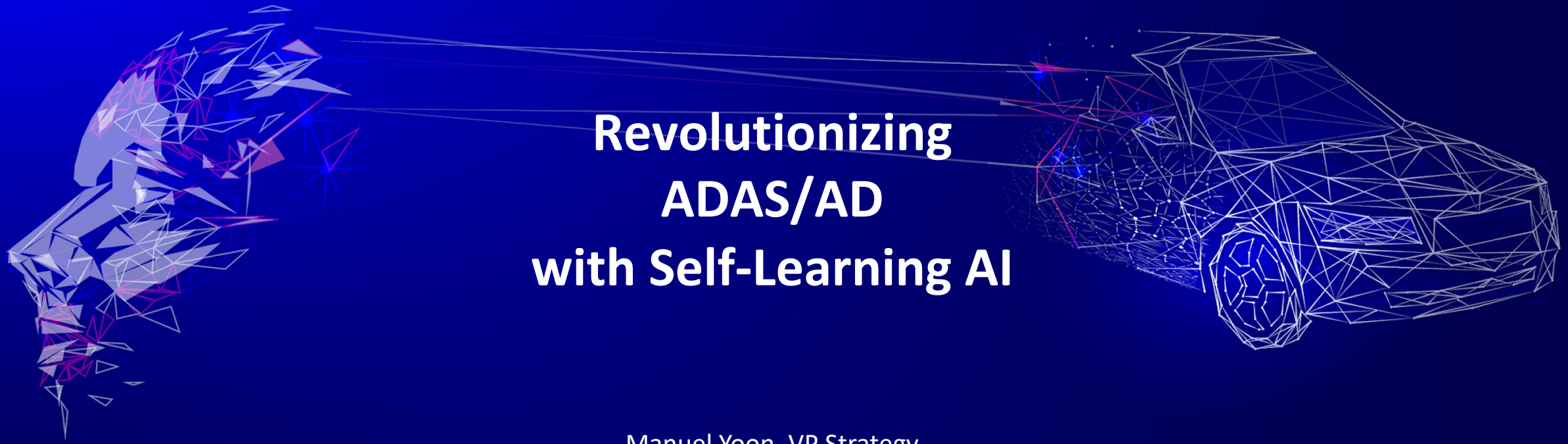
AUTOBRAINS



Revolutionizing ADAS/AD with Self-Learning AI

Manuel Yoon, VP Strategy

Potsdam - November 2nd 2023

$>100 bn

GLOBAL INVEST IN AV TECH

AUTOBRAINS

cruise
Oasis

AI GAPS IN AUTOMOTIVE

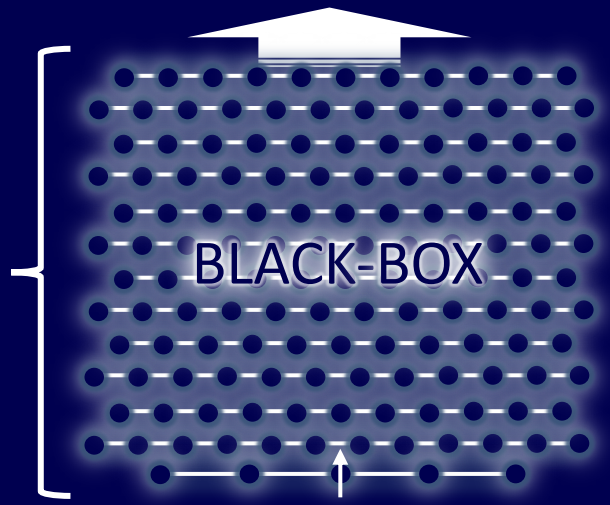
ADAS & AD ARE BASED & DEPENDENT ON THE RIGHT AI TECHNOLOGY

AUTOBRAINS

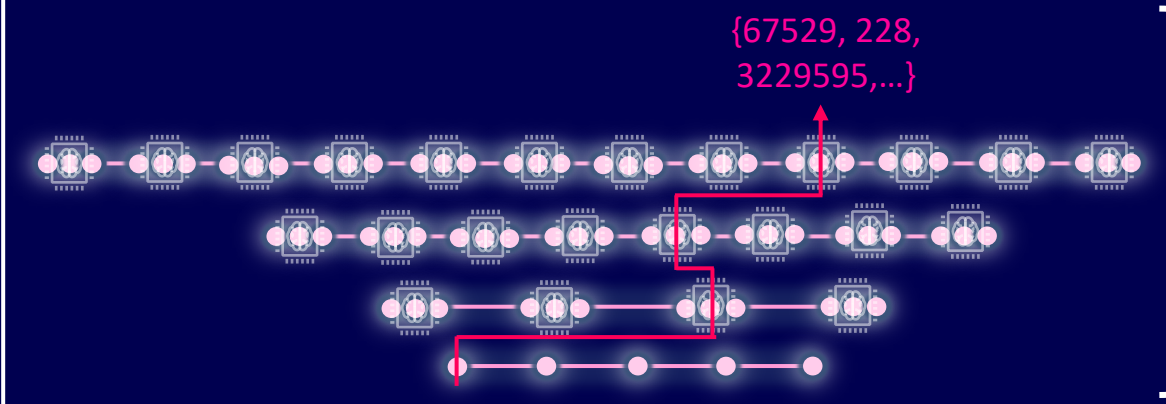
Supervised Deep Learning vs. Autobrains' Self-Learning

Trained on labelled data to classify

Output: Bounding Boxes



SUPERVISED DEEP NEURAL NETWORK



ADAPTIVE NEURAL NETWORK FOR SIGNATURE GENERATION

Trained to generate representations/ signatures that are:

- ***Sparse***
- Binary
- Uniform
- Invariant
- Robust

Output: Signatures

REDUCING COMPUTE SPACE & HW COST – ENABLING TRANSPARENCY

AUTOBRAINS

Autobrains' Signatures

Hyper-dimensional, sparse binary representations {67529, 228, 3229595,…}

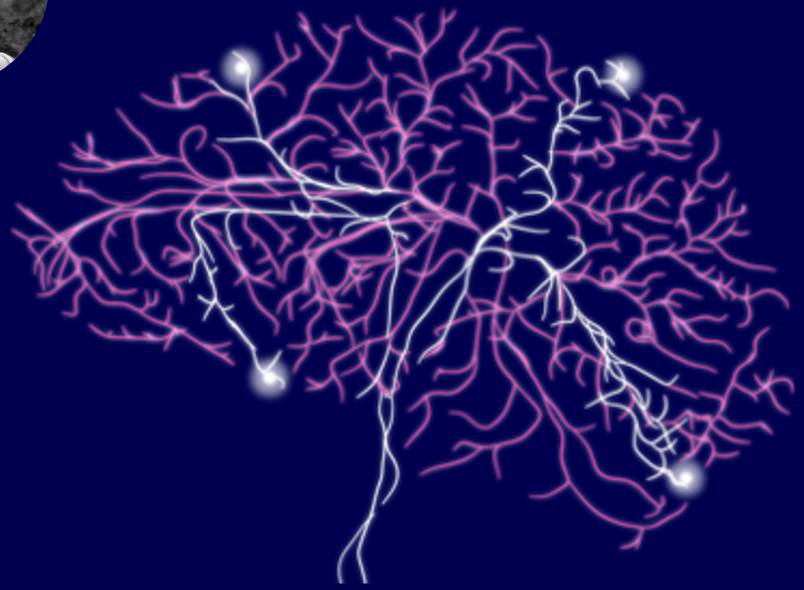
Signatures are the core of Autobrains' innovative AI, underlying all products.

AUTOBRAINS

Autobrains' Signatures – Inspired by Neuroscience

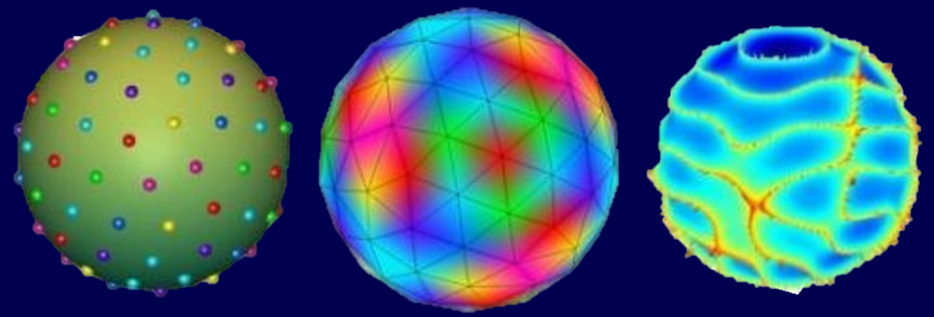
EFFICIENT CODING HYPOTHESIS

by Horace B. Barlow



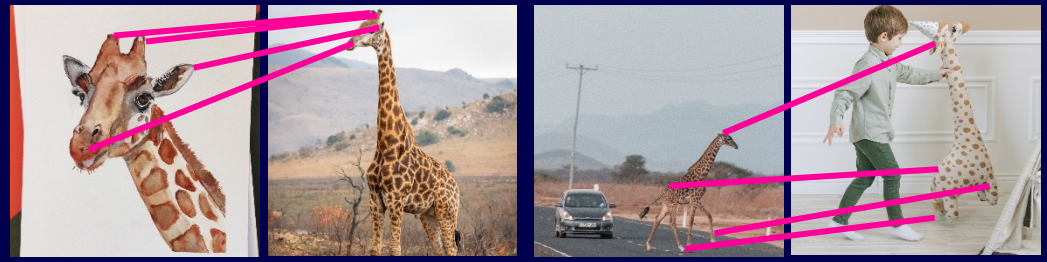
Maximized sparsity in the code minimizes the number of neural spikes needed to encode a given sensory input.

Maximally **sparse…**



**Source: https://www.unsw.edu.au/science/our-schools/maths/our-school/spotlight-on-our-people/history-school/glimpses-mathematics-and-statistics/distributing-points-sphere

…as **generalized** as necessary



*Source: https://optometry.berkeley.edu/alumni/hall-of-fame/horace-b-barlow/

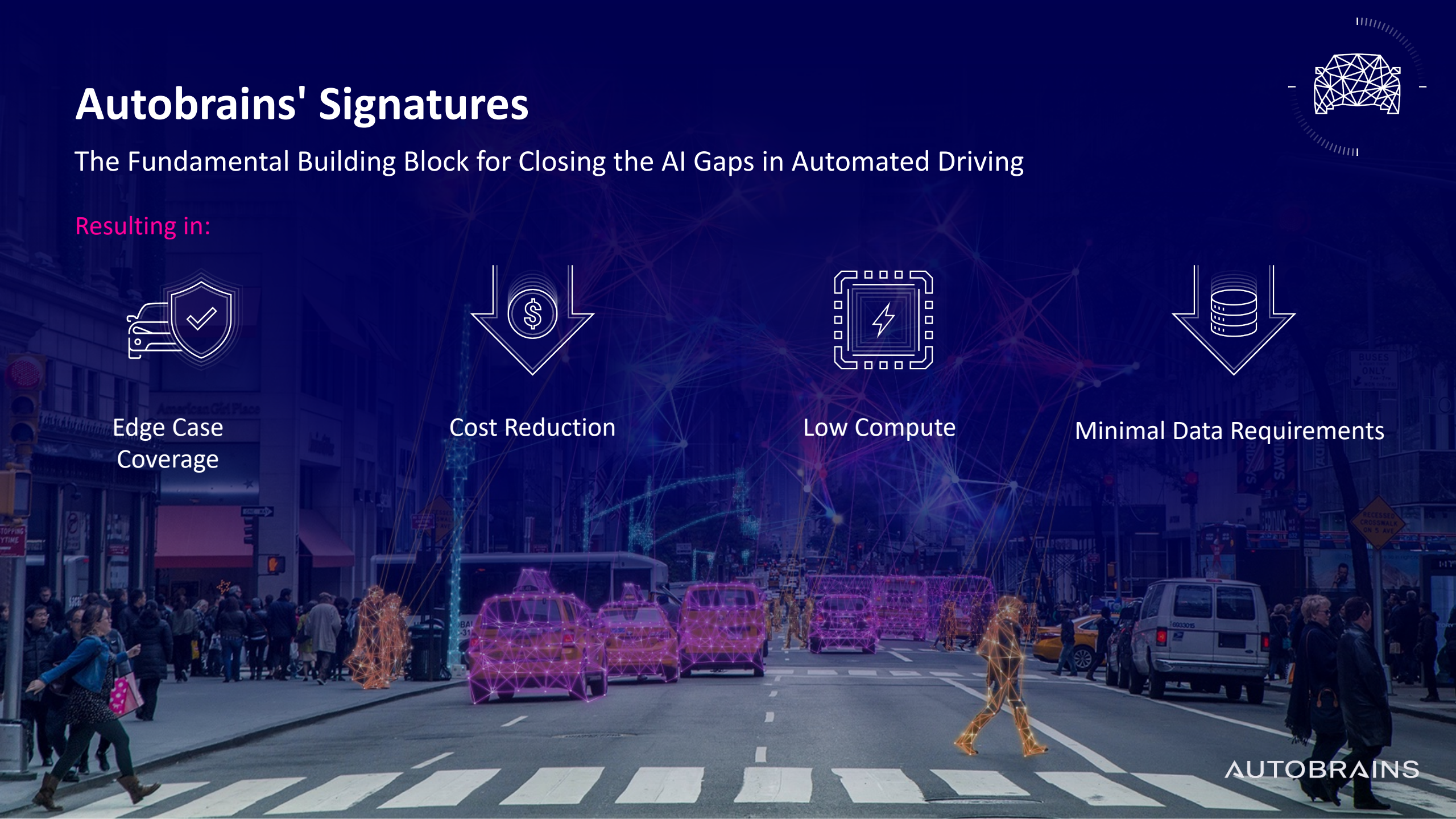
**Source: https://www.unsw.edu.au/science/our-schools/maths/our-school/spotlight-on-our-people/history-school/glimpses-mathematics-and-statistics/distributing-points-sphere

AUTOBRAINS

Autobrains' Signatures

The Fundamental Building Block for Closing the AI Gaps in Automated Driving

Resulting in:



Edge Case Coverage

Cost Reduction

Low Compute

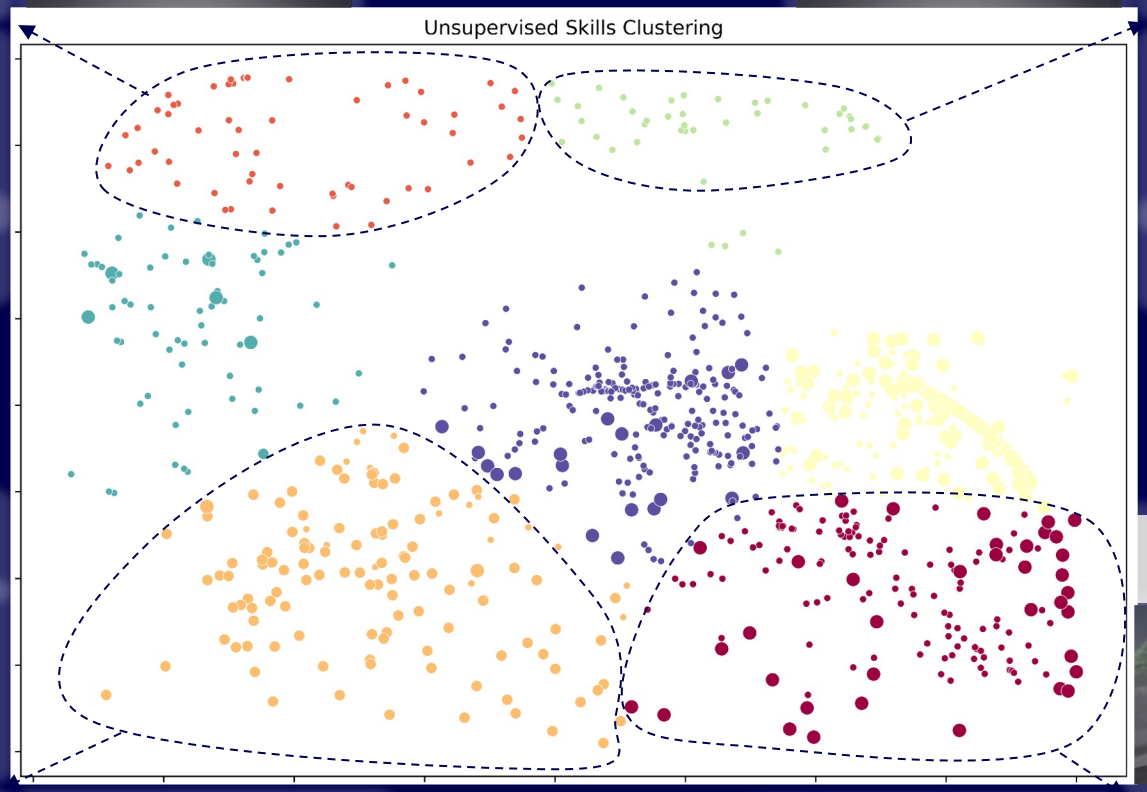
Minimal Data Requirements

AUTOBRAINS

Unsupervised Skills Learning

AEB Skill

Slowing Down Skill



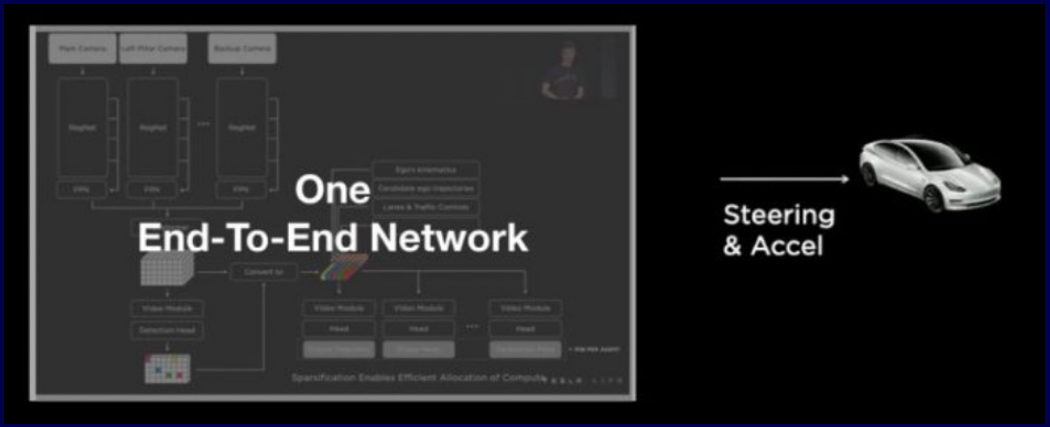
Overtaking Skill

Right-Lane Skill

AUTOBRAINS

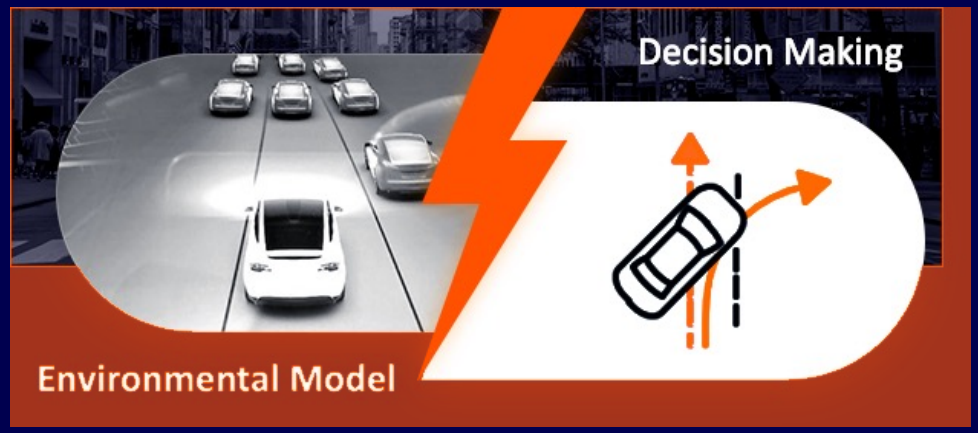
Perception Decision Gap

E2E APPROACH



One generic E2E AI AD system is too large and has too many degrees of freedom

ADAS APPROACH

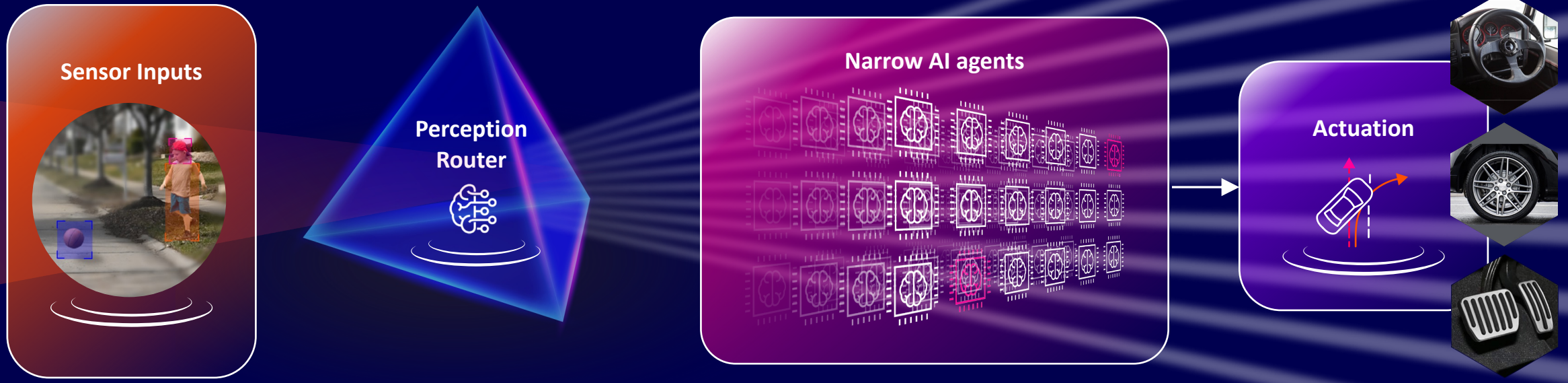


Breaking AI into two problems not jointly optimized

Solution: Narrow AI facilitating the pragmatic approach of using an ensemble of Narrow AI agents to scale

AUTOBRAINS

Picking the right brain for a specific situation



AUTOBRAINS

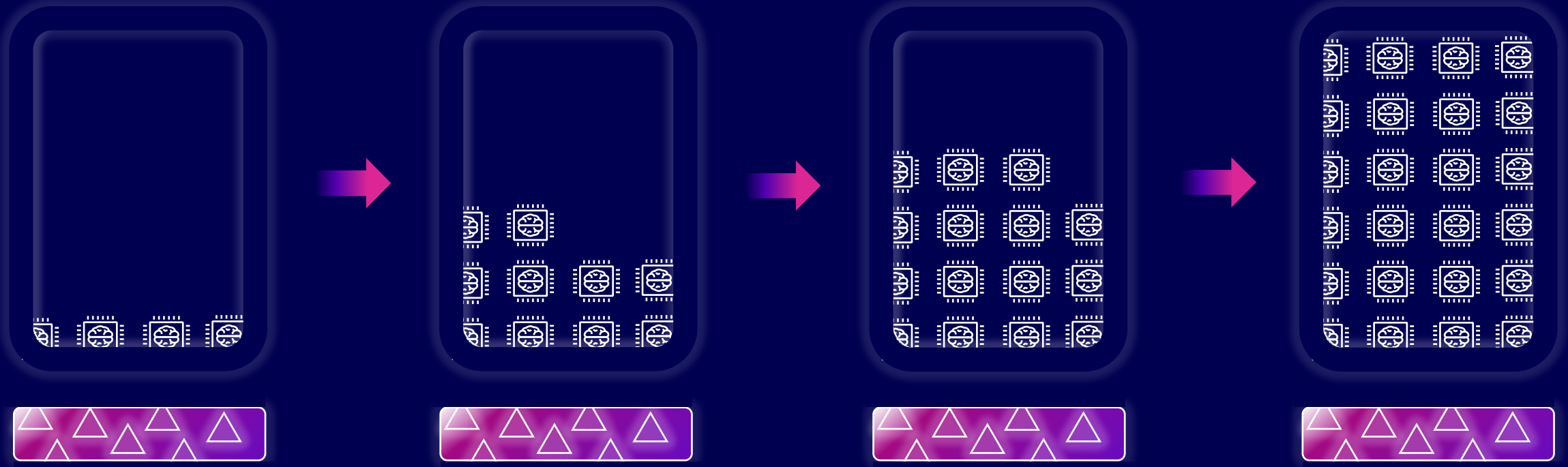
ADDING SKILLS

COVERING MORE SCENARIOS

NO RETRAINING

10 Skills
1% of driving time

~400 000 Skills
Full AD



SKILLS: THE METHODOLOGICAL AND MODULAR SOLUTION TOWARDS AD

AUTOBRAINS

Thank you!

AUTOBRAINS

Manuel Yoon, VP Strategy

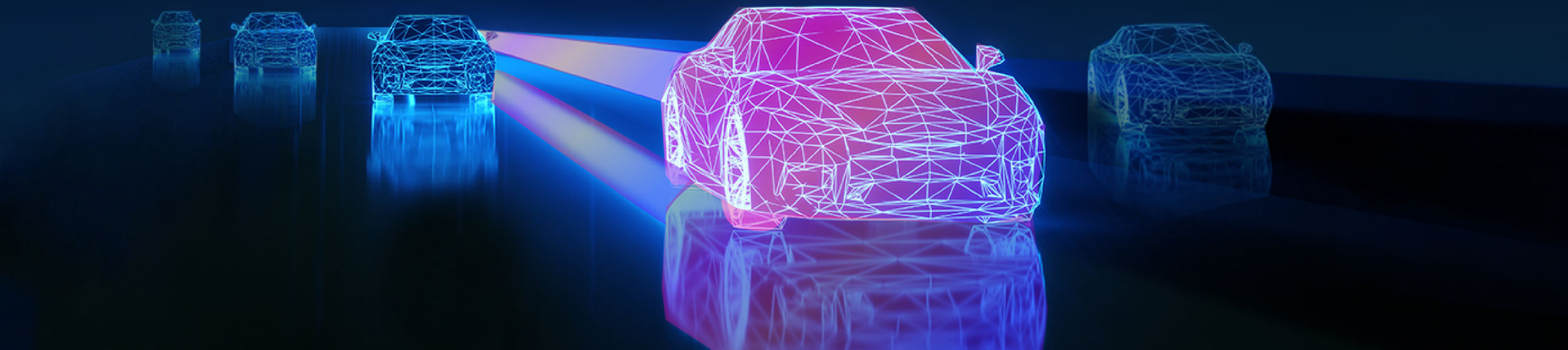
manuel.yoon@autobrains.ai

Continental

AUTEL

TOYOTA VENTURES

VINFAST

KNORR-BREMSE

TEMASEK