Videonetics
Look Deeper

Intelligent Traffic Management System

Powered by DeeperLook™ AI & DL Framework

INTELLIGENT TRAFFIC MANAGEMENT SYSTEM (ITMS)

Videonetics Intelligent Traffic Management System (ITMS) is designed to replace tedious manual processes to track, regulate and analyse vehicle movement on roads and automatically detect various types of violations. This helps in inculcating traffic discipline among people, makes traffic management more robust, and contributes to better road safety.

Our system is powered by DeeperLook™ Artificial Intelligence and Deep Learning Framework. It is also seamlessly integrated with Videonetics Intelligent VMS and Video Analytics as part of the Unified Video Computing Platform (UVCP™), so that video surveillance and traffic monitoring services complement each other, and field issues get addressed with a holistic approach.

The system uses standard surveillance IP cameras to capture the video for analysis. The IP cameras are installed to cover either a single lane or multiple lanes depending on the resolution of the cameras and the size of the license plates. Videonetics ITMS is integrated to RADAR systems, traffic signal controllers and boom barriers to cater to a wide range of applications.

APPLICATION AREAS

- Urban Traffic Monitoring
- Parking Management
- Highway Traffic Monitoring
- Toll Booths
- Commercial & Industrial Complexes
- Gated Communities

ITMS SUITE

- Automatic Number Plate Recognition
- Red Light/ Stop Line Violation Detection
- Speed Violation Detection
- No Helmet Detection
- Triple Riding Detection
- Detection of Cellphone Use While Driving
- No Seat Belt Detection
- Vehicle Moving Wrong Way
- Parking Violation
- Free Left-Turn Block Detection
- ATCC (Congestion, Counting, Classification)
- Integrated e-Challan/ e-Ticket Management Software
- Smart Dashboard/ Data Visualisation Platform

Platform agnostic

The underlying algorithm in ITMS works with any OS platform – Windows, Linux, macOS. It is also agnostic of the camera make and model, providing tremendous flexibility to optimally design the solution without being restricted by specified proprietary and vendor-driven constraints. The software supports Intel©, ARM, NVIDIA©, Huawei and Xilinx FPGA architectures that accelerate video computing hence, achieving ultra-powerful performance with higher RoI.

Ensure law enforcement and road safety

Our ITMS acts as a true decision support system for traffic planners and traffic law enforcement agencies. It caters to city-wide deployments and enables real time processing, ensuring enforcement of rules and regulations.

Integration with police database

The ITMS solution has the capability to interface with country-specific vehicle databases for tracking offenders, resulting in elimination of tedious processes to track, regulate and analyse vehicle movement on roads, and to enforce traffic rules for safety of citizens and their properties.
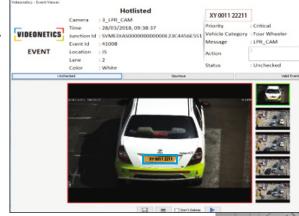
Automatic Number Plate Recognition System

Automatic Number Plate Recognition (ANPR) system automatically captures the license plates of any vehicle(s) in the field of view (FOV) of a camera and stores them in the database, so that details of the vehicles are available at any later point in time along with related video footage. If there is more than one vehicle in the camera FOV, then all of them are independently processed and their license plates are recognised irrespective of the type of vehicle – private car, taxi, bus, truck, auto rickshaw/ tuk-tuk, motorcycle etc. The system supports both single lane as well as multiple lane vehicle and license plate detection. It is agnostic to the background and foreground colours of license plates.

Videonetics ANPR system can detect vehicle license plates of over 100 countries and offers full VMS functionality along with incident detection analytics applications – all in a single, unified, monolithic systems architecture. It automatically generates alerts when any vehicle captured within the camera FOV is recognised as 'suspicious', 'wanted', or any other category tagged by the user. It has an integration framework with the city Automatic Number Plate Recognition surveillance system. Vehicles can be searched on the basis of timestamp, number plate, colour or vehicle category.
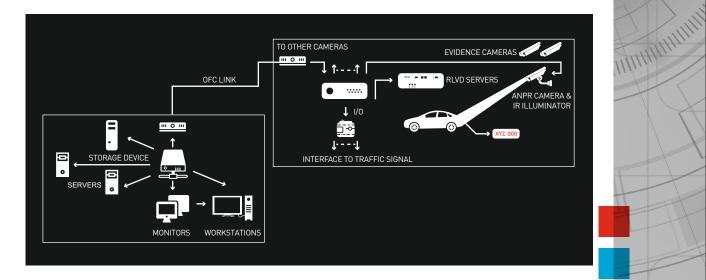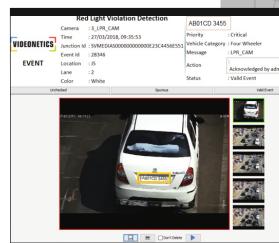
Red Light/ Stop Line Violation Detection System

The custom-built, end-to-end solution is designed for tough conditions to effectively monitor road junctions 24x7 and generate alerts in various forms when a vehicle violates red light at a traffic intersection. The system offers full VMS functionality long with incident detection analytics applications – all in a single, unified monolithic systems architecture. The system is architected in a modular fashion so that it is scalable and additional roads can be added to the system for monitoring and incidence detection.
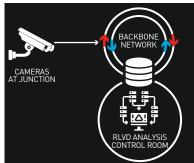

■ Systems architecture for RLVD

Videonetics RLVD system supports both centralised as well as distributed computing architecture.

A. CENTRALISED SYSTEMS ARCHITECTURE: Video feeds from all he cameras on a road terminate in the central control room, if it is equipped with proper communication infrastructure, bandwidth, servers, storage and other IT infrastructure. All these video feeds are analysed in real time in these central servers to detect violation of red light and automated recognition of the license plates of the violating vehicles.

B. DISTRIBUTED SYSTEMS ARCHITECTURE: Multiple IP cameras installed at each junction are connected to a local mini server placed at the junction itself. The video feeds are analysed in real time by the server to automatically detect the violation locally, and transmit only the filtered information about the violation clip (like a small segment of the video, with details of the incident and related metadata) to the control room. The junctions are centrally connected to the control room through VPN using private or public leased line/ MPLS service.

■ Reports

The interface allows control room operators to search and view archived events anytime. There can be various search criteria – date and time, event type, license plate number, or any combination of these parameters. The search results appear on the screen and can be exported as an Excel or PDF file.

Camera : All Cameras To : 08/01/2019, 10:59:00				From : 08/01/2019, 10:00:00	
SL	Camera	Event Type	Time	Vehicle Number	Snap
1	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:54:40	XY00ZZ1122	XY00ZZ1122
2	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:55:24	AB00CC1122	AB00CC1122
3	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:54:40	AA12BB2233	AA12BB2233
4	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:49:42	BC11BB2233	BC11BB2233
5	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:49:30	AA11BB2234	AA11BB2234
6	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:37:07	XX11BB2244	XX11BB2244
7	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:35:10	YY11BB1234	YY11BB1234
8	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:33:54	AB00CC1122	AB00CC1122
9	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:31:33	BB12BB2233	BB12BB2233
10	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:30:31	CC11BB2233	CC11BB2233
11	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:26:01	DD11BB2234	DD11BB2234
12	Machli Ghar To Banganga square	Red Light Violation Detection	08/01/2019, 10:25:14	EE11BB2244	EE11BB2244

■ Alert notification

The system can be configured to send messages to any other third-party software/ device whenever any event is detected. Additionally, the system itself can send emails and SMS to any recipient as notification against an event.
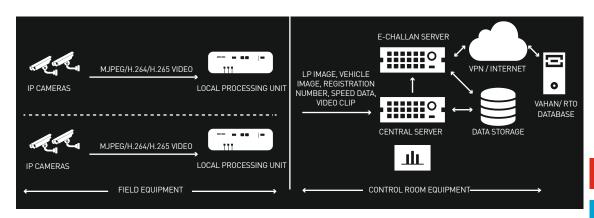
Speed Violation Detection

Videonetics Vehicle Speed Violation Detection solution is a field-proven, state-of-the-art video-based speed violation detection solution. It is fully customised and meant for challenging traffic conditions. Exclusive of any sensors like radar and laser, the solution's algorithm is powered by its pioneering research on computer vision and image processing. The user-friendly and powerful software GUI provides rich user experience and seamless operation between various modules of Integrated Traffic Monitoring.

■ Features

- Customised and configurable rule engine for setting user-defined speeding parameters
- Built-in vehicle classifications
- Built-in ANPR engine
- ANPR detection for license plates of over 100 countries
- Provides average* and instantaneous speed
- Exclusive of conventional sensors like radar, laser and loop detectors etc.; however integration framework is available
- Vehicle category editor and detection such as 'stolen'/ 'wanted'/ 'suspicious' etc.
- Zoom-in/ out captured number plates for better viewing
- Audit trail of number plate updates by system operator
- High availability and redundancy
- Integrated with open source maps
- Separate over-speeding limits for 2-wheelers and 4-wheelers
- Speed detection up to 250 kmph with high accuracy
- Exhaustive MIS reports
- RTO/ VAHAN Sarathi database integration
- e-Challan/ e-Ticket integration
- Certified by NABL accredited test laboratory and other reputed research institutes**
- Tested and field-proven for challenging environments
- Integration framework available for third party sensors

*With two-camera setup
**Details available on request

No Helmet Detection System

Videonetics No Helmet Detection System (NHDS) tracks in real time two-wheeler riders who are violating traffic laws by not wearing helmet while driving on the road. The solution is intelligent enough to detect riders who pretend to wear helmet by using caps, scarfs etc. to cover their head. The system is intelligent enough to detect various types of standard helmets to filter out and detect tnon-standard helmets.

Triple Riding Detection

Videonetics Triple Riding Detection System (TRDS) detects in real time those who are doing triple riding on 2-wheelers. The powerful technology not only captures the number plate of the 2-wheeler with ANPR but can also generate an alert with the evidence video. On detection of a triple ride, the system generates events, store it, and allows its retrieval when required for analysis later on.

Once a violation is detected, evidentiary image is recorded with time stamp and vehicle number. The detected event is sent to another application installed at Central Control Room (CCR), and challan/ ticket is generated. Challan/Ticket generation also involves integration with the RTO/ vehicle owner database to collect the name, address and other details of the vehicle owner.

Detection of Cellphone Use While Driving

Videonetics Detection of Cellphone Use While Driving detects in real time drivers who are using cellphones while driving 4-wheelers, consequently violating traffic laws and putting their lives at risk. The solution intelligent enough to analyse gesture movements of the driver who is driving any type of 4-wheeler whether it is a private car, taxi, jeep, lorry, truck etc. After capturing the license plate of the violating vehicle with ANPR, the system generates an alert with the evidence video. Additionally, events are stored for analysis later on. The solution can seamlessly integrate with our Integrated e-Challan/ e-Ticket Management Software to generate e-tickets with details such as the violation image, time stamp, date and vehicle number etc. It enhances real time traffic monitoring, identification and processing of traffic offences, eventually helping modernise traffic management and make city roads safer.
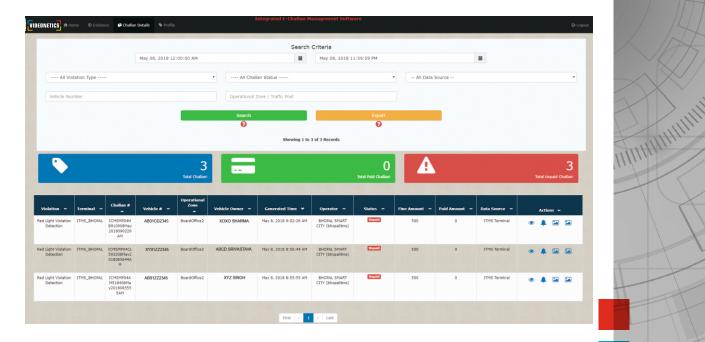
No Seat Belt Detection System

Videonetics No Seat Belt Detection System analyses live video streams to quickly detect 4-wheeler drivers who are not wearing seat belt while driving. Once the licence plate of the violating vehicle is captured with ANPR, the system generates an event and store it for analysis late on. The solution is capable of interfacing with country/ state specific vehicle databases as also with ICMS to issue e-tickets with details such as violation image, time stamp, date, vehicle number. Additionally, it can seamlessly integrate with other ITMS applications such as RLVD, Speed Violation Detection, Detection of Cellphone Use While Driving in the unified user interface.

Integrated e-Challan/e-Ticket Management Software

Videonetics Integrated e-Challan/e-Ticket Management Software (ICMS) is an open architecture software that integrates with Intelligent ITMS application suite offering efficient management of e-challans/e-tickets generated to penalise traffic violations like red light/stop line jumping, overspeeding, driving without seat belt/ helmet, using cellphone while driving, triple riding etc. Additionally, it allows the operator to include violations such as broken or non-standard number plate, among others, when visually detected during the validation of challans/ tickets. ICMS also integrates with handheld terminal/ PDA for spot challan generation.

Licence plate numbers have been altered to protect privacy, in compliance with General Data Protection Regulation (GDPR) guidelines.

Highlights

- National vehicle database (NIC VAHAN) integration
- Ready APIs for integration with regional and international vehicle databases
- Automated, semi-automated and spot mode of operation
- Secure web access
- Mobile user authentication and mobile device authorisation for HHT/ PDA
- Challan/ ticket traceability
- Detailed MIS reports and statistics
- Multiple challan/ ticket printing options

Features

- Ease of operation
  - Intuitive UI for ease of operation
  - Central web-based interface for administration, user management, challan/ ticket management and payment status management

- Ease of installation
  - Web-based central application which can be easily installed in any web servers
  - Android-based mobile app which can be installed in any compatible mobile device – smart phone, handheld device/ PDAs

- Vehicle database integration
  - Integrated with NIC VAHAN database
  - Web API based framework available to integrate with local, regional and international vehicle databases

- Scalability
  - Web service based architecture to support receipt of data from different system
  - Client-Server architecture is useful for parallel operation of multiple field devices
  - Central software for challan/ ticket management is scalable with IT infrastructure

- Security/ Cyber security
  - All the communication to and from the server is fully secured and protected to eliminate possibility of eavesdropping

- User management
  - Pre-defined user roles like admin, supervisor and operator available
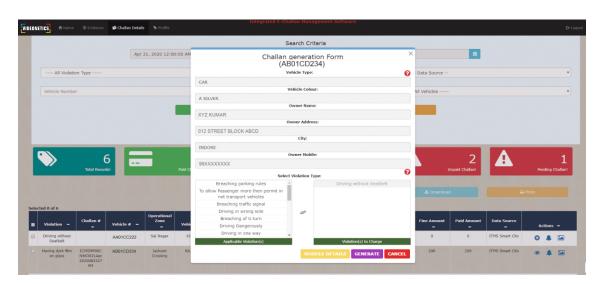 - Role-based device user authentication

- Challan/ ticket management
  - Each challan/ ticket is identified by unique identifier assigned to it when challan/ ticket is generated
  - Very large number of challans/ tickets can be uniquely identified and searched
  - Authorised users can search the history of offences – by device, location, offender, device user, generation type

- Challan/ ticket traceability
  - Each challan/ ticket is identified by unique identifier for future references
  - Challan/ ticket tagged to issuing officer's details
  - Challan/ ticket with accurate time stamp
  - Challan/ ticket generated using handheld device can be tagged with GPS location to accurately trace the location of offence

- Digital signature
  - Challans/ tickets are signed digitally by digital signature of the responsible authority

- Detailed MIS reports
  - Detailed MIS reports available from central location
  - Standard reports readily available based on type of offence, location, officer, offender

- Pictorial evidence
  - Each challan/ ticket is embedded with event images as evidence of the offence in central mode of operation

- Manual challan/ ticket generation
  - Upload images and text to generate challans/ tickets in semi-automated mode
  - Web-based data entry for manual challan/ ticket generation
  - Control room officers can generate e-challans/ e-tickets for the violations observed in Videonetics IVMS footage

- Event image and video clip from Videonetics IVMS is used as evidence

■ Additional features in spot operation using handheld devicest

- Device management
  - Device is pre-registered and managed centrally

- Security
  - OTP (one-time password) based user authentication

- Device hot listing
  - Hot listing and black listing of devices by IMEI from central location by authorised personnel

- Spot challan/ ticket
  - Spot challan/ ticket is generated by traffic officer at point of violation

- Offence history
  - For an offender, display of detailed history of previous offences, if any

- Frequent offence detection
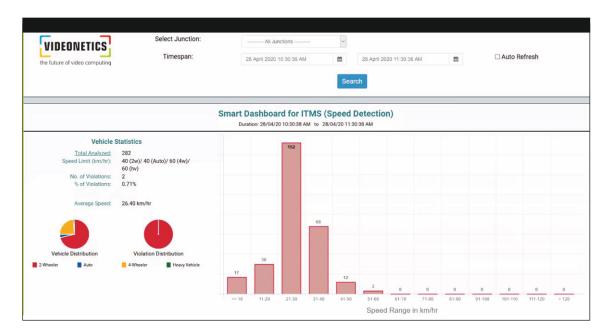 - Displays frequent offence types in hand-held devices

- Contextual help
  - Full context-based help is available to the officer for easy operation of the software

- Offline operation
  - Offline session per user is maintained in the handheld device. Once authenticated, the user can continue to work even if connectivity is lost

Smart Dashboard and Data Visualisation Platform

This is an interactive tool that provides real time statistical data, display of graphs/ charts of violations. It also gives details of violations by junction, location, vehicle type, along with snapshots of all the events for any given period. The browser-based design makes the solution easy to use and gives flexibility to generate reports based on customers' operational requirements. It also enables the user to track a suspected vehicle on an interactive map interface (e.g. Google Maps). The framework is highly scalable and integrates with third-party sensors through open APIs/ SKDs.

Other Solutions

The list of other applications includes:

- Suspected Vehicle Detection
- Sudden Congestion Detection
- Parking Zone Verification
- Virtual Loop for Vehicle Presence Detection
- Wrong-Way Movement Detection
- Vehicle Count or Traffic Estimation
- Free Left Turn Block Detection
- Integration Framework for ATCC & ATCS Systems

Making the world
a safer, smarter, happier place.

Videonetics's Unified Video Computing Platform™ helps you make sense of surveillance, by providing you with an end-to-end solution for a wide range of applications. The platform is powered by our Artificial Intelligence and Deep Learning engine, which is trained on humongous data sets, making our solutions incredibly robust and smart. All our products and solutions are integrated yet modular, ONVIF compliant, OS and hardware agnostic, scalable and interoperable.

Videonetics has been ranked #1 Video Management Software provider in India, and among the top 5 in Asia (OMDIA Informa Tech 2021). We remain driven by innovation, and committed to making the world a safer, smarter, happier place.

Providing an end-to-end solution for a wide range of applications

| Intelligent VMS | AI Enabled Video Analytics | Facial Recognition | Intelligent Traffic Management System | VCPaaS™ Video Computing Platform as a Service |

Technology leader across verticals, in different parts of the world

| CITIES & NATION | AVIATION & TRANSPORTATION | COMMERCIAL BUILDINGS | INDUSTRIAL | FINANCIAL & LEGAL | EDUCATION | CRITICAL INFRASTRUCTURE |

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