Vaisala RoadAI

/ ARTIFICIAL INTELLIGENCE ASSISTED ROAD INFRASTRUCTURE MANAGEMENT

VAISALA

The Most Efficient Way to Collect and Manage Infrastructure Data

Vaisala RoadAI (Road Artificial Intelligence) is a service for efficient infrastructure management. The service supports maintenance processes, as well as provides better means to monitor and coordinate construction projects. The two core elements of the service are video capture and automated analysis of the captured video. The video is used as raw data by the computer vision, in combination with sensor data to form spatial information of visible objects. Video capture enables visual documentation to support communication and verification of computer vision in automating inventories and producing notifications of detected changes.

RoadAI is used by various sizes of organizations in infrastructure management, construction and maintenance. In construction projects the system enables a structured way to keep everyone involved aware of progress, and to give an up-to-date view of the project to planning personnel and security officers alike. RoadAI supports maintenance processes by providing a streamlined way to capture visual feed from the field and refining it to valuable information for decision making.

System Overview

- Video and location information are collected using a smartphone
- Manual annotations can be added in the field
- Manage all visual material in one system
- Print reports and pre-filled maintenance plans
- Automatically obtain information about traffic infrastructure
- Constant monitoring and change detection

"The system was easy to scale for a larger number of employees. It increases our efficiency by not having to go to the field as often"

Ilmari Halme, Development manager, VR Track

Ideal for Large-scale Infrastructure Monitoring and Collaboration

ROADS

RAILROADS

AIRPORTS

CITIES

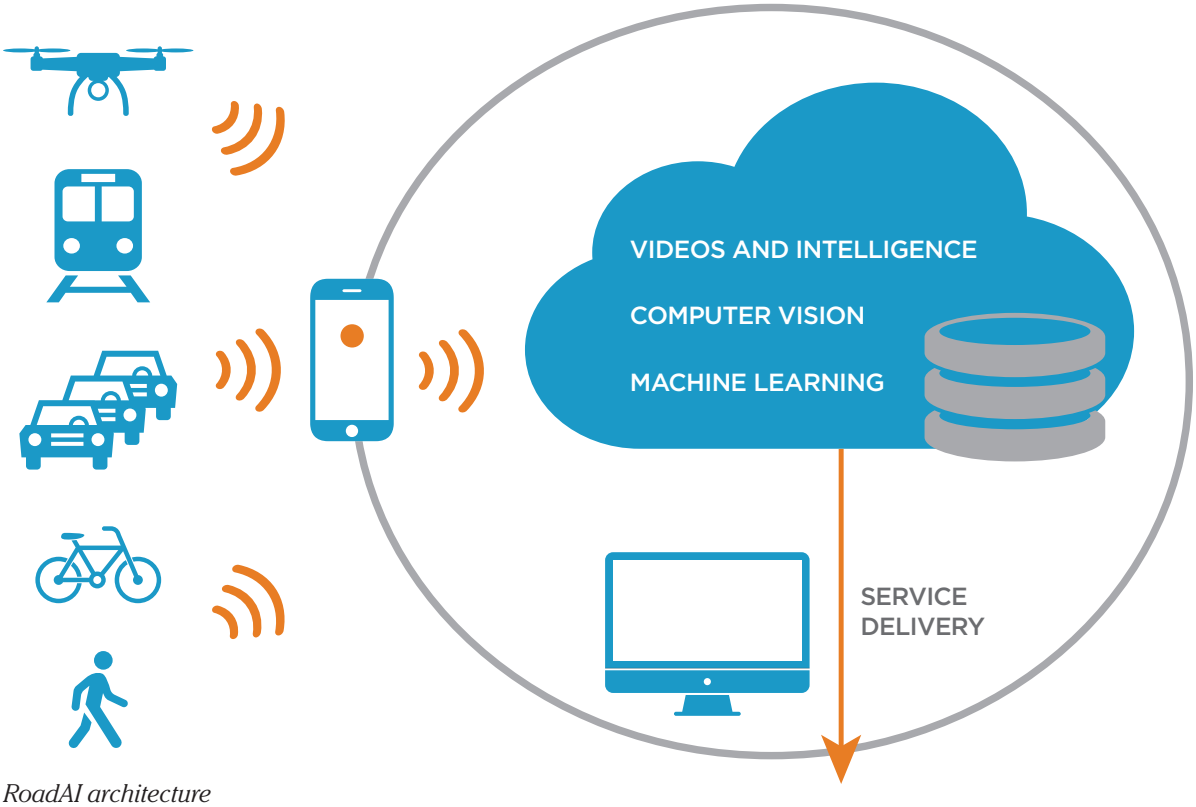
RoadAI is suitable for existing road and rail monitoring processes as well as new construction projects, but it can also be used to monitor a variety of other environments and applications. Vaisala offers an unmatched selection of devices and computer vision services which complement RoadAI.

Key Features Serving Many Industries and Applications

- Computer vision enables automation of visual inspections
- APIs for accessing data from other systems (application programming interfaces)
- Secure data transmission with strong encryption
- Collected data can be anonymized to meet privacy requirements

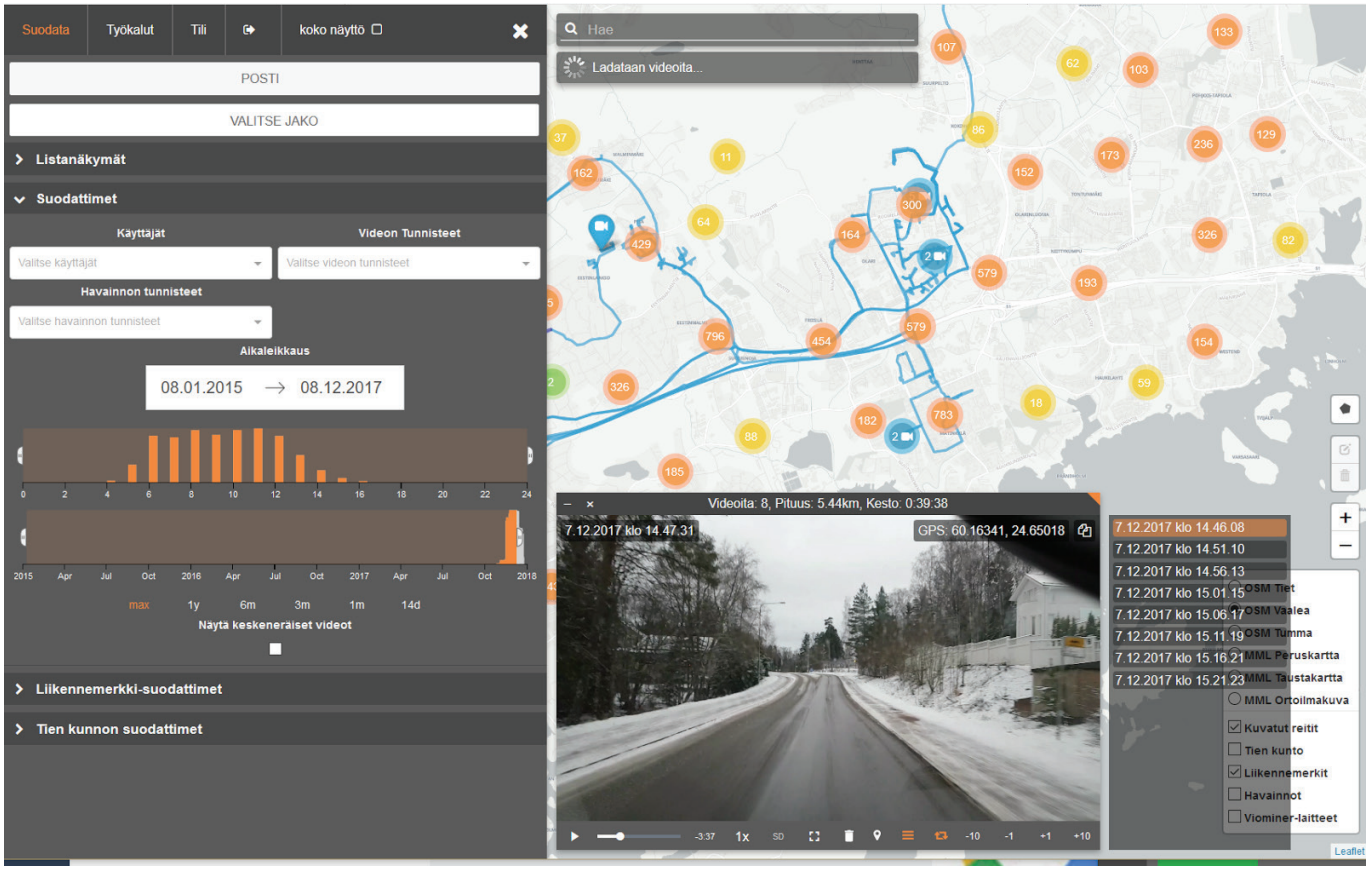
"RoadAI brings a new perspective to improving road asset management and maintenance operations"

Pasi Leimi, Director, City of Lappeenranta



RoadAI architecture

Simple and Intuitive Visual Material Management



The map-based user interface provides access to all spatial data and information, whether manually produced or generated by the computer vision algorithms. The browser-based interface means there is no need to install any additional software. All the geolocalized data can be found from their actual location on the map, giving asset owners an immediate overview of the state of the infrastructure. The list view gives an alternative way to access the visual data as well as options to manage and refine using metadata. Comprehensive filtering options ensure fast access to specific data.

Share data inside and outside your organization

Always have the latest information available

Compare changes between different points in time

Receive support from maintenance specialists

Automatic Data Outputs and Situational Awareness

RoadAI can be developed to carry out the same visual inspection that a person can perform on collected video material. For example, a postal fleet can be used to monitor large parts of the road network with minimal intervention. On top of the superior performance compared to inspections carried out by people, automated analysis is also objective and consistent.

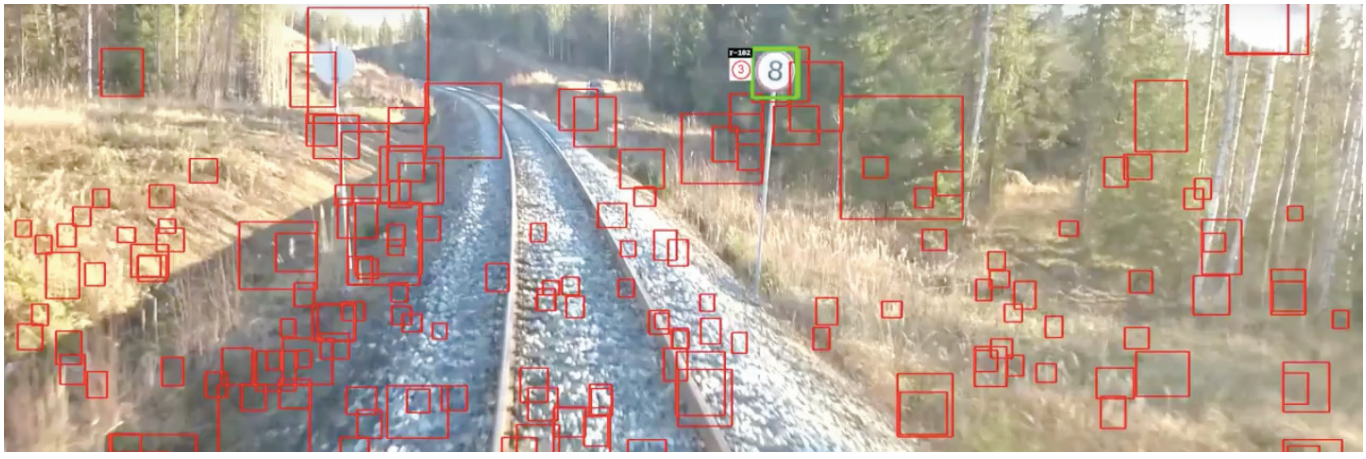
There are several computer vision and data analytics services available for real-time environment monitoring, and custom solutions can be created where required.

Automatically Exreacted Information

- Traffic signs and related objects
- Lane markings, pedestrian crossings
- Overall road and rail condition
- Road surface cracking and pothole detection

Benefits for Inventories and Constant Monitoring

- Data access through API's
- Exporting to various formats such as Shapefile, CSV, Excel
- Nearly real-time video processing and data extraction
- Change detection enabling fast reaction and maintaining procedures
- Simultaneous monitoring of multiple infrastructure elements

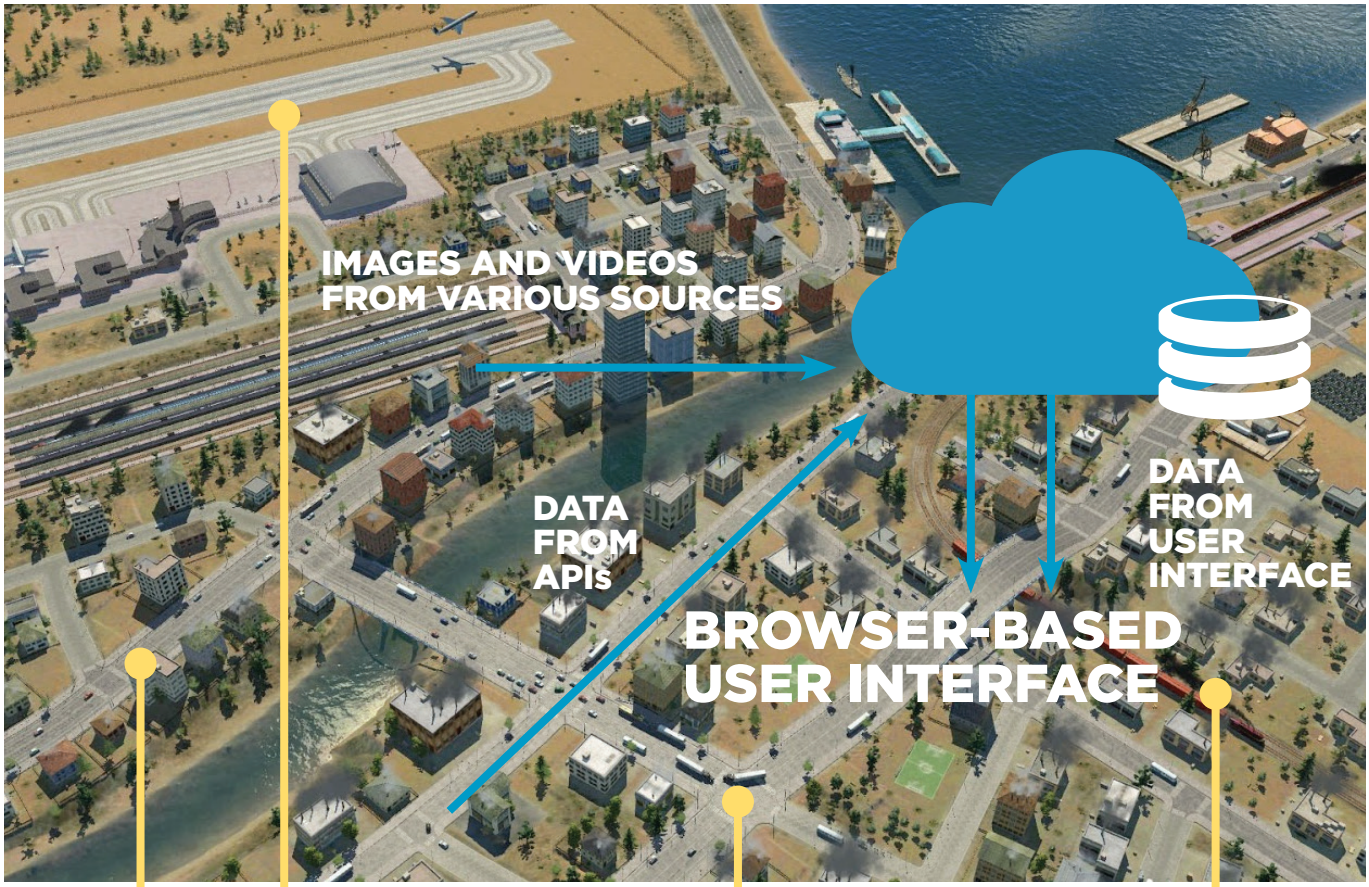


Enhance Decision Making with Up-to-date Information

Continuous data collection improves infrastructure management in several different ways. Decisions can be made faster as all information has already been collected and is stored in one location. The videos also contain valuable data for other parties, such as insurance companies or navigation system providers. Sharing the same data with multiple users and external organizations enhances efficiency and makes the data even more valuable.

Receive automatic alarms and notifications about any deficiencies in infrastructure, minutes after data collection..

Up-to-date information is used to enhance situational awareness and TO support decision making.



Problems with infrastructure such as cracking, potholes, and foreign objects are detected automatically.

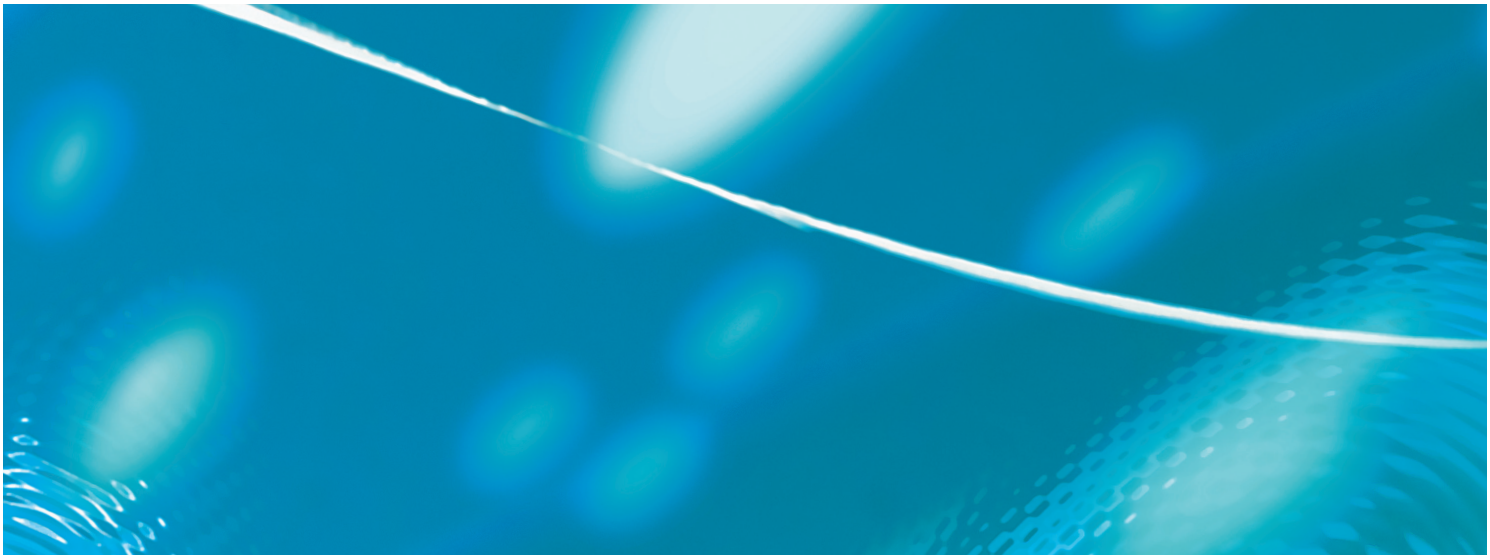
Buses or other commercial fleets can collect data during normal operation, reducing collection costs.

Cameras on trains provide up-to-date data on railroads and security devices.

Intelligent Infrastructure Monitoring

"Simple data collection and the ability to turn mobile-phone video into structured information can drive down the cost of having an up to date road data-bank. The [Vaisala] technology has shown very promising results in three areas: location and classification of point and line objects, generation of orthophoto of the road surface and deidentification of video and pictures. The [Vaisala] solution has given results far surpassing our expectations during testing."

Tomas Levin, Senior Principal Engineer
Norwegian Public Roads Administration



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