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## Data Labeling and Standards

# Intro

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📍 Santa Clara, CA – Hyderabad, India

◎ Data Curation, Labeling and Validation for Autonomous systems

👥 Daimler, Samsung, Pony AI, DeepScale, Starsky, Nuro, Marble, Uber, AutoX…



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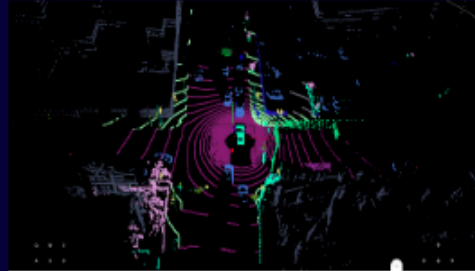
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# Data Labeling



**3D Bounding Boxes**

Individual frames or unlimited-length sequences with consistent size and ID.



**Sensor Fused Sequence Annotation**

2D and 3D labels in multi-sensor sequences with consistent ID.



**Point Cloud Sequence Segmentation**

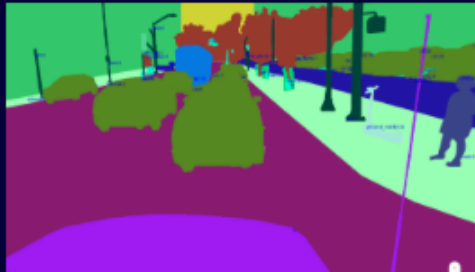State of the art Instance or semantic segmentation of sequences.



**Polylines**

Accurately defined lane lines with rigorous quality checks.



**2D Bounding Boxes**

Precise object detection and localization in images and videos.



**2D Semantic Segmentation**

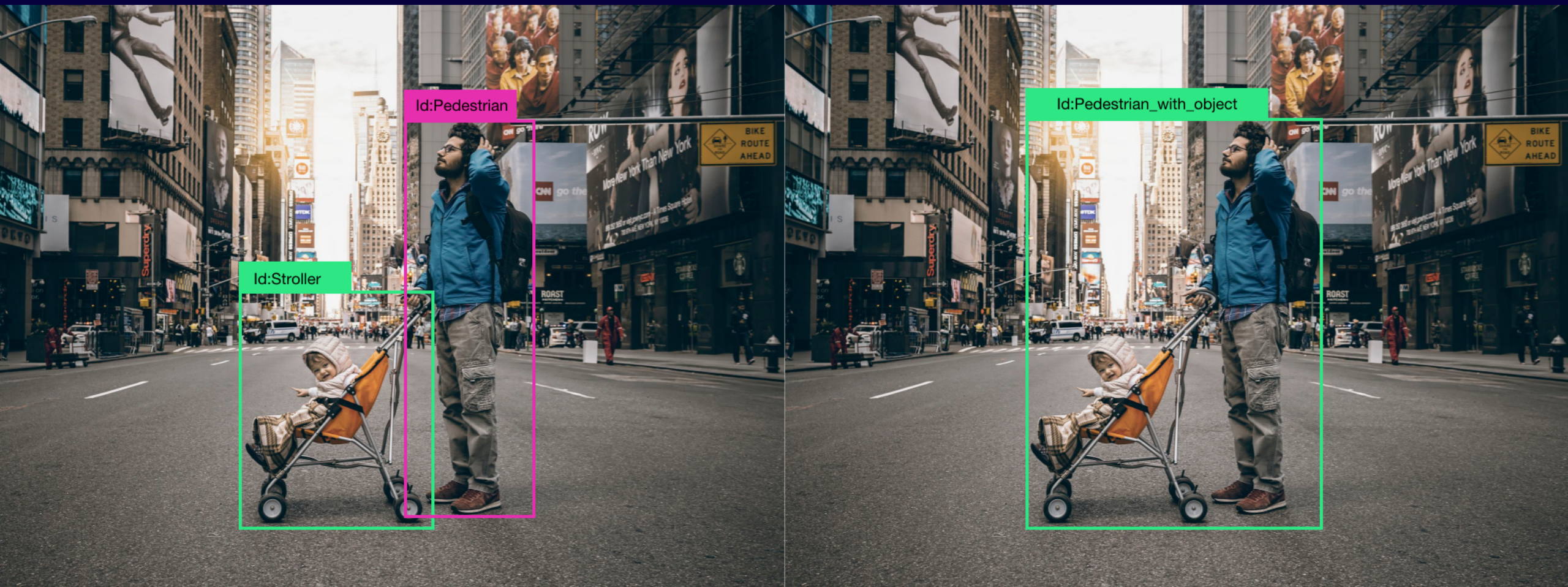Pixel-perfect semantic segmentation tasks at scale.



**2D Landmarks and Key Points**

Transformative ground-truth dataset with a sequence of points.

Data Labeling = Ground truth production

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# Problem

# Data Labeling

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OpenLABEL : An open standard for data labeling

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# OpenLABEL: Use Cases

## Technical Use Cases

- ML Model Training
- ML Model Validation
- Semantic Ground Truth
- Query-able Ground Truth
- Standardize Tooling

## Business Use cases

- Dataset sharing
- Tooling development cost saving
- Enable scenario sharing/sorting/filtering
- Increase labeling quality
- Facilitate data marketplaces

## End-user use cases

- Standardize HIL Processes
- Streamline vendor selection
- Reduce tooling implementation effort
- ODD testing (through search and filtering)

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# OpenLABEL: Work Packages

## WP 3: Taxonomy & structure

- usage of ontologys for OpenLABEL
- list of requirements for the ASAM ontology project
- example list of required objects (entities+attributes) and labels

## OpenXOntology

## WP 1: Annotation Format and metadata

- concept for an annotation format including a proposed schema
- Metadata labeling specs
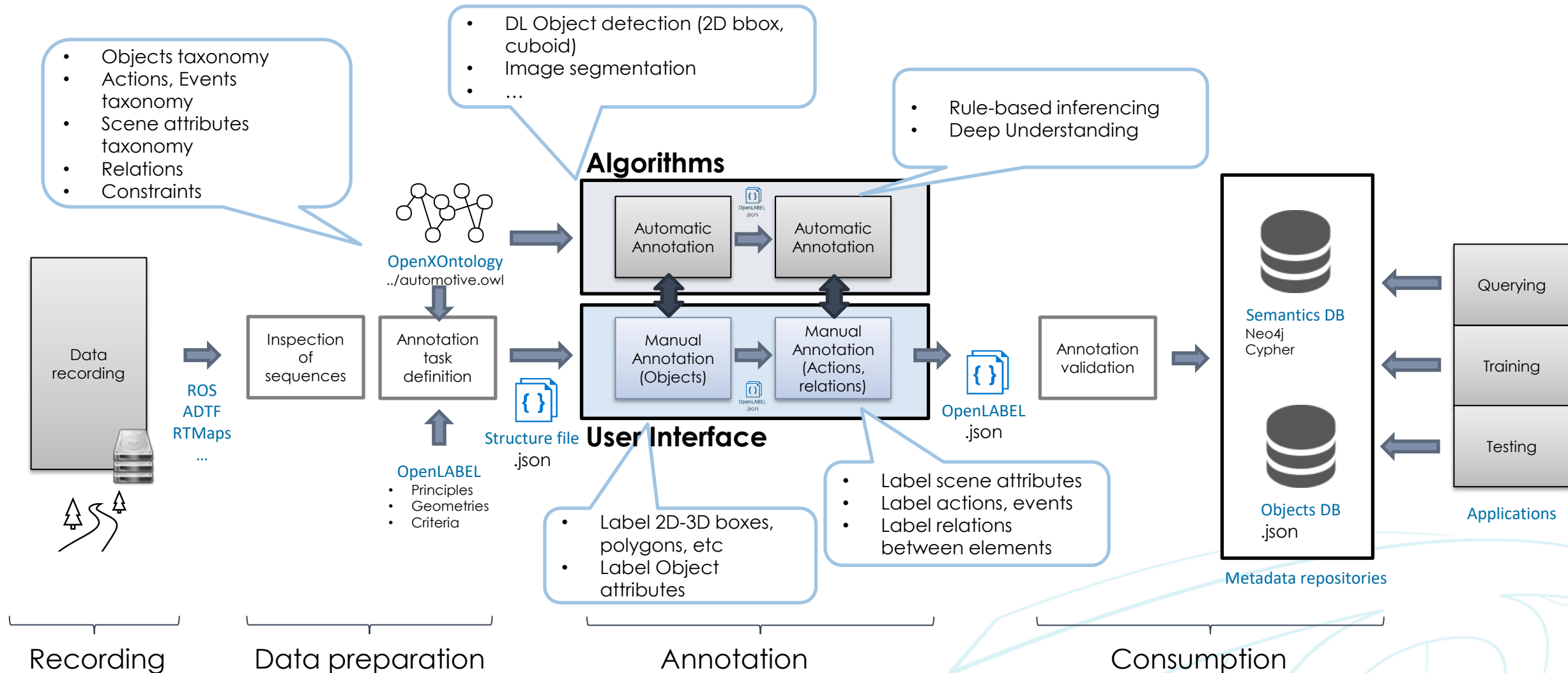- The WP will consider existing labeling specs and formats.

## WP 2: Labeling methods

- description of identified labeling methods for objects
- Labeling specs (instructions) according to labeling method
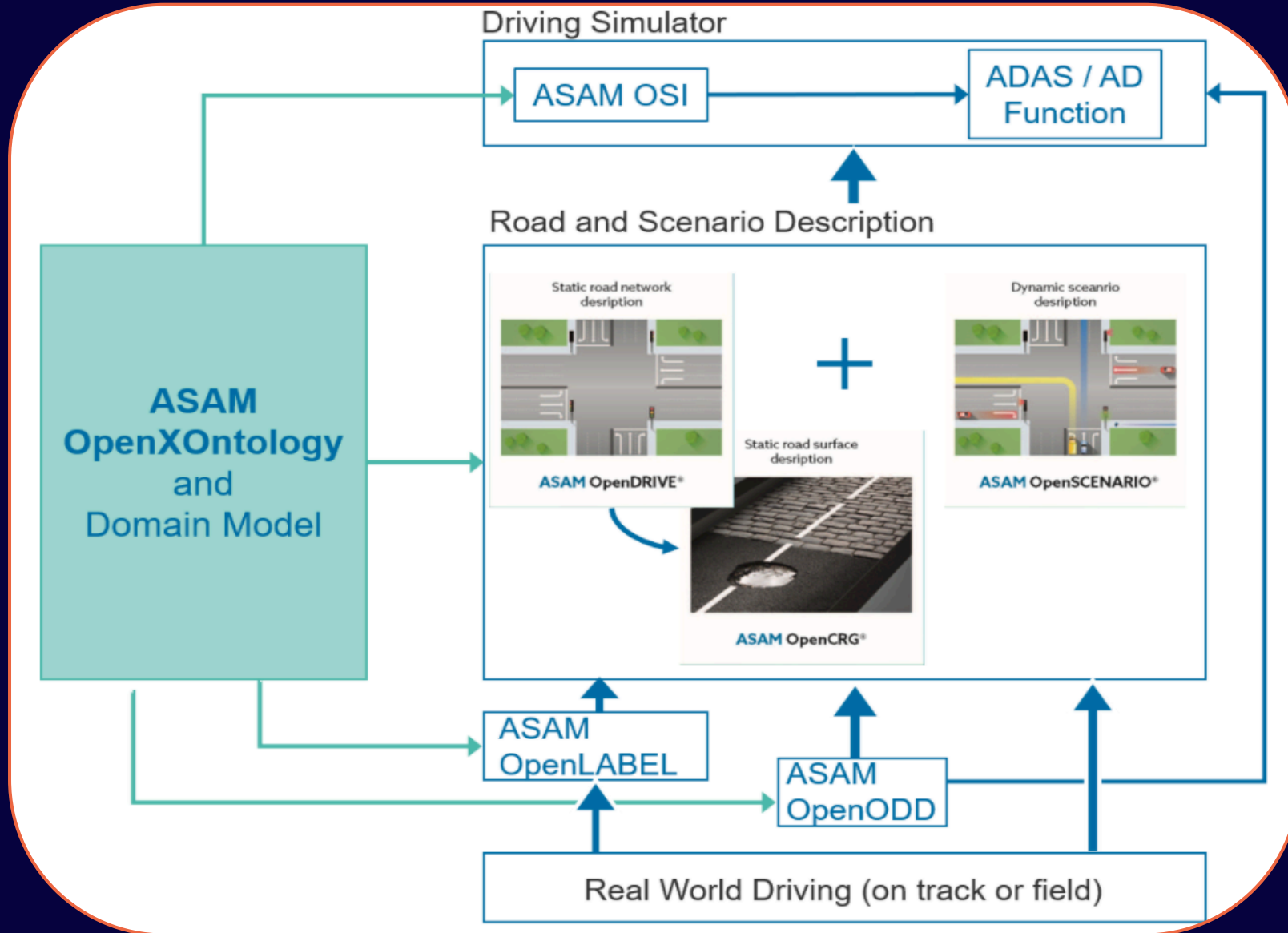- draft description of how to use specific methods for different use cases

## WP 4: Scene/ scenario labeling

- Scoping of labeling methods for objects for activities, events and scenes
- Labeling specs (instructions) according to labeling method
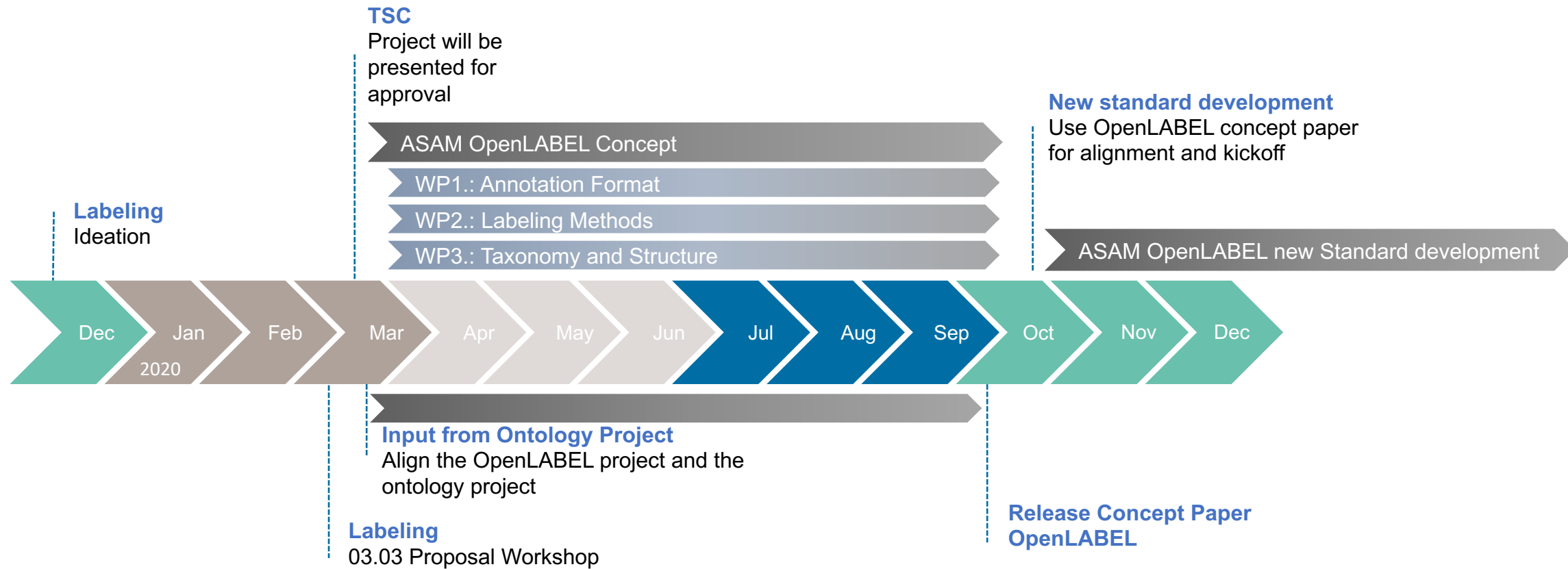- Semantic concepts definitions and their structure

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# Semantic labeling

# OpenX: Inter-relations

# Timeline for OpenLABEL

**TSC**
Project will be presented for approval

**New standard development**
Use OpenLABEL concept paper for alignment and kickoff

**Labeling**
Ideation

ASAM OpenLABEL Concept

WP1.: Annotation Format

WP2.: Labeling Methods

WP3.: Taxonomy and Structure

ASAM OpenLABEL new Standard development

| Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |

2020

**Input from Ontology Project**
Align the OpenLABEL project and the ontology project

**Labeling**
03.03 Proposal Workshop

**Release Concept Paper OpenLABEL**

ASAM

# Questions?

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