SIEMENS
Ingenuity for life

awareAI

Smart camera system with artificial intelligence to detect and track vehicles and pedestrians in defined detection zones

Overview

The Siemens awareAI system is a smart camera using artificial intelligence (machine-learning algorithms) focussing on the detection, classification and tracking of road users including trucks, buses, cars, bikes and pedestrians. All detection tasks are performed within the device, which provides the highest level of data protection, as only fully anonymized information is processed by external systems.

For detection and classification of road users, the awareAI camera can be installed out-of-the-box without any additional configuration. The device can be configured for advanced features, such as detection zones and tracking. The configuration of detection zones is possible through a web interface.

Benefits

- Versatile all-in-one solution with deep learning capabilities
- Support for advanced setups incorporating multiple cameras
- Highest privacy protection level due to local processing
- Reliable classification into various vehicle and pedestrian categories
- Flexible and convenient configuration of detection zones
- Ease of installation due to a single PoE+ data/power connection

Key Features

Object detection and classification

Using the integrated artificial intelligence engine, the awareAI camera can detect and classify 13 different object types out-of-the-box. Object detection and classification works from scratch without providing georeferences.

Detection zones

After commissioning, so-called detection zones can be defined through the awareAI configuration interface. Different types of detection zones are available, e.g. for pedestrian crossings, parking or generic tracking areas. For detection zones, precise georeferences must be provided for the camera device itself and for the detection zone polygon vertices. When detection zones are used, all detected objects are referenced to a detection zone.

Object tracking

Objects can be tracked to additionally determine their movement speed and direction, enabling crossing time predictions and other traffic analysis.

Data interface

The data interface transmits all detected objects through a secure web socket connection in the JSON format. The device tries to connect to the configured server on starting and pushes its detections with each frame. For each object, the object class, normalized boundary polygon position and classification confidence rate is transmitted. When detection zones are used, the corresponding detection zone is delivered as well. If tracking is used, the speed, direction, and object ID is also transmitted. Optionally, an evidence image can also be included.

Live view

For commissioning and maintenance, the camera provides a web interface with a live view of the camera image, detection zones and detected objects.

Supplementary Features

Video recording

For testing and commissioning purposes, short video clips can be recorded and transferred to an external server via FTP or SMB.

Network configuration

The camera is default-configured for DHCP. As an alternative, a static IP address and subnet mask can be configured.

Security configuration

The data interface requires a CA certificate file to trust the server to be connected to. Additionally, a client certificate is used for client authentication by the camera. The camera provides a feature to export a certificate signing request and to import a certificate. As an alternative, the private key may be imported.

Temperature monitoring

For optimal operation, the awareAI camera monitors its own temperature. The temperature is provided via the data interface together with device status information.

Status monitoring

The following status information is provided at regular intervals via the interface port:

- Current time (UTC)
- Uptime in seconds
- Temperature
- Error log

Time synchronization

The awareAI camera system can be configured to use NTP time synchronization.

Hardware

The camera device consists of a USB 3.0 area camera with a fixed focus lens. This camera is connected to the processing unit which performs the data processing. The connection is done via the power and monitoring board (PMB) which also serves as a USB 3.0 hub. The PMB is responsible for DC supplies from the PoE+ interface.

Installation

The awareAI camera has a wide view angle of 90 degrees. The higher the distance of the camera device to the observed area, the more vehicles can be covered by one camera, up to the camera's operational distance limit. The camera can be mounted on poles, gantries and building facades.

Operating Modes

Single device installation

It is possible to deploy single camera devices on-site and connect them via a router to a centralized server. The server connects them and gathers the detection data.

Second camera option

For non-real-time applications, a second external camera ("slave") can be connected to the main awareAI camera ("master") to cover a second field of view.

Multi-device installation with local server

In a multi-device installation, one or several cameras are installed; data is captured by a local server which combines the collected object information with other sensors. The software Sitraffic Sensus Monitor can be used for such multi-device integration applications.

Siemens Mobility GmbH

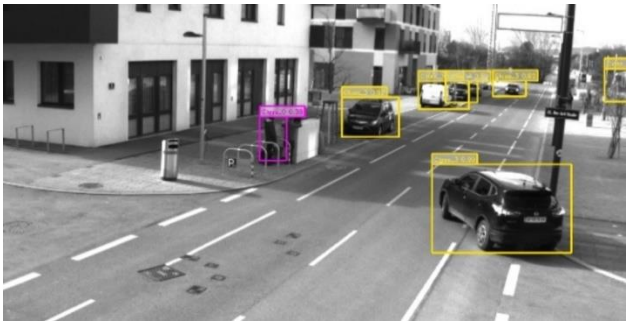
Intelligent Traffic Systems
Siemensstrasse 90
1210 Vienna, Austria

Order No. C97199-N2001-A004-00a-7629

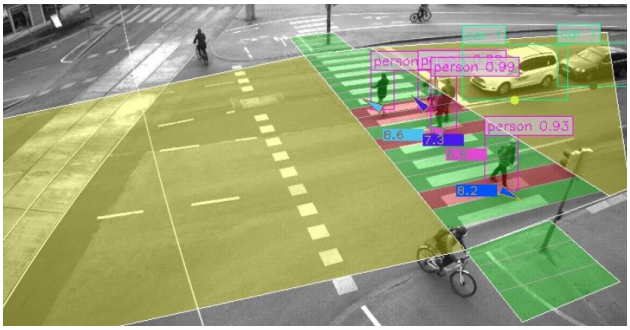
Technical Specifications

Parameter	Value
Dimensions	170 × 110 × 200 mm (excl. sunshield and holder)
Weight	3.5 kg (incl. sunshield and holder)
Operating temperature range	-20 to 45° C (optional sunshield to avoid direct sunlight available)
Range	5–40 m
View angle	90° (horizontal)
Camera	10 Megapixels, monochrome cameras
Power supply	PoE+ (48 V), typ. 20 W power consumption
Data interface	PoE+ Gigabit Ethernet

Installation Examples



Vehicle tracking



Pedestrian crossing surveillance

Parking space occupancy monitoring