

## Application Overview



Automatic vehicle classification (AVC) is an integral part of all electronic toll collection (ETC) systems. The collection of traffic volume data according to vehicle classes differs from simple volume counting insofar as each vehicle is not only recognized as a vehicle, but is also classified into one of several defined categories.

Benewake LiDAR Vehicle Classification System offers long lasting and extremely reliable sensors for ITS in various operational areas such as stop-and-go Toll Plazas (ETC) and highway-speed Multi Lane Free Flow (MLFF) gentries. The system detect vehicle flow, speed, length, height and type at the same time.

## Vehicle Classification Advantages

### Customer Benefits



It help ETC manage fast charge project. No manual check work required. It will enhance safety for staff and reduce labor cost. The overall cost of the solution is lower than the 2D LiDAR solution.



The high frame rate LiDAR ensures that the solution can detect high-speed vehicles and can support 140km / h vehicle speed.



Strong anti-interference ability to adopt any environment. The system installed a dust removal brush to effectively suppress the lens dust interference, and can work in dark environment.



No secondary development with integrated algorithm and the error is less than 5%. Support wireless transmission. The system can support the industrial interface RS485.

### Performance Parameters

Range	0.1-180m
Distance Resolution	1cm
Accuracy	±5cm
Frame Rate	1Hz~1000Hz adjustable (default 100Hz)
Ambient Light Immunity	100Klux
Communication Interface	UART(customizable)

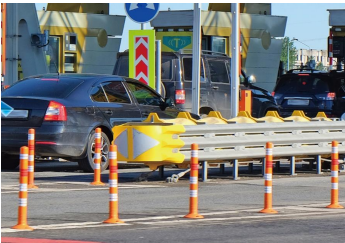
### Optical Parameters

Light Source	LD
Central Wavelength	905nm
FOV	120°*120°
Photobiological Safety	CLASS 1 (IEC 60825)



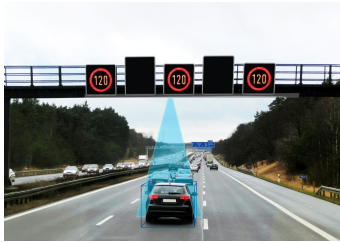
## Case Study

LIDAR based vehicle classification system has high accuracy. The adjustable installation FoV further widens its application scene. The system has obtained the eye-safety CCIC inspection exemption level certification, laser safety level Class 1 certification, anti-vibration impact report and many other certifications that meet technical standards. The system allows every customer to manage and control every traffic issue and every part of roads and the system support 7 kinds of vehicles now.



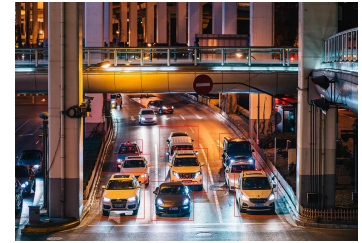
### ETC

The system is installed on the top of the safety island and measure vertically downward. After the vehicle passes through, the 3D model of the vehicle can be obtained. Then inform the system model and charge by type..



### Highway

The system is installed on the gantry. It can output vehicle speed, vehicle type and other information through preset adjustment angle, or transmit information to the control center through wireless transmission.

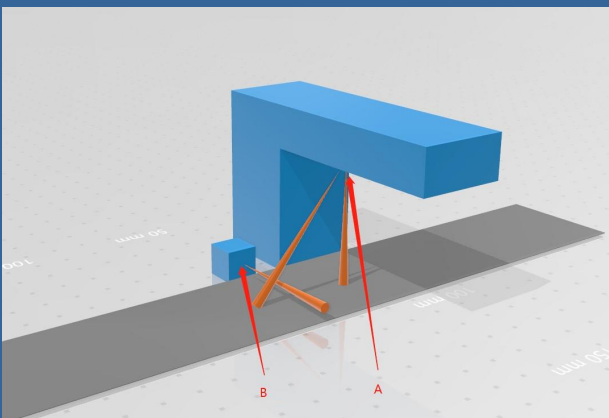


### City Road

The system is installed on the top of the large-scale. 24-hour automatic collection of traffic flow is realized, which provides reliable information for the traffic big data.

## Installation

### ETC Safety Island



**Part A:** Vehicle identification module. By installing the structural parts, two TF03-100 or TF02 Pro are fixed at a 40 ° included angle, one is measured vertically and the other is inclined downward. Usually the module is installed directly on the top of the toll station, under the overpass or under the traffic light pole through the installation hole, and is connected to the main system through the data line.

**Part B:** Axle identification module (auxiliary vehicle identification, more accurate results) It is composed of a TF03-100 and an installation structure. It is installed on the roadside of the toll station and used for axle statistics. Complement the components of this solution.



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