Norwegian Public Roads Administration
Norway

High-performance ALPR and manual image review service improve automation and accuracy across country's five regional toll roads

In 2019, the Norwegian Public Roads Administration procured an on-premise license plate review solution to improve the automation and accuracy with which the region's five toll roads could identify and bill toll road users.

SOLUTION

▷ INTRADA INSIGHT

▷ MANUAL IMAGE REVIEW SERVICE

TOLL ZONES: 63

TOLL GANTRIES: 237

AVERAGE DAILY RECOGNITIONS: 1,232,876

AVERAGE PASSAGES PER DAY: 3,013,698

About NPRA

The Norwegian Public Roads Administration (NPRA) is the government agency responsible for national and county public roads and traffic across Norway.

- Established in 1864
- Manages over 34,300 miles (55,300 km) of roadways

Tolling Challenge

- Provide customer choice in manual image review (MIR) process
- Provide interoperable video tolling solution
- Integrate data from different roadside equipment suppliers

The Solution

Intrada® Insight was selected and deployed across all five toll companies operating under the NPRA. The Q-Free solution offered an unrivalled combination of automated license plate review (ALPR/ANPR), advanced machine-learning, and integrated MIR.

Results

Intrada Insight delivered accurate, high-quality results while appropriately managing agency risk.

- 98% accuracy and error rates < 0.02%
- Unified operations for 5 regional toll companies
- Boosted toll revenues
- Significantly reduced operational costs for manual image review

Q FREE

Background

Toll roads have been long used in Norway to fund road building and maintenance. The network is owned by the Norwegian Public Road Administration (the Statens Vegvesen) which delegates operations to regional toll companies. AutoPASS is used by all five toll companies providing a seamless, interoperable, country-wide toll system. AutoPASS features a free-flow automated tolling solution with over 63 toll sections and 237 stations throughout Norway.

Road side equipment is supplied by multiple tolling equipment manufacturers, requiring the back-end solutions adopted by the NPRA to be vendor agnostic. In addition, each toll company must be able to choose how it wants to handle manual image reviews. The MIR software must therefore support operators from both the procured company providing the MIR service as well as the operators itself while staying compliant to GDPR and local privacy and security rules.

Unmatched Accuracy

The project required a 98% recognition rate with an error rate below 0.02% in all conditions. The strict accuracy requirements did not only apply to local Norwegian license plates but also the ability to decipher between all European plates as well. Such that, the system had to be able to identify and distinguish Norwegian license plates from similar plates, such as Swedish and Lithuanian plates, to avoid country confusion and avoid costly manual review.

Intrada Insight met these performance requirements by employing a combination of optical character recognition (OCR) techniques such as vehicle signature recognition or *fingerprinting*, ALPR, grouping techniques, and self-learning decision rules. During the test period, Intrada Insight achieved over 99% accuracy and error rates well within the performance requirements.

Scalability & Manual Review

NPRA required that overall system performance (i.e. automation) continuously improve to reduce the need for and expense of manual image review. To meet this requirement, Intrada Insight learns from the input provided through the MIR process. The corrected data enables the system to increase performance and optimize the manual review process by considering operator variability and other human factors.

To further reduce the time spent on image review, manually verifying ALPR output, and correcting mistakes, the Intrada MIR employs advanced workflows that minimize the average time spent per reviewed transaction while simultaneously reducing human errors and false negatives (e.g. unreadable plates). This semi-automated workflow works in conjunction with the reviewer to reduce the number of interactions during the review process. The system was designed based on years of user feedback, delivering the highest level of user optimization.

Out of six solution providers, the five toll companies operating for the NPRA considered Q-Free's offering the best fit and recognized quality and risk management for the ALPR *and* MIR service as "very good". The tender award explicitly mentioned the quality for the ALPR as especially good and awarding the MIR service the highest score between all options available.

About Intrada Insight

Intrada Insight is a scalable, high-performance end-to-end image processing and review software for video-based electronic toll collection (ETC). It is a turnkey solution that enables toll road operators and system integrators to achieve significant operational cost reductions and maximize toll revenues. Intrada Insight is vendor agnostic, making it compatible with any existing or new toll system - regardless of camera or back office supplier.

The solution delivers an unmatched combination of advanced self-learning video analytics with project optimized image processing, an innovative manual image review subsystem, and comprehensive status reporting. Together, Intrada Insight processes millions of passages each day while delivering unparalleled performance, saving customers millions each year.

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