Kapsch TrafficCom

kapsch >>>
challenging limits

Deep Learning Versatile Platform (DLVP)

Enhancing Traffic Management with Intelligent Technology

Built on artificial intelligence and machine learning technologies, DLVP processes and analyzes video streams (live or offline) to translate visual inputs into actionable information for enhancing tolling and traffic operations. It provides real-time analytics as well as event detections and situational awareness.

Kapsch Deep Learning Versatile Platform (DLVP) is a comprehensive ecosystem enabling complex traffic monitoring and traffic management applications driven by artificial intelligence. The system has been built in a highly flexible way; its deep learning component can be trained quickly and efficiently to customer specific needs. The platform translates visual input into digital data – this data is analyzed and processed in real time to trigger manifold actions and generate dynamic reports.

Intelligent technology

DLVP uses highly flexible deep learning frameworks to detect and classify road users (vehicles of all kinds, pedestrians and persons with personal mobility devices). DLVP can be customized with virtual segments to detect client specific rules, such as zones to look for stopped vehicles, driving directions and specific vehicle classes. In addition to the virtual segments, the platform can be customized with virtual lines counting the number of passing vehicles / road users, compare entry and exit points, trigger actions and many more.

Hardware agnostic

DLVP is hardware agnostic in both the data input (via video cameras) and processing (computing device) areas. The system can consume incoming digital video streams with as low as 352 x 288 pixels, various video formats and frame rates (fps).
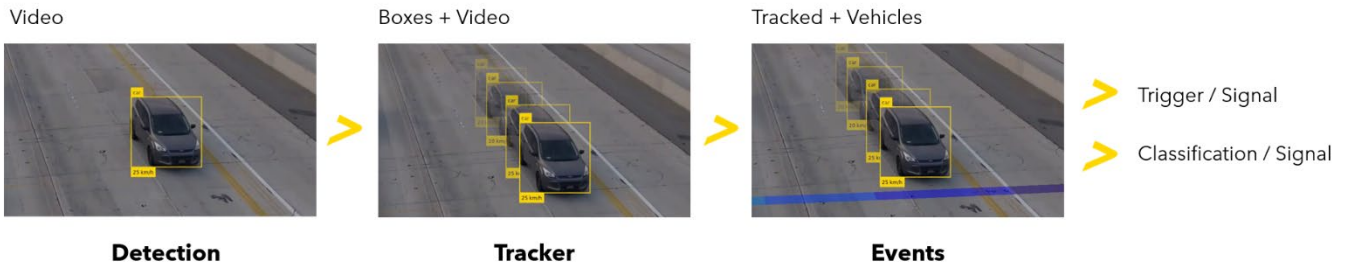
Multiple camera mounting positions (left or right side of roads, above roads, various mounting heights, etc.) are supported through intense training of the artificial intelligence, which can be extended any time through the Kapsch in-house data annotation and A.I. training team.

Through the platform approach, DLVP can be set up with various neural network detectors (detecting trained objects in every frame of a video stream) and trackers (establishing the relationship of the same object across multiple frames) to best serve and address the goals and specifics of individual projects.

DLVP software is ready to be deployed on edge / fog / server and cloud, providing maximum flexibility to our customers.

Functionality

How DLVP uses AI to monitor traffic

Video	Boxes + Video	Tracked + Vehicles	
			> Trigger / Signal
			> Classification / Signal
Detection	**Tracker**	**Events**	

Transforming video into data

DLVP comes with a flexible RESTful reporting interface, which pushes data (statistical data like counts, vehicle classes, travel speed, etc. in JSON format to configurable reporting endpoints – making the integration of DLVP into Traffic Light Controllers (TLCs), Advanced Traffic Management Systems (ATMS) and Data Management Systems easy. DLVP provides video analytics and not data analytics, therefore DLVP acts as a camera – Video Analytics Platform and feeds with data the Data Analytics Platforms. These Data Analytics Platforms can gather data from different sources and create reports to meet their needs.

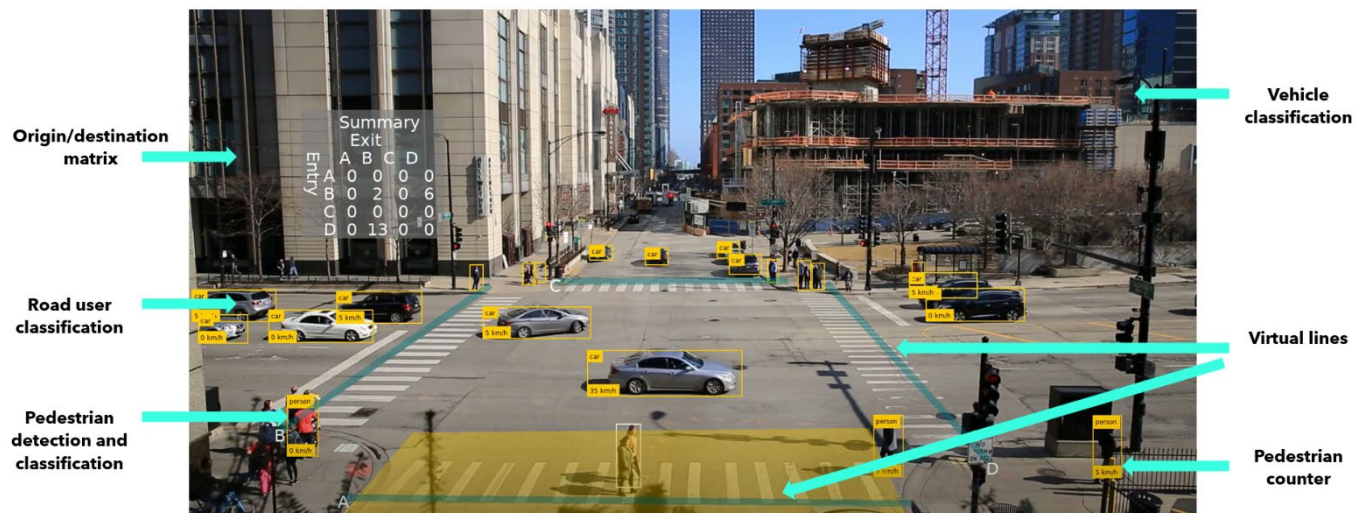Figure: Virtual segmentation of the camera's field of view

Figure: DLVP intersection example

DLVP Supported Functional Use Cases

Vehicle Detection

- Vehicle detection and classification

Person Detection

- For pedestrian, cyclist, and persons with personal mobility devices

Vehicle and Person Classification

- 23+ classes based on TLS 8+1

Travel Speed Estimation

- Speed measuring, analyzing their origin and destination
- For analysis only

Counting

- Road usage volume
  - Per lane
  - Per class
  - Red light occupancy (combined with TLC info.)
  - Green light throughput (combined with TLC info.)
  - Turn count (micro origin / destination matrix)

Cycle Length Calculation

Micro Travel Time Calculation

Zone Monitoring

- Junction box zone
- Travel direction
- Vehicle class in lane

Incident and Anomaly Detection

- Near miss detection
- Rule violation
  - Tailgating detection
  - Wrong way driver detection
  - Slow zone / congestion detection
  - Stopped vehicle detection
  - Pedestrian-on-roadway detection

Data Enablement for BSM Generation

- Basic safety message

Third Party Component Trigger

- ALPR camera trigger

Predictions

- Travel path prediction

Kapsch TrafficCom

Kapsch TrafficCom is a globally renowned provider of transportation solutions for sustainable mobility with successful projects in more than 50 countries. Innovative solutions in the application fields of tolling, tolling services, traffic management and demand management contribute to a healthy world without congestion.

With one-stop-shop solutions, the company covers the entire value chain of customers, from components to design and implementation to the operation of systems.

Kapsch TrafficCom, headquartered in Vienna, has subsidiaries and branches in more than 25 countries and is listed in the Prime Market segment of the Vienna Stock Exchange (ticker symbol: KTCG). In its 2023/24 financial year, about 4,000 employees generated revenues of EUR 539 million.

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