

ADAPTIVE RECOGNITION

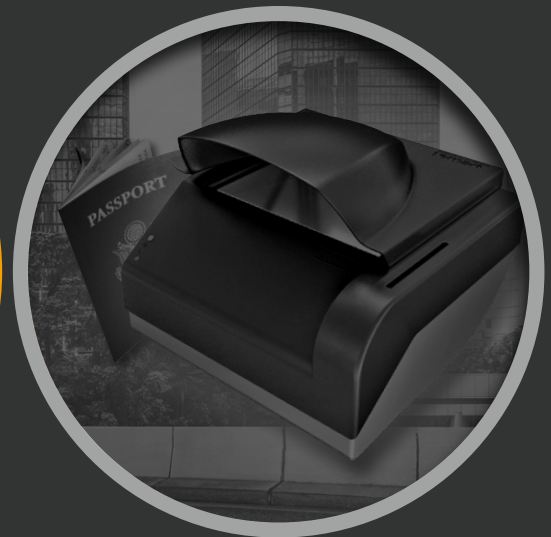
Image Recognition Products for Traffic, Security, ID Data Entry Automation and Biometric Identification



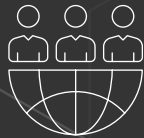
INTELLIGENT
TRANSPORT SYSTEMS



RECOGNITION
SOFTWARE & CAMERAS



IDENTITY DOCUMENT
READERS & BIOMETRICS



market presence in
220+ countries worldwide



10,000+
satisfied partners



300+ employees



50,000+ ID scanning systems



80,000+ traffic systems

RECOGNITION
SOFTWARE

SMART
SURVEILLANCE



INTELLIGENT
TRAFFIC
SYSTEMS

IDENTITY DOCUMENT
READERS & BIOMETRICS

RECOGNITION
CAMERAS

RECOGNITION SOFTWARE



CARMEN® GO
CARMEN® ANPR
CARMEN® ADR
CARMEN® ACCR
CARMEN® DOT
CARMEN® UIC

RECOGNITION CAMERAS



PARKIT CAMERA
FREEWAYCAM
SMARTCAM
SPEEDCAM
CONTAINERCAM
ENFORCECAM
MICROCAM
S1
FREEWAYCAM IR-LIGHT
FREEWAYCAM RAD-AR

INTELLIGENT TRAFFIC SYSTEMS



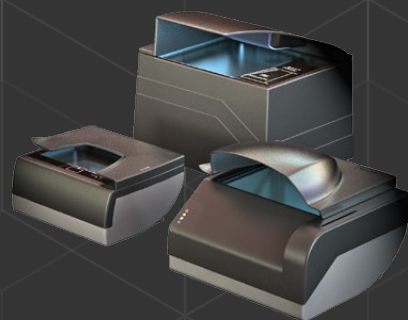
PARKIT SYSTEM®
TRAFFICSPOT
GLOBESSEY® DATA SERVER (GDS)

SMART SURVEILLANCE



VIDEO SURVEILLANCE SYSTEM
INTELLIO IVS4
INTELLIO INITIO
INTELLIO VISUS
INTELLIO SOLUTIONS

IDENTITY DOCUMENT READERS & BIOMETRICS



COMBO SCAN
COMBO SCAN KIOSK
COMBO SMART
COMBO SMART KIOSK
COMBO SMART N
PRMC
SCANNER SOFTWARE
AFS 510



ABOUT ARH

OCR RESULTS:



- NUMBER PLATE: ARH 001
- VEHICLE TYPE: MERCEDES BENZ
- NATIONALITY: EU-HUNGARY
- SPEED: 158 MPH / 254 KMH
- BLACKLIST: --- NO ---
- COLOR: BLUE METAL
- OWNER: ZSOLT VANYI
- RECOGNITION TIME: 2018-01-12T15:19:21+00:00

CARMEN[®] GO

CARMEN[®]



TYPICAL APPLICATIONS

Traffic analytics? Access control? Logistics track-and-trace? The answer is ARH's CARMEN® license plate recognition – possibly the best engine that effectively reads over 28,000 plates types all over the world. But Carmen can do more: ARH's CARMEN® software family reads container codes, wagon codes, hazmat plates and more. The following examples include typical applications where ARH's plate recognition engines offer unique benefits.

TRAFFIC MONITORING

Airport and harbour logistics

LAW ENFORCEMENT

PARKING MANAGEMENT LOGISTICS TRACK-AND-TRACE

Gas station security

Container code recognition

ACCESS CONTROL

CONGESTION CHARGING

USDOT code recognition

Railway code recognition

ADR (HAZMAT) CODE RECOGNITION

TRAFFIC ENFORCEMENT **TRAFFIC ANALYTICS**

campus security

TOLL COLLECTION

AVERAGE SPEED MEASUREMENT

BORDER CONTROL



- NUMBER PLATE: 6006 JAA / ٦٠٠٦ - ج ١١
- VEHICLE TYPE: FERRARI
- NATIONALITY: KSA
- SPEED: 122 MPH / 196 KM/H
- BLACKLIST: --- NO ---
- COLOR: RED
- OWNER: AHMED ABANA
- RECOGNITION TIME: 2018-01-12T15:19:21+00:00

INTRODUCTION TO THE ANPR/LPR PROCESS

WHAT IS ANPR/LPR?

Automatic Number Plate Recognition/License Plate Recognition (ANPR/LPR) has been ARH's core technology for over 27 years – software and hardware development and manufacturing.

ANPR/LPR is a traffic surveillance method based on optical character recognition (OCR).

A specific OCR algorithm processes captured images or footage to recognize the plate characters. ANPR/LPR can be implemented in any traffic related application using either an existing CCTV/IP camera system or dedicated ANPR/LPR cameras, which ensure high recognition rates and true 24/7 operation.

The operation of any ANPR/LPR system can be divided into three main steps. It is important to highlight that CARMEN® ANPR/LPR technology provides a fully adaptable solution delivered either as an SDK (software development kit) that can be seamlessly integrated with any existing workflow – or as a standalone, ready to use application.

HOW DOES ANPR/LPR WORK IN PRACTICE?

The operation of any ANPR/LPR system can be divided into three main steps.

1. Detection & image capturing

At the front end of any ANPR/LPR system there is a camera that captures images of the plates. The camera plays an important role in the ANPR/LPR process, by making sure that the captured images are appropriate for ANPR.

This highly determines the overall performance of the system. The best results are achieved by using specialized cameras designed for ANPR/LPR. ARH offers a wide range of dedicated ANPR/LPR cameras.

2. Image preselection and plate recognition

The main software aspect of an ANPR/LPR system is reading the plate text from the preselected set of captured images.

This automated recognition has several steps, including image normalization and enhancement, as well as detecting the vehicle in the image. The final step is taken by the OCR algorithm that recognizes the individual characters.

CARMEN® ANPR is the world leader in ANPR software, and it's a result of over 26 years of continuous development. It facilitates country-independent recognition, in case of dense traffic reading of multiple plates from one image, color recognition, state or country identification, accomplishing all of this extremely fast with high accuracy.



3. Data record and end-user application

Besides the characters of the vehicle plate, CARMEN® also returns plenty of additional information, such as an image with the recognized plate(s) and the confidence level assigned to each character as well as the whole plate. Once all license plate data is saved to a database, the data record serves as input to the end-user's business logic. Automated number plate recognition may be a key component of vehicle access control, traffic and toll enforcement and many other applications.

ANPR RESULTS:


ARH 001

- NUMBER PLATE: ARH 001
- NATIONALITY: EU-HUNGARY
- RECOGNITION TIME: 2018-01-01T15:19:20+00:00



DETECTION



IMAGE
CAPTURING



IMAGE
PRESELECTION



PLATE
RECOGNITION



DATABASE
RECORD



END-USER
APPLICATION



CARMEN® ANPR FREEFLOW

LICENSE PLATE RECOGNITION SOFTWARE LIBRARY & SDK

GLOBAL LICENSE PLATE RECOGNITION SOFTWARE FOR TRAFFIC SOLUTIONS

CARMEN® FREEFLOW is the unlimited version of the ANPR product line. Designed to read and process a large number of license plates in 24/7 traffic monitoring, security, highway tolling and congestion charging systems. It offers country-independent recognition as well as recognition of number plates featuring not only Latin characters but also characters from Arabic, Cyrillic, Chinese, Korean, Thai alphabets, and many more.

Other applications that can benefit from its fast and accurate automatic recognition capabilities include speed and journey time measurement, access control, parking management, bus lane enforcement, border control or gas station monitoring, etc. CARMEN® ANPR FreeFlow reads license plates from any image source extremely fast and with outstanding accuracy.

CARMEN®

OCR RESULTS:



ARH 001

- NUMBER PLATE: ARH 001
- VEHICLE TYPE: MERCEDES BENZ
- NATIONALITY: EU-HUNGARY
- SPEED: 158 MPH / 254 KMH
- BLACKLIST: --- NO ---
- COLOR: BLUE METAL
- OWNER: ZSOLT VANYI
- RECOGNITION TIME: 2017-05-12T15:19:21+03:00



6006 JAA

- NUMBER PLATE: 6006 JAA / ٦٠٠٦ ج ا ا
- VEHICLE TYPE: FERRARI
- NATIONALITY: KSA
- SPEED: 122 MPH / 196 KMH
- BLACKLIST: --- NO ---
- COLOR: RED
- OWNER: AHMED ABANA
- RECOGNITION TIME: 2017-05-12T15:19:21+04:00

MAIN BENEFITS

- Increases security and safety of highways and access control areas
- Enhances fidelity by handling various plate sizes, syntaxes, and distorted plate images
- Allows smooth and problem-free 24/7 operation
- Saves time and energy with fast and reliable automated license plate reading
- Decreases data entry errors with improved accuracy and recognition rates
- Ensures easy installation through SDK and user-friendly API

KEY FEATURES

- Automatic recognition of license plates in free flowing traffic environments
- Fast, easy, and straightforward use
- Hardware independence: compatible with any image source (analog/digital/still images/MJPEG video streams)*
- Country, state or province, and plate type recognition
- Country-independent recognition including Latin, Arabic, Chinese, Korean, Thai, etc. characters
- Optional License plate color recognition
- Non-empty dangerous goods plate recognition included

* ARH's dedicated ANPR/LPR cameras are available for high quality image capturing and industry leading recognition rates.



TRAFFIC
MONITORING



TOLLING
SYSTEMS



JOURNEY TIME
MEASUREMENT



ACCESS
CONTROL



BUS LANE
AND RED LIGHT
ENFORCEMENT



TRAFFIC
SECURITY
MONITORING



VIDEO
ANALYTICS



BORDER
CONTROL



GAS
STATION

CARMEN® ANPR 5K, 8K and 11K LICENSE PLATE RECOGNITION SOFTWARE LIBRARY & SDK

In applications where the vast potential of CARMEN® FreeFlow is not necessary, one of the CARMEN® ANPR 5K/8K/11K versions may be the ideal choice. In fact, CARMEN® ANPR 5K/8K/11K may be the optimal cost-effective choice for roads with low traffic density or 3rd party smart cameras with not so powerful processors. CARMEN® 5K/8K/11K can also be recommended for vehicle access control systems.

CARMEN® ANPR 5K, 8K and 11K: principle of operation

In these versions, before actually starting to process an image, CARMEN® needs a credit. New credits are generated throughout the day (24 hrs). However, the number of available daily credits are limited – hence the name 5K, 8K and 11K. In these 3 cost-effective versions of CARMEN®, operation is dependent on 2 parameters: one is a time factor indicating the time lag between generation of new credits; the other is the maximum credit buffer size – these 2 factors determine the processable number of images in a given time period. Calculating with 3 images per vehicle, there are enough credits for a peak of 180-200-220 vehicles per hour. These CARMEN® versions are ideally used for vehicle access control in corporate headquarters, as well as on roads with low traffic density – where the cameras installed or the processing hardware have limited performance.

MAIN BENEFITS

- Offers the high recognition rates of CARMEN® FreeFlow with quad-core operation
- Saving time and energy in data entry by automating plate reading
- Centralising registration eliminates the need for access cards or codes to system users
- Increasing safety and security of access control areas
- Boosting reliability by handling various plate sizes, syntaxes, and distorted plate images
- Allowing smooth and problem-free 24/7 operation
- Cost effective versions of CARMEN® FreeFlow ANPR

KEY FEATURES

- Automatic recognition of analog/digital input plate images of vehicles in stop and go or reduced speed traffic situations
- Fast, easy, and straightforward use
- Country, state or province, and plate type recognition
- Country-independent recognition including Latin, Arabic, Chinese, Korean, Thai characters, and many more
- Optional license plate color recognition



VEHICLE ACCESS
CONTROL
SYSTEMS



CORPORATE
PARKING
FACILITIES



PARKING
MANAGEMENT



HOTELS OR
RESIDENTIAL
AREAS



AIRPORT
AND HARBOUR
LOGISTICS



BORDER
CONTROL



GAS
STATION



CARMEN® GO

LICENSE PLATE RECOGNITION CLOUD AND PLUG & PLAY ANPR

Are you looking for a simple app to transform any video stream into ANPR results? Would you like to build your own system, without the need for ANPR integration? Motivated by these challenges and capitalizing on our 27 years of experience, we have created the forward-thinking Carmen® GO, the plug and play ANPR application. It only takes a few clicks to set up Carmen® GO upon first use. All you need to do is link your camera stream(s) to Carmen® GO and you will get ANPR results directly from the stream(s). By using Carmen® GO you can focus on what matters most to you: your customers and your core business.

CARMEN® GO is a truly camera independent solution, letting you use any IP camera from any vendor.

CARMEN® GO uses the same industry leader CARMEN® ANPR engine that is at the heart of top systems around the world but it goes to the next level by self-adjusting settings to achieve optimal results. This is how we can ensure that CARMEN® GO will return the best possible result based on the given stream.

MAIN BENEFITS

- Camera independent: processes streams of any commonly available IP camera
- No need for ANPR expertise nor any ANPR integration skills
- Fully automatic operation adapts to incoming stream, self-adjusts to produce the best ANPR results
- Scalable solution that can handle up to 8 different streams adaptable to available processing power
- Automatic data storage options selectable by user: internal database, data file, FTP or data stream

KEY FEATURES

- Stream processed automatically, no need for trigger or manual selection
- Available as standalone product
- Adaptable license options, available in 3 different performance packages, each up to 8 streams (24 different options in total)
- Built in advanced vehicle detection algorithm (VehDet)

CARMEN® SERVER

TOWARDS THE CLOUD

Are you looking for a centralized, server based ANPR? Would you like to build your own, powerful backend? Your dedicated cloud or video management system? Think BIG! We have the solution: CARMEN® Server. This version enables your system to perform dozens, even hundreds, of number plate recognitions simultaneously.

- Available to serve 32/64/128/256 parallel ANPR processing tasks
- Enables you to build your own dedicated ANPR cloud server, capable of serving local, regional or nationwide systems
- Daily processed images can reach up to 200+ million*

* 256-core system, 100 ms average processing time



TRAFFIC
MONITORING



TOLLING
SYSTEMS



JOURNEY TIME
MEASUREMENT



ACCESS
CONTROL



BUS LANE
AND RED LIGHT
ENFORCEMENT



TRAFFIC
SECURITY
MONITORING



VIDEO
ANALYTICS



BORDER
CONTROL

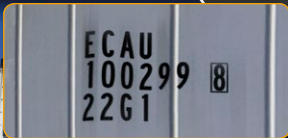


GAS
STATION

CARMEN® ACCR

ISO CONTAINER CODE RECOGNITION SOFTWARE LIBRARY & SDK

The CARMEN® Automatic Container Code Recognition (CARMEN® ACCR) software has been specifically designed to extract and read the Container Codes of ISO containers – the primary identification number of intermodal (shipping) containers. The code identifies the owner and the type/category of the container, and it serves as a unique serial number. Reading the ISO 6346 (BIC code), ILU and MOCO container codes of shipping containers can automate and simplify road, railway, or harbor operations, help border control, manage inventories and run container surveillance systems.



OCR RESULT:
ECAU 100299 8 22G1

ADR/HIN (KEMLER) CODE RECOGNITION SOFTWARE LIBRARY & SDK

CARMEN® ADR

The CARMEN® Automatic Dangerous Goods Recognition (CARMEN® ADR) software has been developed to recognise the Hazard Identification Numbers (Kemler codes) of vehicles carrying hazardous materials. The automatic reading of Hazard Identification Numbers (HIN) in a traffic monitoring or safety system increases safety on roads, bridges, in tunnels – wherever hazardous materials are transported. CARMEN® ADR identifies materials in transport through HIN codes that indicate primary and secondary hazards, which gives emergency responders the ability to quickly reference critical information about potential dangers.



OCR RESULT:
33 1088

CARMEN® DOT

USDOT (DOT) NUMBER RECOGNITION SOFTWARE LIBRARY & SDK

The CARMEN® DOT software has been created to extract and read the DOT number of a CMV (Commercial Motor Vehicle). All commercial vehicles in the United States have to have a unique identification number obtained from their respective Dept. of Transportation: the USDOT (or DOT) number. CARMEN® DOT functions as a highly accurate tool for automatic identification and tracking, as well as supporting inventory control systems.

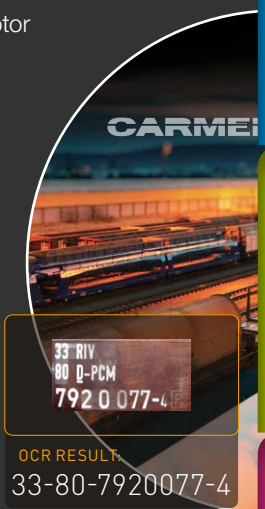


OCR RESULT:
1045759

UIC RAILWAY CODE RECOGNITION SOFTWARE LIBRARY & SDK

CARMEN® UIC

The CARMEN® Railway Code Recognition software (CARMEN® UIC) automatically extracts and reads the UIC numbers from railway wagons. Much like commercial motor vehicles and ISO containers, railroad cars carrying freight or passengers also have unique and internationally standardized identification numbers. Railway companies and logistics operations can significantly benefit from implementing CARMEN® UIC which reads railroad car codes from an image or video signal with the highest accuracy possible.



OCR RESULT:
33-80-7920077-4

COMPARISON CHART

AVAILABLE VERSIONS	CARMEN® ANPR 5K / 8K / 11K	CARMEN® ANPR/ADR FREEFLOW
Available versions	QUAD	SINGLE / DUAL / QUAD
Supported operating systems	Windows, LINUX	
Supported platforms	x86_32 x86_64 ARMv7 or higher	
Suggested CPU cores	1–4	2 / 2 / 4
NNC required, available NNC types	USB (internal 4 pin or type A), PCIe card (X1), Mini PCIe	
Available tools	SDK/API, license manager, engine manager (for Windows) ADI demo, AVI Demo *	
Supported programming languages	Windows and Linux: C/C++, Java Windows only: C#, Visual Basic .NET	
Engine update availability	One year from purchase included, optional subscription available on yearly basis	
Capacity (images/day)	5760 / 8640 / 11250	unlimited**
Processing threads	4 parallel threads	1 / 2 / 4 parallel threads
Credit buffer	300 / 240 / 200	unlimited
Time for 4 new credits (sec)	60 / 40 / 30	–
INTERFACE		
Input	Image (1 still image or 1 frame from a video stream)	
Output	Through SDK functions: NUMBER PLATE RESULTS (multiple if applicable), COUNTRY/STATE, PLATE TYPE, TIP LIST, COLOR, CONFIDENCE LEVEL, POSITION, etc.	

* For more TOOLS: check our SOLUTIONS or SMARTCAM product range

** Depends on CPU speed, settings, engine type

SOFTWARE & SDK

CARMEN® ANPR/ADR SERVER	CARMEN® GO ANPR	CARMEN® ACCR/DOT/UIC
32 / 64 / 128 / 256	SINGLE / DUAL / QUAD	SINGLE / DUAL / QUAD
Windows, LINUX	Windows	Windows, LINUX
x86_32 x86_64 server cloud virtual machines	x86_32 x86_64	x86_32 x86_64 ARMv7 or higher
32–256	2 / 2 / 4	2 / 2 / 4
NNC SERVER	USB (internal 4 pin or type A), PCIe card (X1), Mini PCIe	USB (internal 4 pin or type A), PCIe card (X1), Mini PCIe
SDK/API, license manager, engine manager(for Windows) ADI demo, AVI Demo *	Carmen GO service application, web interface, license manager, SDK for the stream output	SDK/API, license manager, engine manager(for Windows) ADI demo, AVI Demo *
Windows and Linux: C/C++, Java Windows only: C#, Visual Basic .NET	–	Windows and Linux: C/C++, Java Windows only: C#, Visual Basic .NET
one year from purchase included, optional subscription available on yearly basis	one year from purchase included, optional subscription available on yearly basis	one year from purchase included, optional subscription available on yearly basis
unlimited**	unlimited**	unlimited**
scalable: 32 to 256 / RACK	1 / 2 / 4 parallel threads	1 / 2 / 4 parallel threads
unlimited	unlimited	unlimited
–	–	–
Image (1 still image or 1 frame from a video)	Live video stream, 1–8 parallel – selectable at purchase	Set of images (multiple still images or frames from videos)
Through SDK functions: NUMBER PLATE RESULTS (multiple if applicable), COUNTRY/STATE, PLATE TYPE, TIP LIST, COLOR, CONFIDENCE LEVEL, POSITION, etc.	Direct output to INTERNAL DATABASE, FTP, CSV, DATA STREAM formats. Output data: NUMBER PLATE RESULTS, Plate country, images, stream ID, time stamp	Through SDK functions: OCR RESULTS TYPE, TIP LIST, CONFIDENCE LEVEL, POSITION

Technical specifications are subject to change without prior notice. This document does not constitute an offer.

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** Depends on CPU speed, settings, engine type

