

AI at Digiteq Automotive

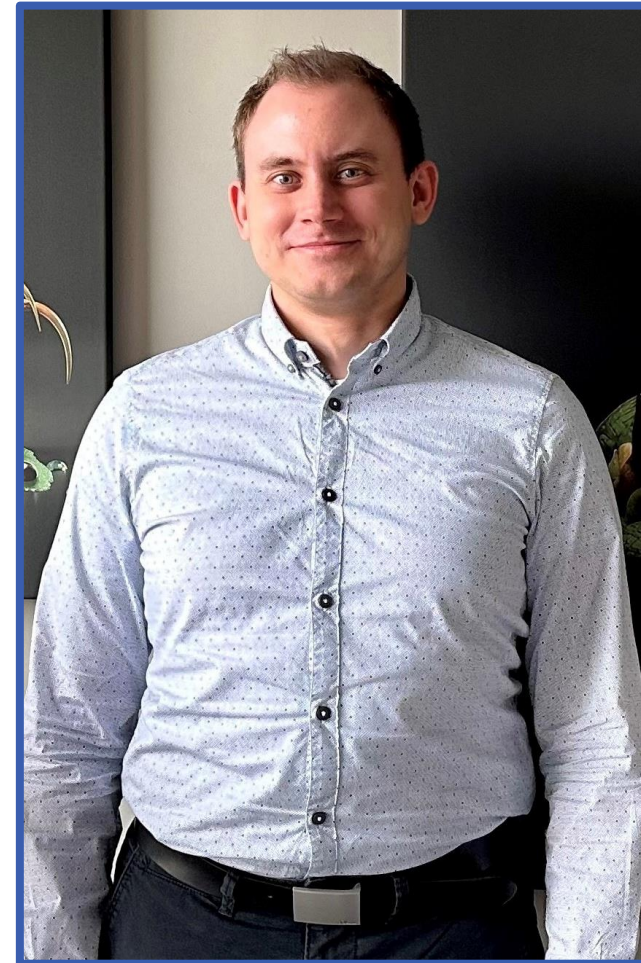
Ondřej Székely

A Volkswagen Group Company

Speaker Introduction

Ondřej Székely

- 2 years at Digiteq Automotive
 - AI engineer
 - Member of *Automated Driving Alliance by CARIAD and BOSCH*
 - Generic Object Detection team
 - Ex-member of *Multi-Task Learning team*
 - Responsible for DQ AI infrastructure
- 7 years at IBM
 - „full-stack“ AI consultant & engineer
 - AI team leader



About the Company

Digiteq Automotive is a 100% subsidiary of Volkswagen Group

C A R I A D
A VOLKSWAGEN GROUP COMPANY

51%

CARIAD is a 100% owned subsidiary of Volkswagen Group

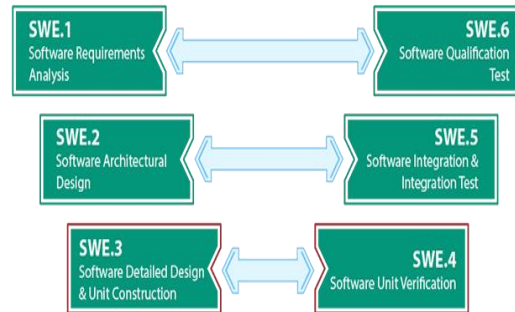


ŠKODA

49%



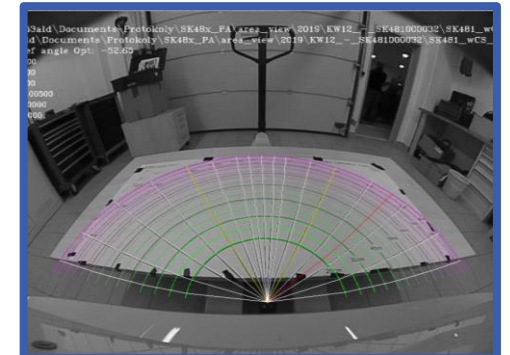
Predevelopment



Series SW Development



Complex Testing



Applications

The Automated Driving Alliance

a partnership between CARIAD and Bosch Mobility



SAE INTERNATIONAL

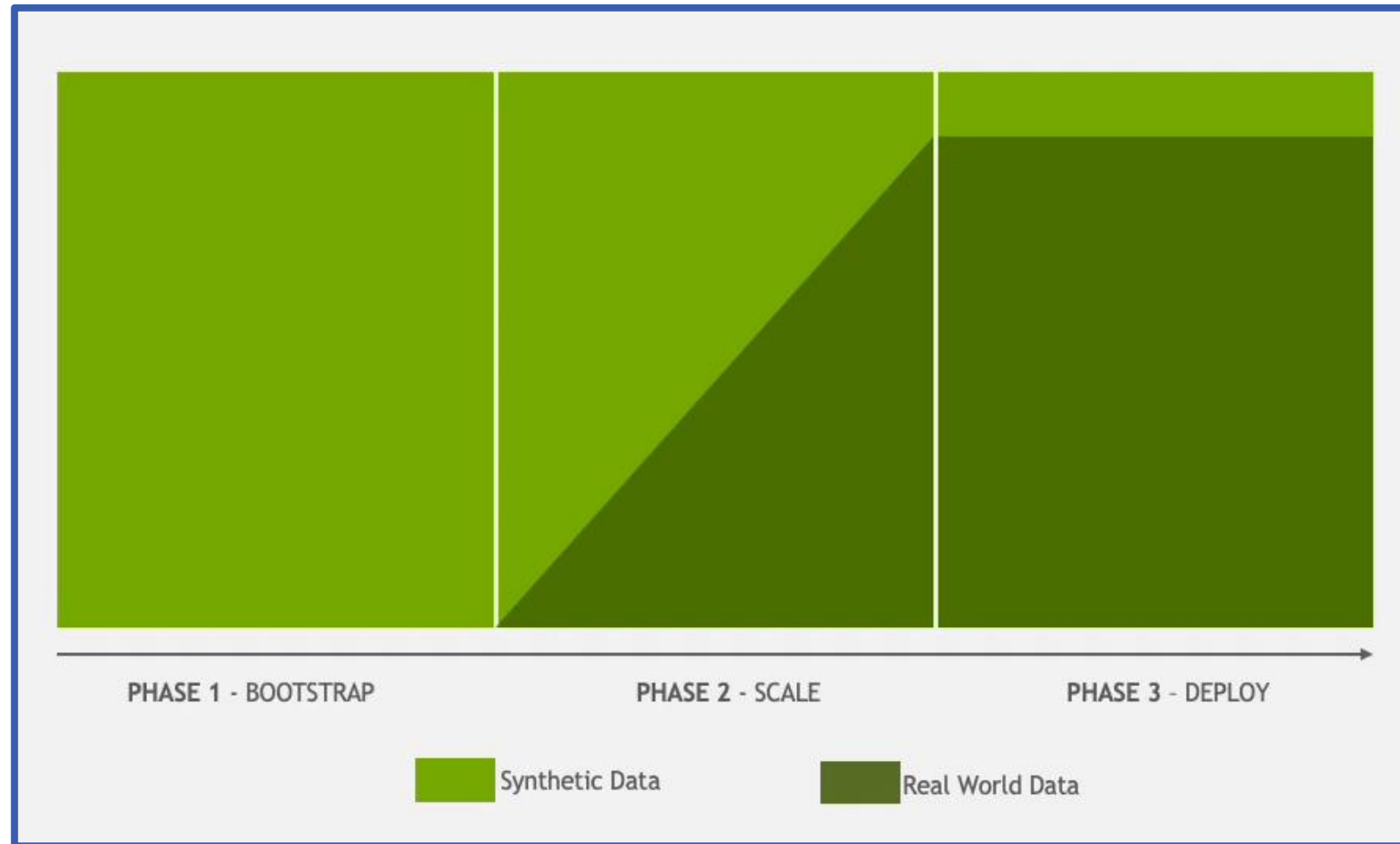
SAE J3016™ LEVELS OF DRIVING AUTOMATION

	SAE LEVEL 0	SAE LEVEL 1	SAE LEVEL 2	SAE LEVEL 3	SAE LEVEL 4	SAE LEVEL 5
What does the human in the driver's seat have to do?	You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in “the driver’s seat”		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
	These are driver support features			These are automated driving features		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met		This feature can drive the vehicle under all conditions
Example Features	<ul style="list-style-type: none"> • automatic emergency braking • blind spot warning • lane departure warning 	<ul style="list-style-type: none"> • lane centering OR • adaptive cruise control 	<ul style="list-style-type: none"> • lane centering AND • adaptive cruise control at the same time 	<ul style="list-style-type: none"> • traffic jam chauffeur 	<ul style="list-style-type: none"> • local driverless taxi • pedals/steering wheel may or may not be installed 	<ul style="list-style-type: none"> • same as level 4, but feature can drive everywhere in all conditions

For a more complete description, please download a free copy of SAE J3016: https://www.sae.org/standards/content/j3016_201806/

“One of the world’s biggest automotive manufacturers + one of the world’s biggest automotive suppliers = one giant leap for automated driving.”

Why Synthetic Data?



<https://www.nvidia.com/en-us/on-demand/session/gtcspring23-se50004/>

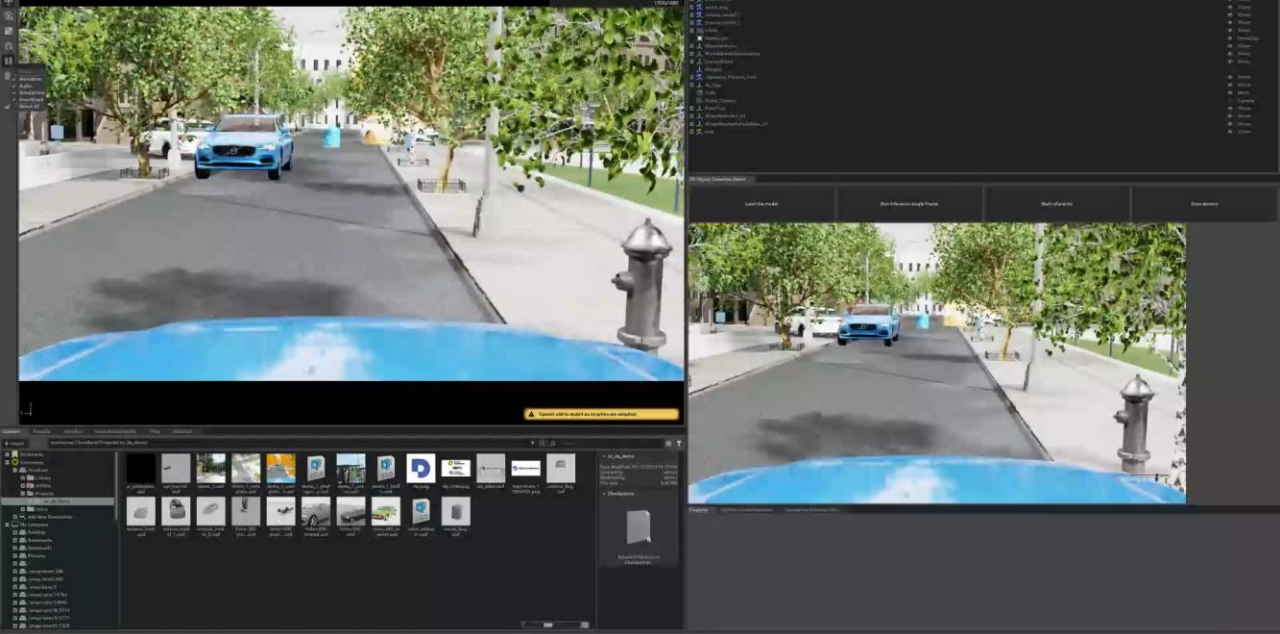
NVIDIA Omniverse



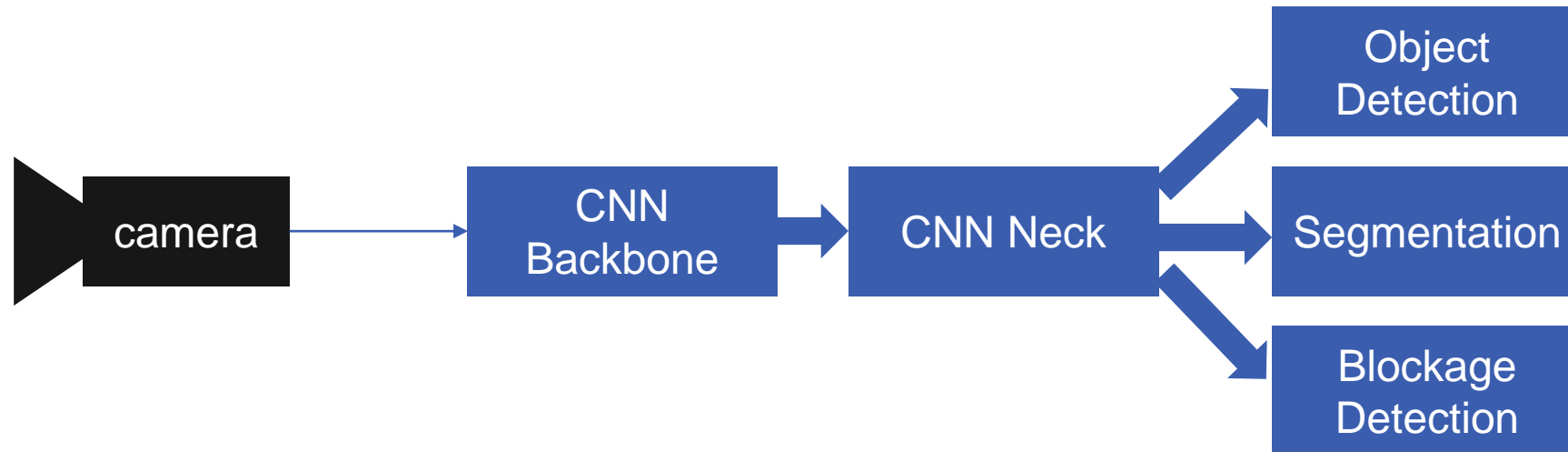


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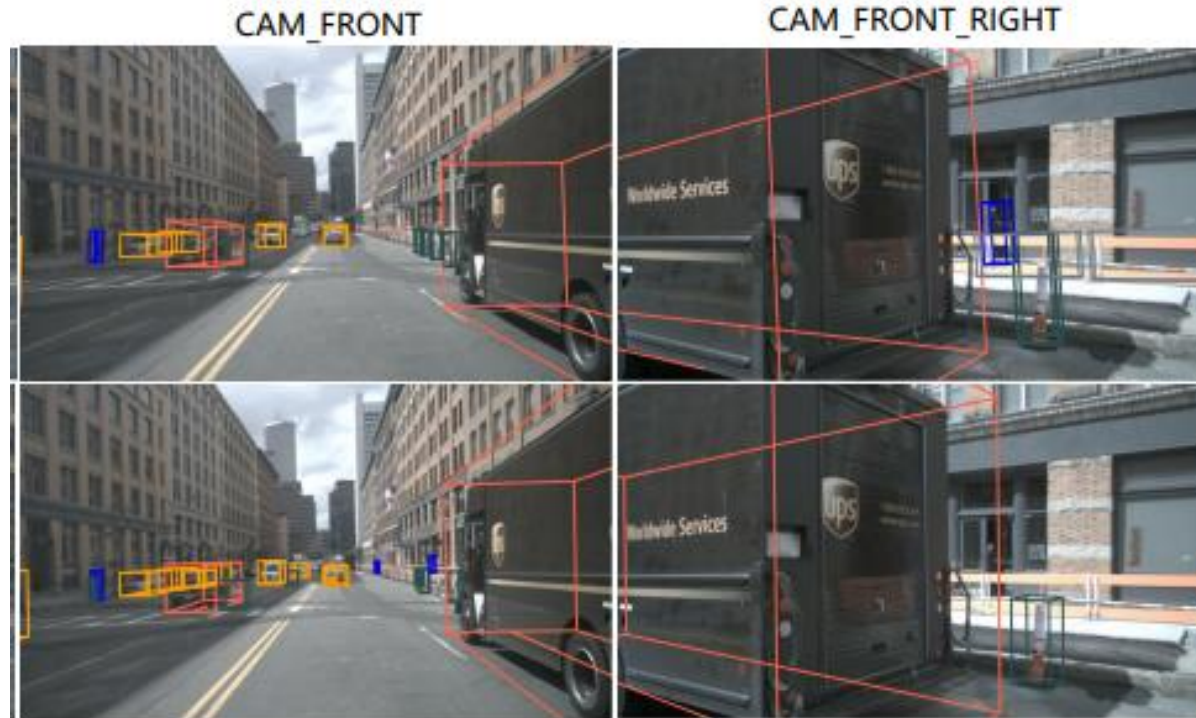
Scene: 2022.2.1 - omniverse/RealWorld/Properties/Assets/Models/_complex_Real_worl



Visual Perception Using Classical NN Design

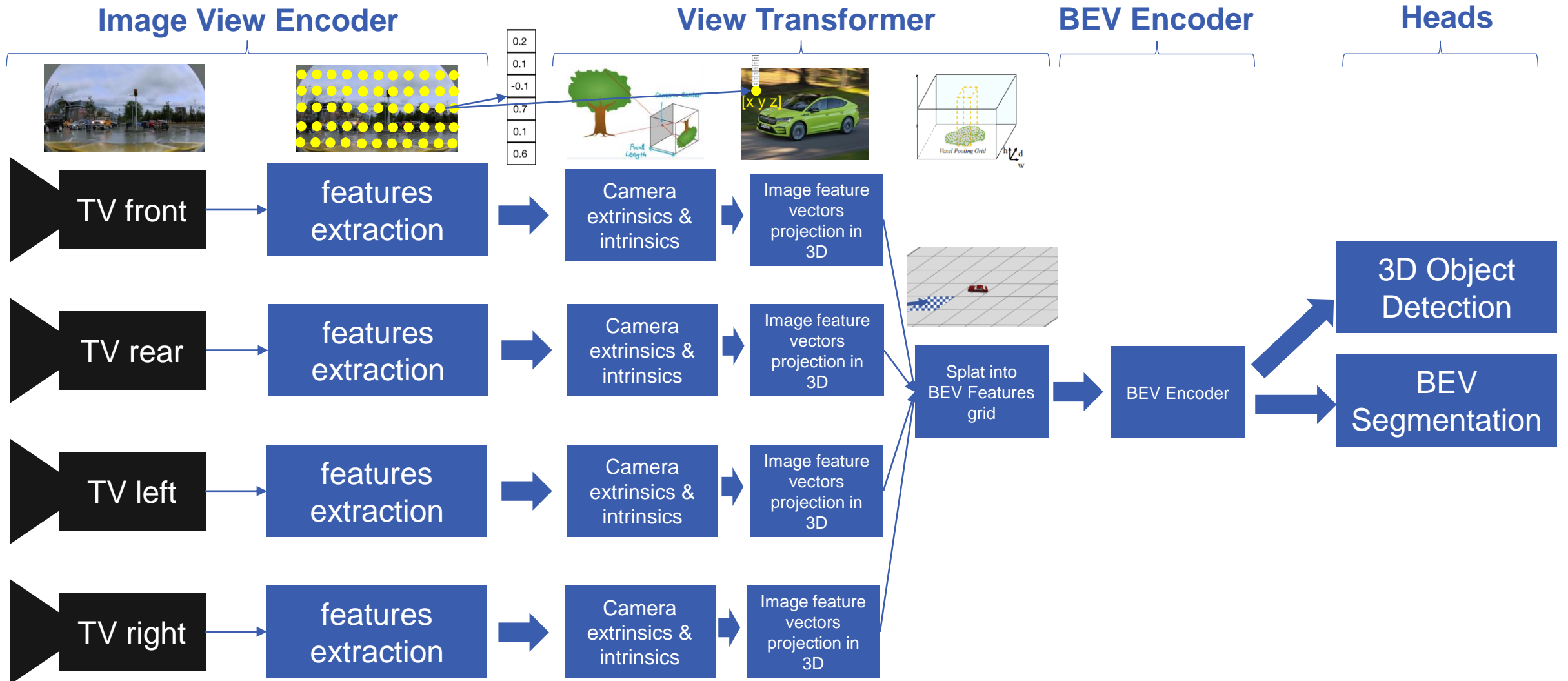


Single Camera Limitations



BEVFormer

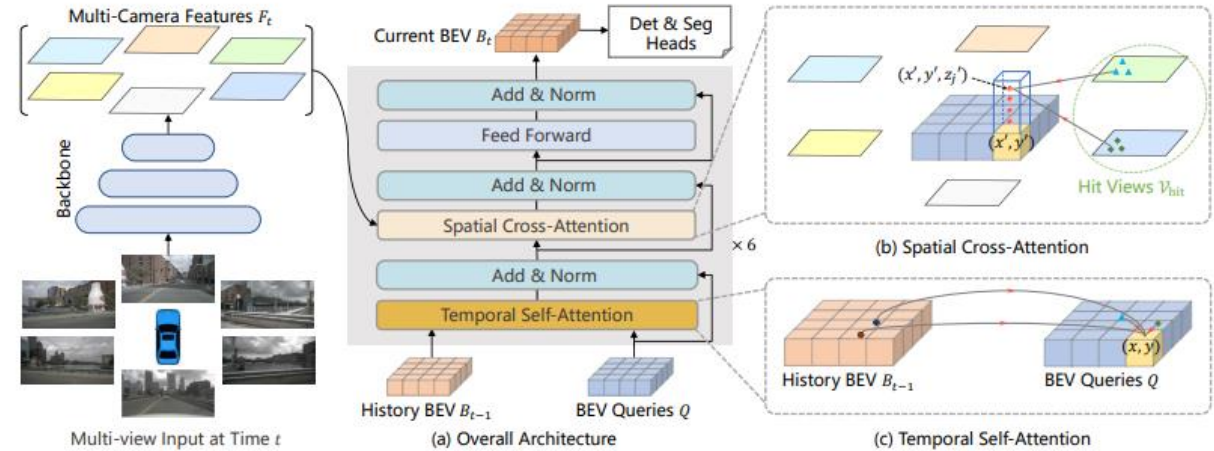
Bird's Eye View



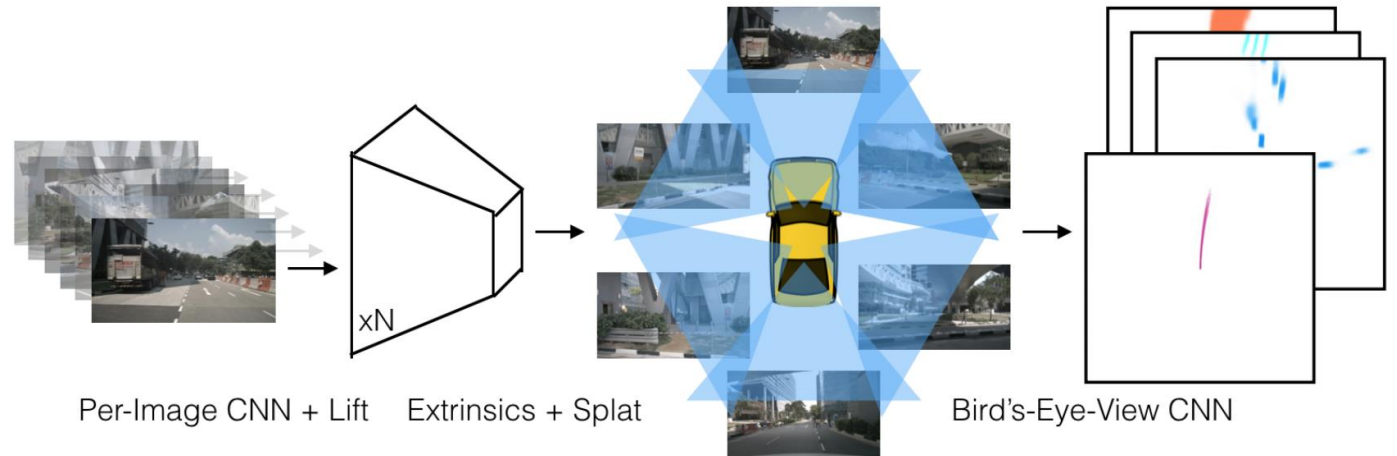
Bird's Eye View



Tesla AI Day 2022



BEVFormer



LSS

AI in Automotive

Is automotive ready for AI?

FuSa (Functional Safety/ISO 26262)

- How to ensure functional safety in case there is a system failure. Some examples of system failures are: loss of steering assist, electronic park brake failure, a fault in collision avoidance, and unintended airbag deployment. These are all malfunctions caused by electrical or electronic systems failure
- Complying with this standard helps automakers detect, manage, and/or mitigate the effects of system and hardware failures
- Not enough to cover all AV engineering challenges
=> SOTIF

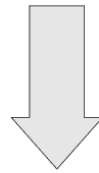
SOTIF (Safety of the Intended Functionality ISO 21448:2021)

- Ensuring the safety of autonomous vehicles in unknown situations (without system failure). The situation can be caused by limited sensor range, different weather/lighting conditions, unexpected objects or human behavior
- It lays out how to best prevent, control, and/or mitigate safety hazards that can occur without a system failure taking place. SOTIF applies to systems like advanced driver assistance systems, which can face safety hazards without failing themselves.

AI in Automotive

Is automotive ready for AI?

- ISO 8800 is intended for **safety-related systems in road vehicles** that utilize **Artificial Intelligence (AI)** and specifically **Machine Learning (ML)** techniques.



Addresses **all phases** of the ML **development & deployment lifecycle**



Addresses **identification & mitigation of risk** arising due to use of **AI** techniques



Structured into clauses with 4 main parts following the development lifecycle



70 normative requirements that need to be fulfilled resulting in safety artifacts

AI in Automotive

Is automotive ready for AI?

