Application of AD Database for Town Traffic Safety

Presentation for ASAM Open Label Ideation Workshop

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Iteration Loop of AD with AI

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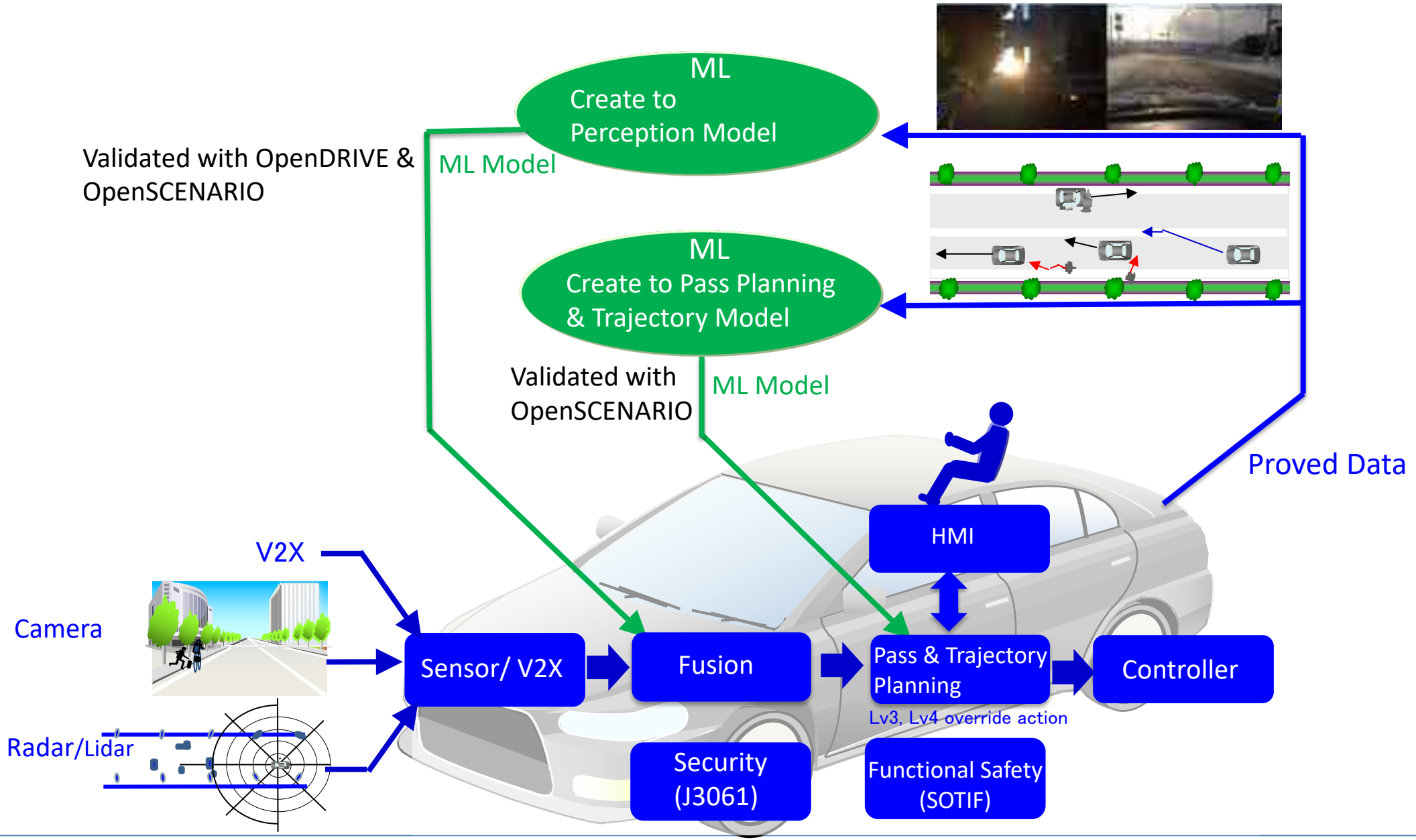

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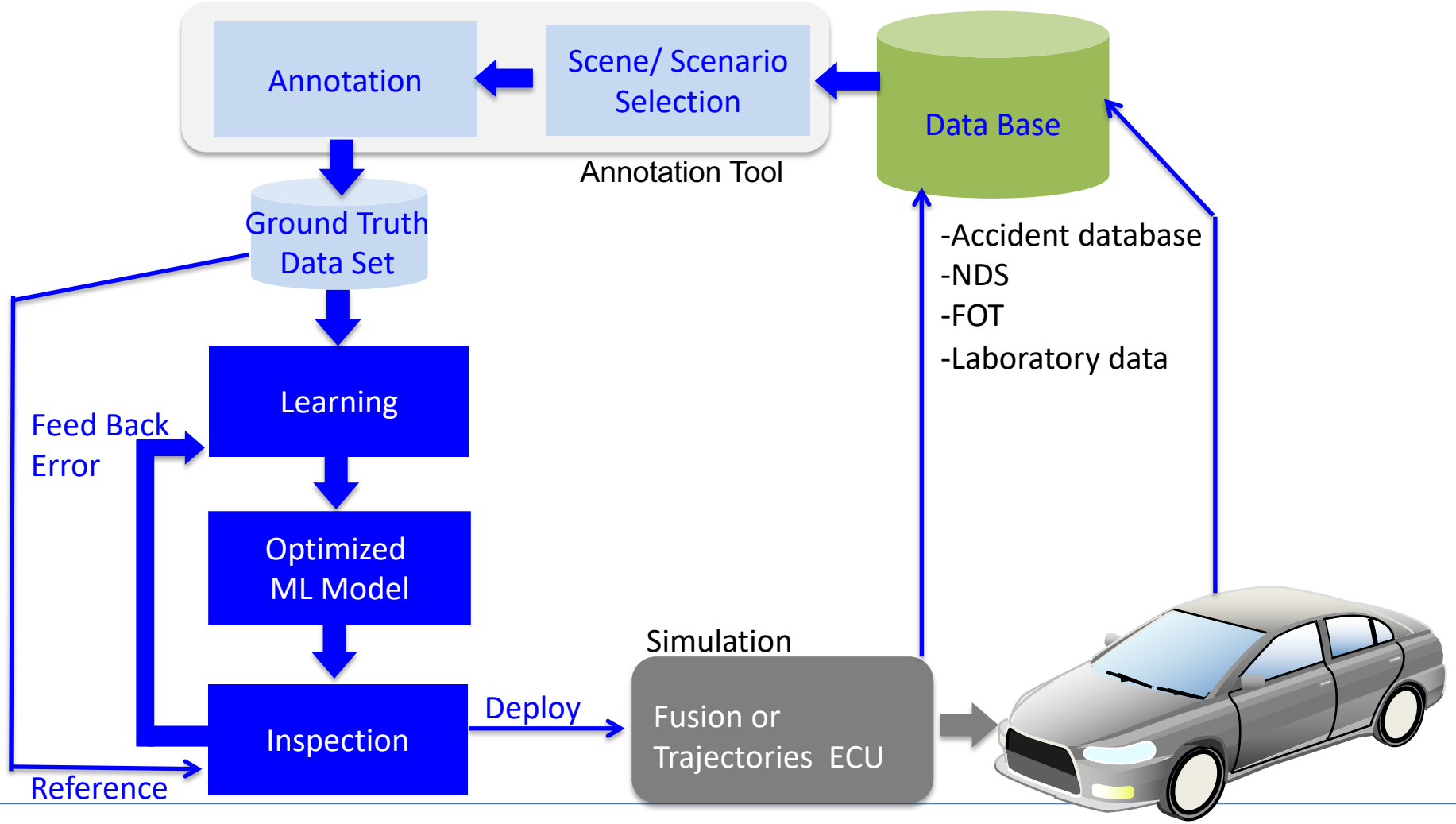
Create Optimized Machine Learned Model

It is necessary to prepare the optimal Ground truth according to the purpose.
Ground truth have physical (e.g. visual) and semantic meaning.
Semantic meaning occasionally changes by context and connotation.



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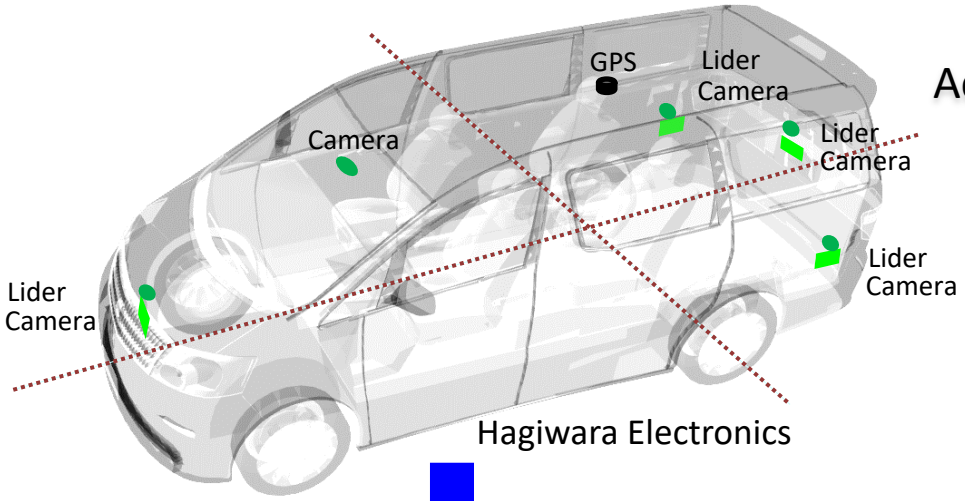
Challenge to make a Data Base for Safe for Pedestrian



Data Acquisition

Raw Data

-ODD Valuation < City, Urban, Site seeing area >
-360 view with 4 Fish aye cameras, 90 Front camera, 5 Lidars >
-Scene trigger < Operator's voice, Key, Actuator signal >
-Time Valuation < morning, noon, evening, night >
-Weather Valuation
-Season Valuation

JARI

Raw Data
(4.2 PByte)

Laboratory, Institute, etc.
- Behavior analysis
- Model Create

JARI: Japan Automotive Research Institute, https:// www.jari.or.jp
HAGIWARA: Hagiwara Electronics Co., Ltd, https:// www.hagiwara.co.jp

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TAG Category at JARI Data Base

How enhance 2D Tag to 3D, 4D Tag?

Target	Category 1	Category 2	Direction	Attribute	Obstacle
Pedestrian	Adult Child Unknown	Male Female	Front, Back, Left, Right Diagonal valuation Unknown	None, Umbrella, Cart, Bicycle, etc.	Yes , NO, Out of frame
Vehicle	Passenger Car Large Car Unknown	Preceding vehicle Oncoming vehicle Parking, etc.	Front, Back, Left, Right Diagonal valuation Unknown	–	Yes , NO, Out of frame
Motorcycle	Large, Small, Unknown	–	Front, Back, Left, Right Diagonal valuation Unknown	None, Umbrella, etc.	Yes , NO, Out of frame
Bicycle	–	–	Front, Back, Left, Right Diagonal valuation Unknown	None, Umbrella, etc.	Yes , NO, Out of frame
Roadside Object	Traffic Sign	Red, Yellow, Green Direction(Arrow)	Front, Left, Right	–	Yes , NO, Out of frame
Roadside Object	Road Sign	White line, Yellow line, etc.	–	–	–

Source: JARI

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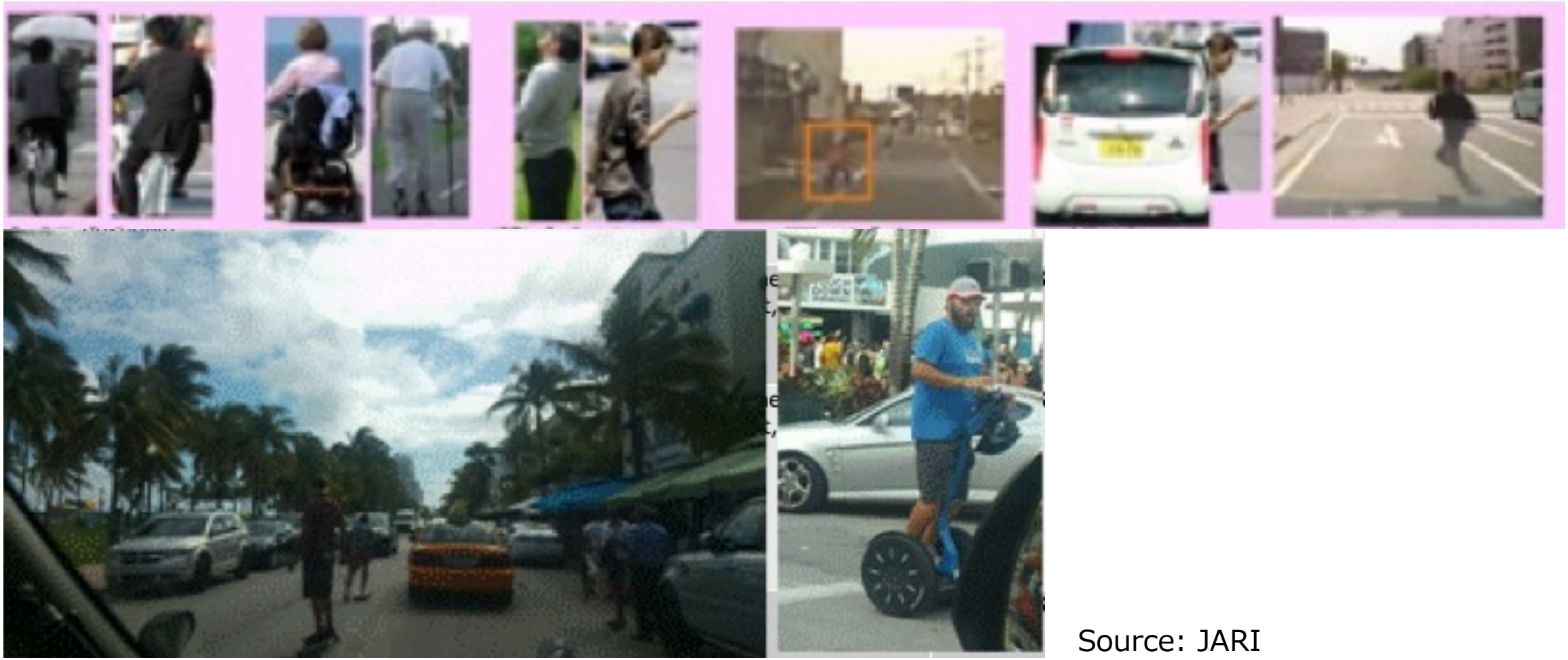
TAG Category at JARI Data Base

In reality, there are many complicate objects. How categorize?
It should be flexible and custom-definable for next gen. perception AI model .



Source: JARI

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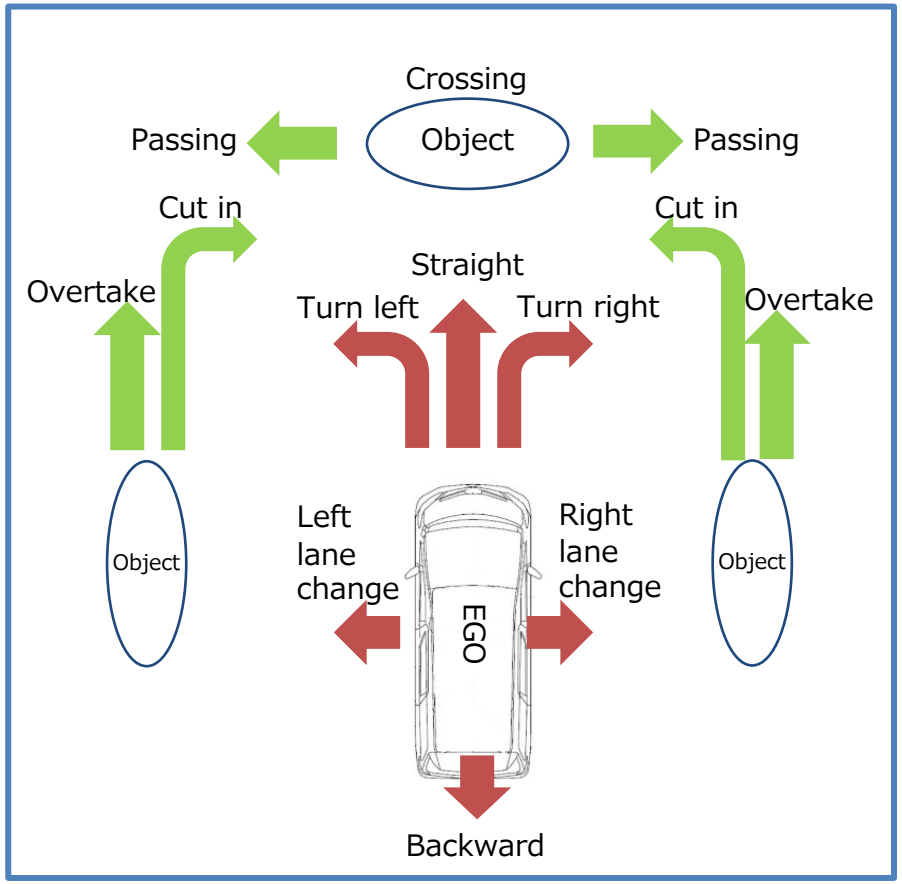
4D TAG at JARI Data Base

Look-ahead is executed based on the extension of behavior.
Time series (start-end time) tag information of the location, the behavior of the own vehicle, and the behavior of the surrounding objects is prepared,
as the learning data for recognizing the behavior.



Dynamic Infomation

EGO behavior
Object behavior

Source: JARI & HAGIWARA

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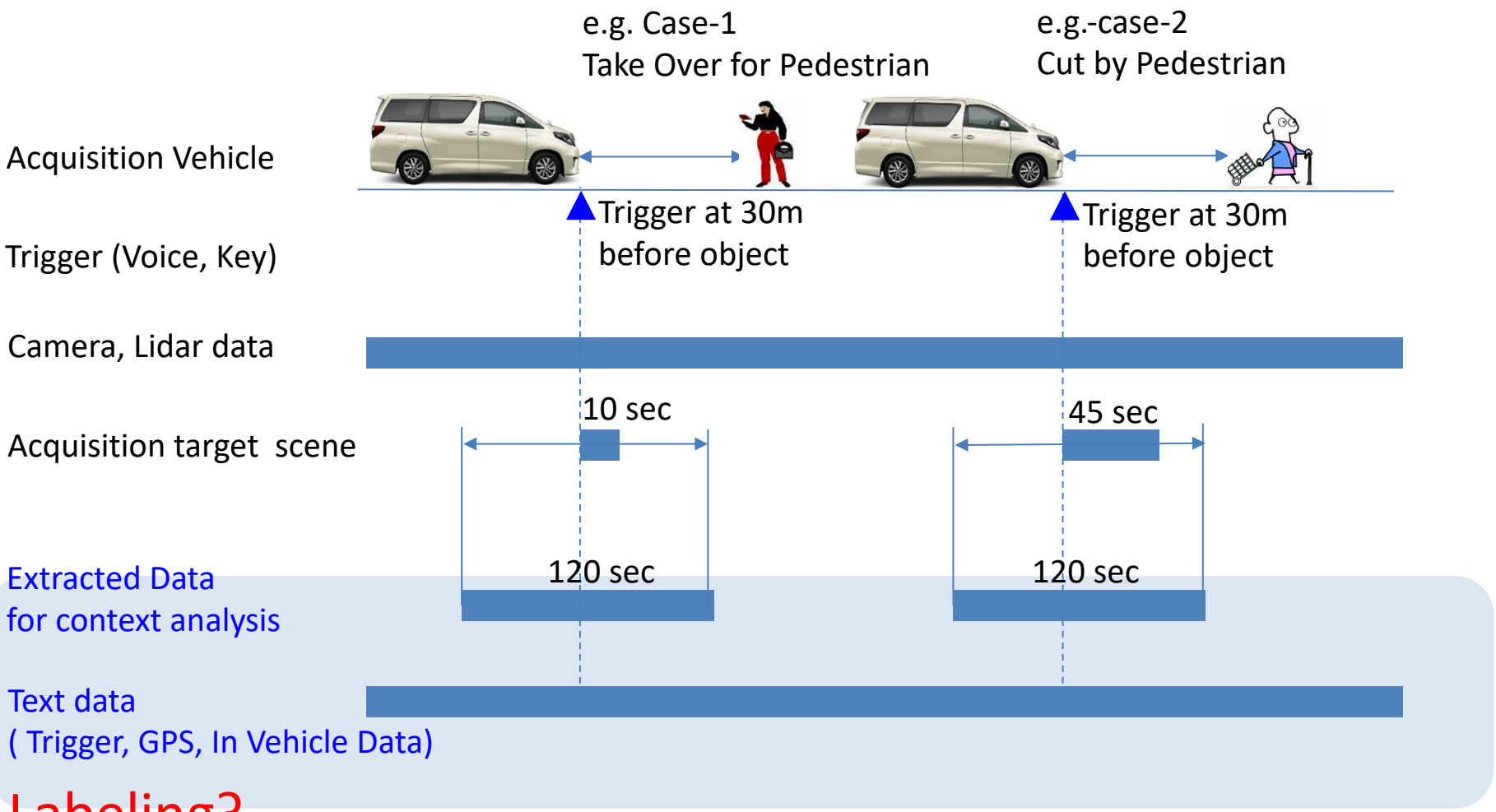
Data Acquisition and Scene Extraction at JARI Database



How to Labeling?

Source: JARI & HAGIWARA

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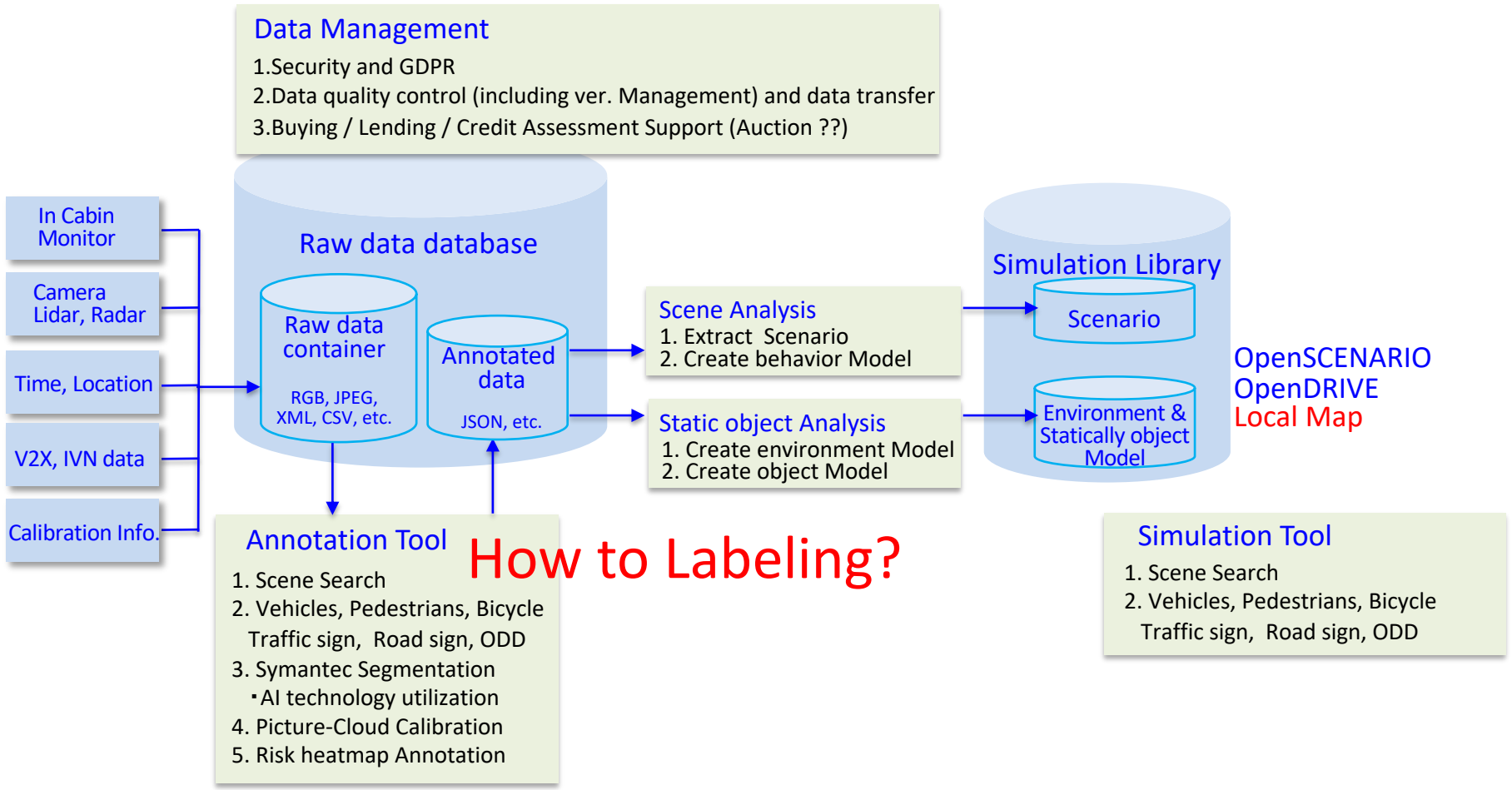
For create usable AI model



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A local government initiatives for autonomous driving

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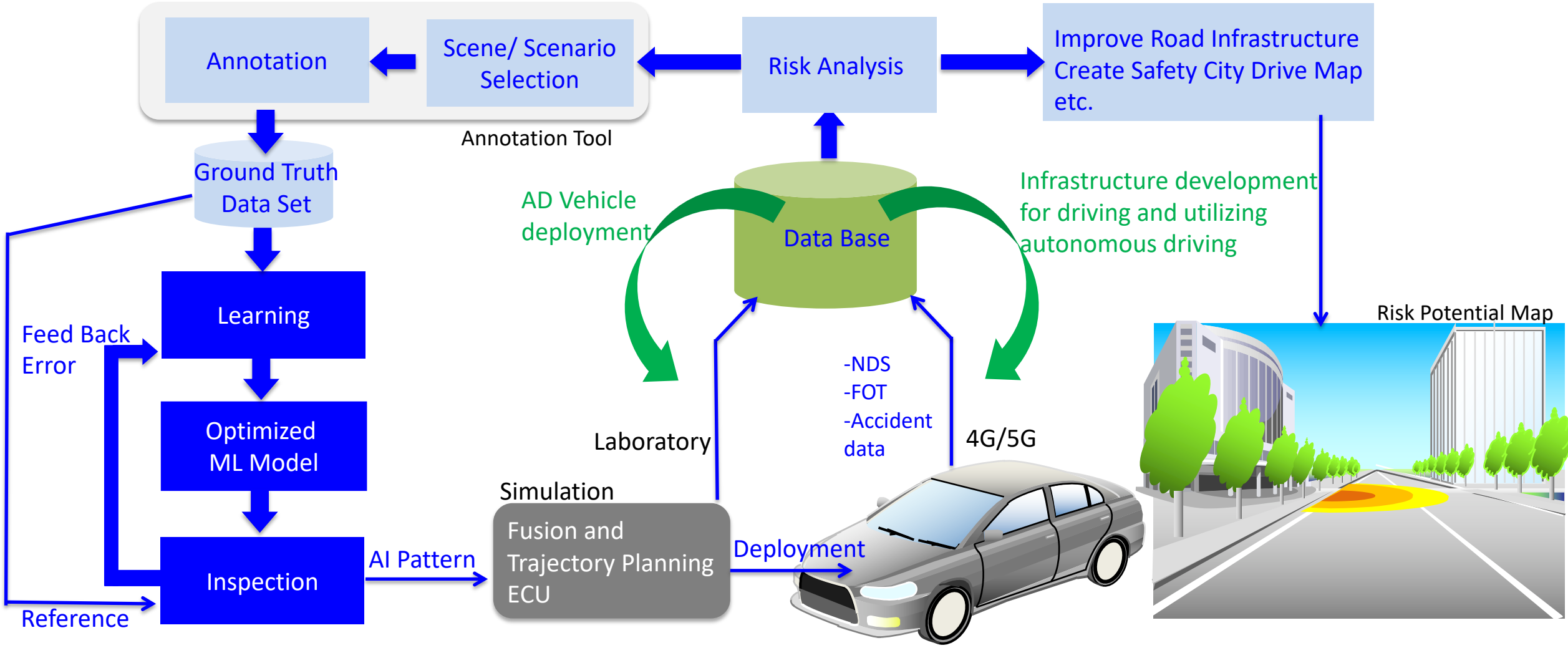
Shiojiri City Gov. will use AD technologies for local traffic safety, based on the area's AI and annotation skill and resources.



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“Shiojiri” is the IT-City blessed with nature

Winery, Traditional wood craft, Precision machinery Industry area

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Shiojiri's annotation organization for AD development

Shiojiri City Gov. has an annotation organization which is accepting work to create ground truths for ML.

-Raw data from OEM, Tier1
-JARI Database
-NDS data from FOT of AD project in Shiojiri

Client

Annotation Server

Raw Data Container

Work file

Tag file (XML, JSON)

Siojiri

Event(Scene) Search

Annotation (Manual & AI)

Complete

Check progress
- Accuracy
- Annotation Category

Annotated Data

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Approach for reduce traffic incident risk in Shiojiri

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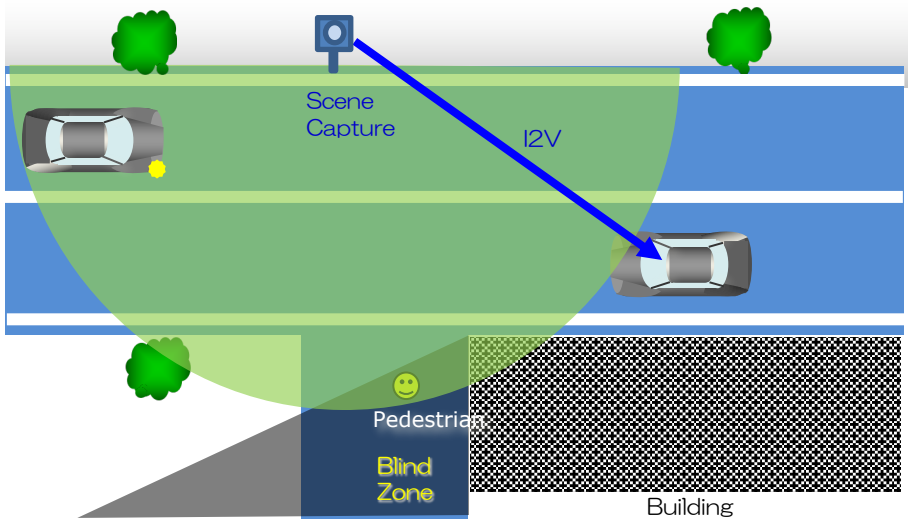
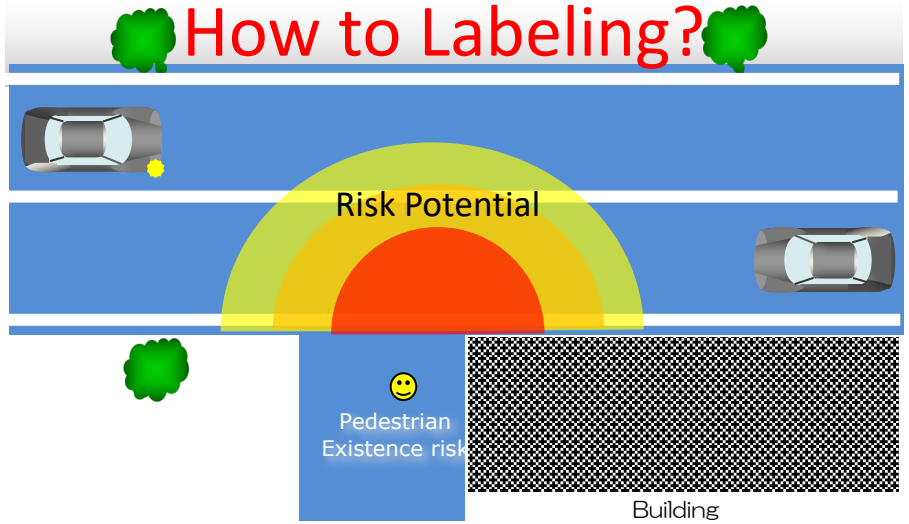
Shiojiri is a city with an old historical city, so there are many narrow road with poor visibility. External support for car is essential.

Advanced Infrastructure



or

Provide the Risk areas on the city MAP



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Thank You your attention

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