traceability**



MONOLITHIC END-TO-END AI LIMITATIONS
Diminishing Returns



Real-World Driving Scenarios



DRIVING IS DESIGNED
FOR HUMANS

DRIVING IS DESIGNED
For Humans

- Driving features are designed for humans
- Human brain = best reference for AD
- Use non-human technologies only on top and not instead of human-level driving

> A major part of real-world AI has to be solved to make unsupervised, generalized full self-driving work, as the entire road system is designed for biological neural nets with optical imagers
>
> **Elon Musk**, CEO Tesla

ADAPTIVE INTELLIGENCE
Of The Human Brain

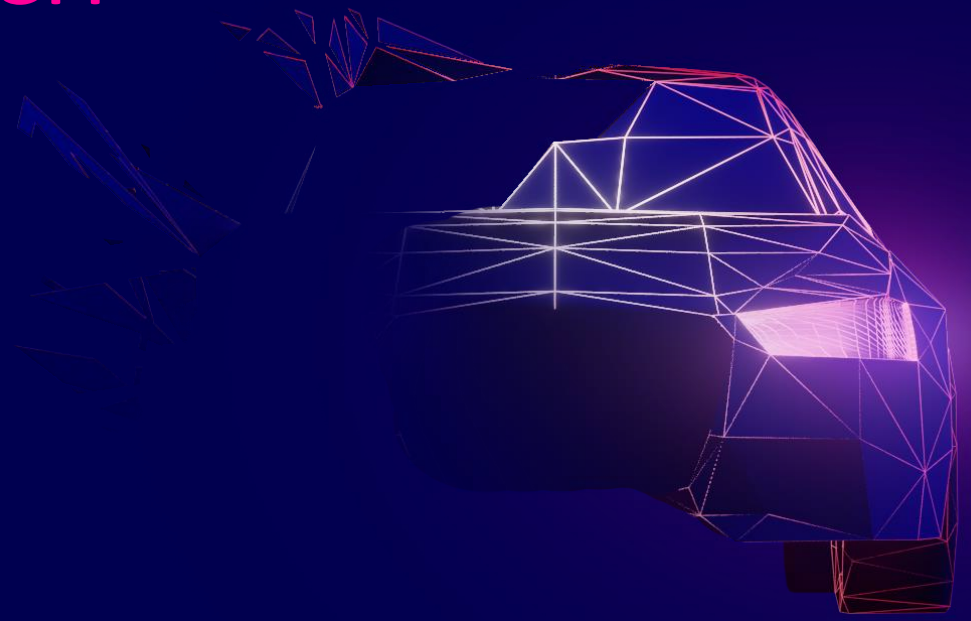
Holistic Understanding

“See the whole”

Context Switching

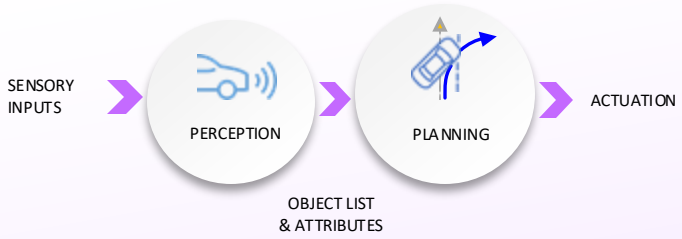
“Only the relevant”

ENABLING AD2.0 WITH A NEW AI APPROACH



A NEW KIND OF AI
Addressing Automotive AI Challenges

Compound Architecture



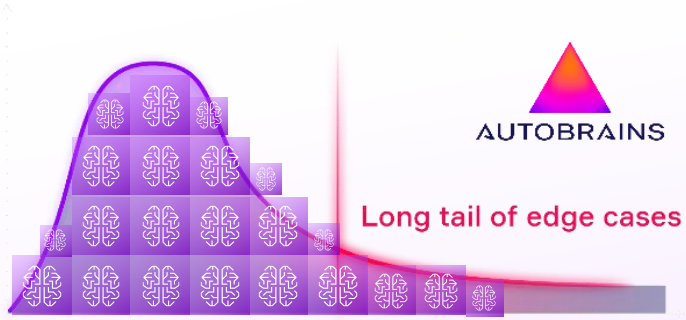
Separate models: perception - planning

Monolithic End-to-End

Real-World Driving Scenario Distribution

Single end-to-end neural net

Scalable E2E - Skills



Real-World Driving Scenario Distribution

Ensemble of modular E2E networks (**Skills**), each optimized for a specific driving scenario

VERSION UPDATE

Monolithic E2E

Supervised retraining of full network

Version 2

Version 1 → Version 2

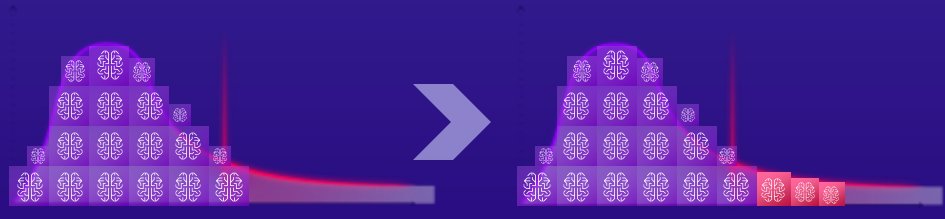
Full Version Replacement

VS

Scalable E2E

Continuous and modular Self-Learning

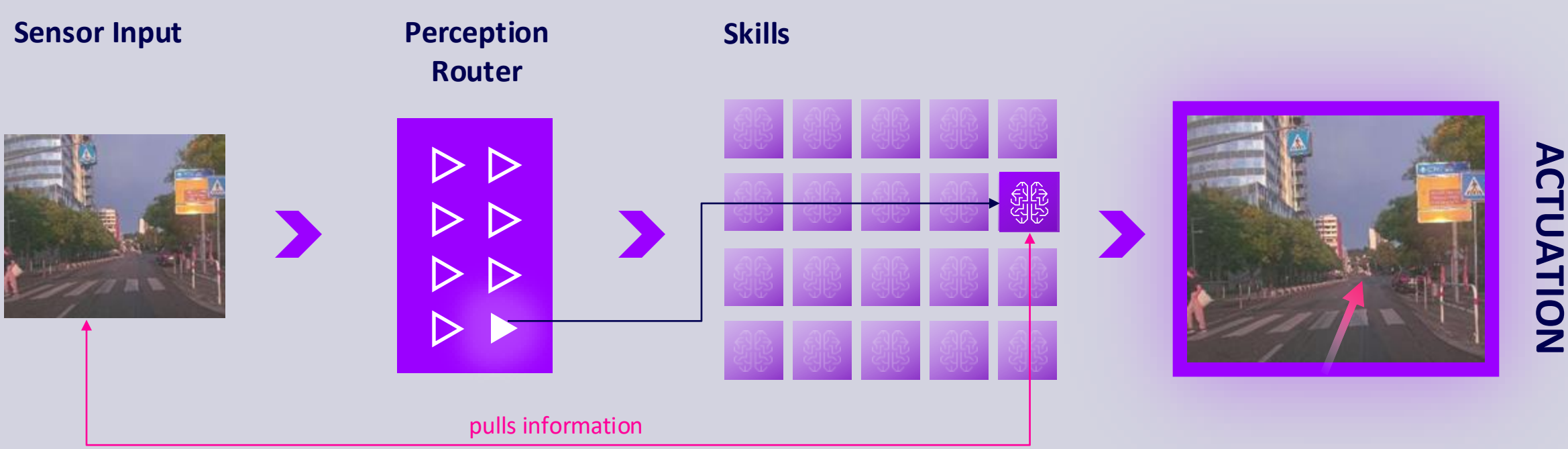
Adding Skills

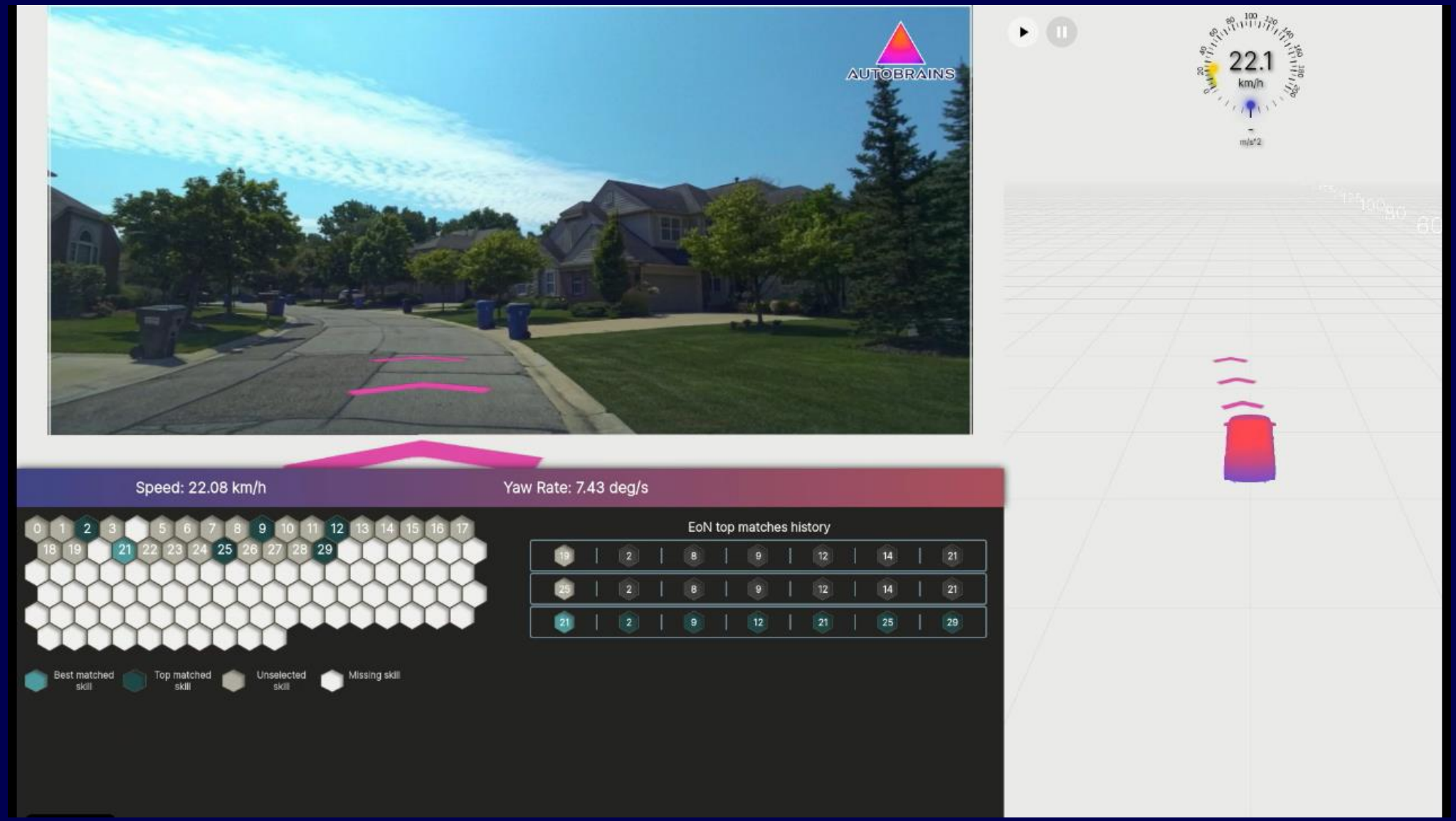


N Skills → + n Skills

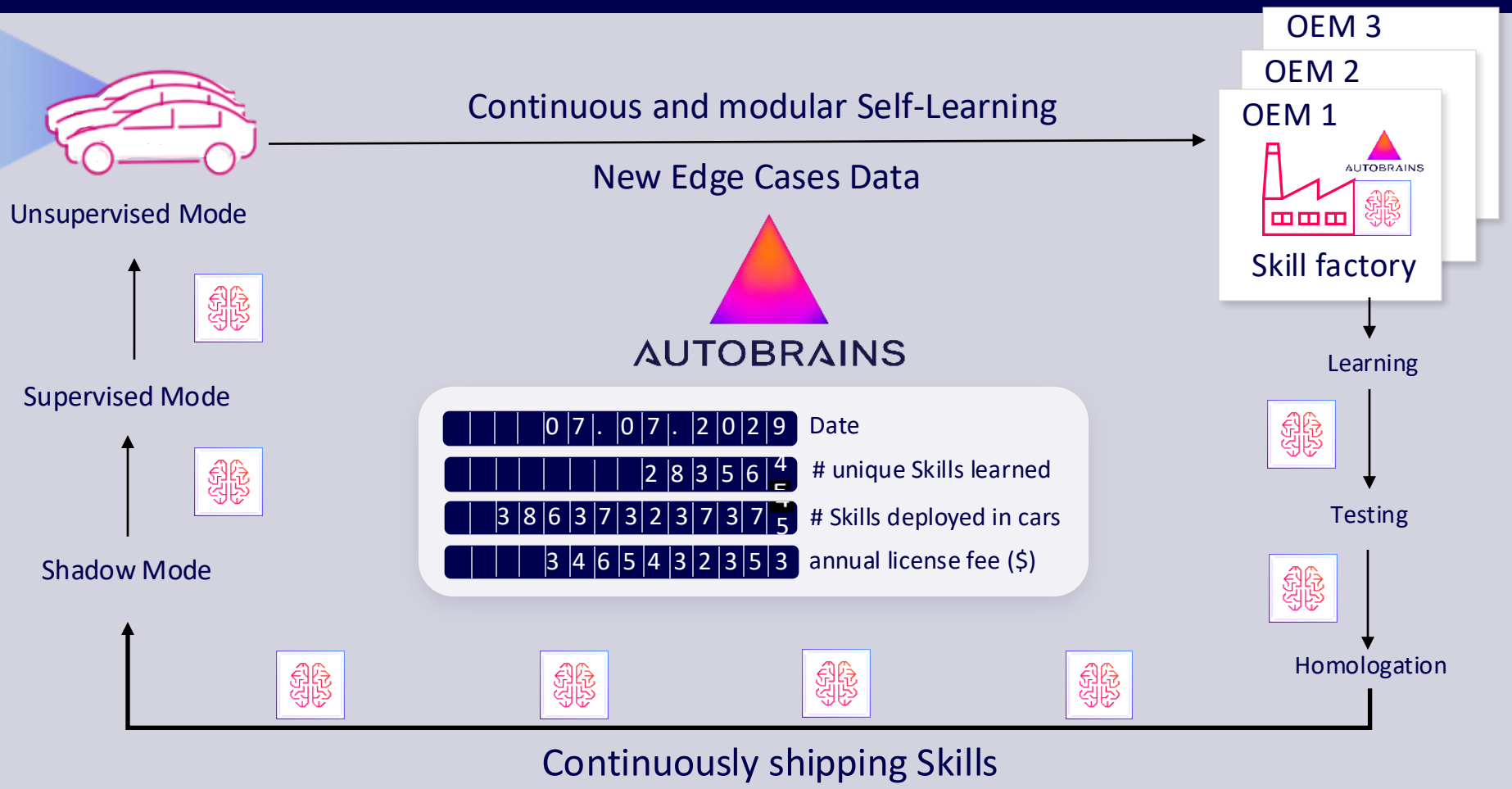
Gradually Adding Skills

AUTOBRAINS' SKILLS
In-Vehicle Implementation



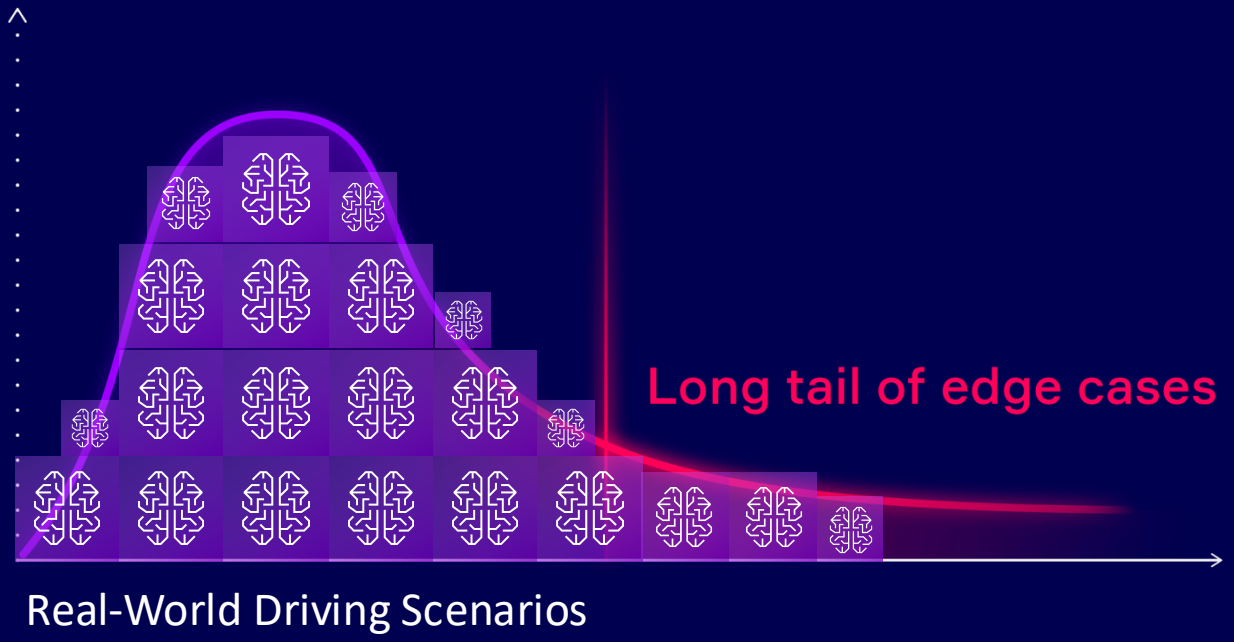

AUTOBRAINS
22.1
km/h
Speed: 22.08 km/h
Yaw Rate: 7.43 deg/s
0 1 2 3 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 21 22 23 24 25 26 27 28 29
Best matched skill
Top matched skill
Unselected skill
Missing skill
EoN top matches history
19 2 8 9 12 14 21
25 2 8 9 12 14 21
21 2 9 12 21 25 29

AUTOBRAINS' SKILLS
Life Cycle Model



AUTOBRAINS' SKILLS
Meet the AD Requirements

- ✓ Optimized E2E for Edge Cases
- ✓ Explainability
- ✓ Low compute
- ✓ Shorter cycles
- ✓ Incremental learning
- ✓ Modular architecture



THANK YOU

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