

NEC Enhanced Video Analytics Provides Advanced Solutions for Video Analytics

YOSHIKAWA Masato, ARAKI Soichiro, UCHIDA Terutaka, YANO Tatsuya

Abstract

Acceleration of digital transformation using video analytics technologies in stadiums, shops, hotels and public transport has made it necessary to provide the efficient provision of composite video analytics solutions. NEC Enhanced Video Analytics (EVA) is an integrated software platform that flexibly combines the components of video analytics including face recognition, behavior detection and attribute estimation to meet the needs and resolve the issues of customers. This paper introduces the advantages provided by this platform, some examples of solutions and details of the system configuration.



video analytics, face recognition, behavior detection, attribute estimation, digital transformation, safer cities, IoT, edge computing

1. Introduction

Installations of network cameras are recently being advanced for the purpose of crime prevention and accident control measures in facilities, shops, streets and public transport systems, and have already proven their effectiveness. While the main usage of the video data from cameras has traditionally been to check and analyze the saved data, mechanisms making use of video analytics technologies to provide information for video processing by analyzing video data in real time are recently being implemented. NEC is contributing to the safety domain by providing video analytics technologies mainly focused on face recognition. More recently, NEC is advancing increasingly into a wider range of fields, as seen in contributions to customer engagement improvements of hospitality treatment in shops and hotels. This trend has made it desirable to develop various video analytics technologies.

The problem posed here is the method of providing video analytics technologies. If face recognition and other video analytics technologies were provided as independent solutions for a customer who wants to

introduce several video analytics technologies, such a method would be extremely inefficient. Even if the same cameras are shared by different systems, it would still be required to introduce several systems or perform individual development for combining multiple solutions. Below we introduce the NEC Enhanced Video Analytics (NEC EVA) integrated software, which functions as the mechanism for solving these problems by freely combining various video analytics technologies on a single platform to meet the needs and issues of the customers.

2. Values provided by NEC Enhanced Video Analytics (NEC EVA).

NEC EVA is the software platform for building solutions that can deal efficiently with the video analytics needs of our various customers. As shown in **Fig. 1**, it is composed of common functions for camera input/video processing, a variety of analytics units and common management user interface, so that it is capable of providing each customer with the suitable solution by flexibly combining different kinds of the necessary functions. For example, with the integrated surveillance solution, NEC EVA provides several surveillance functions. These

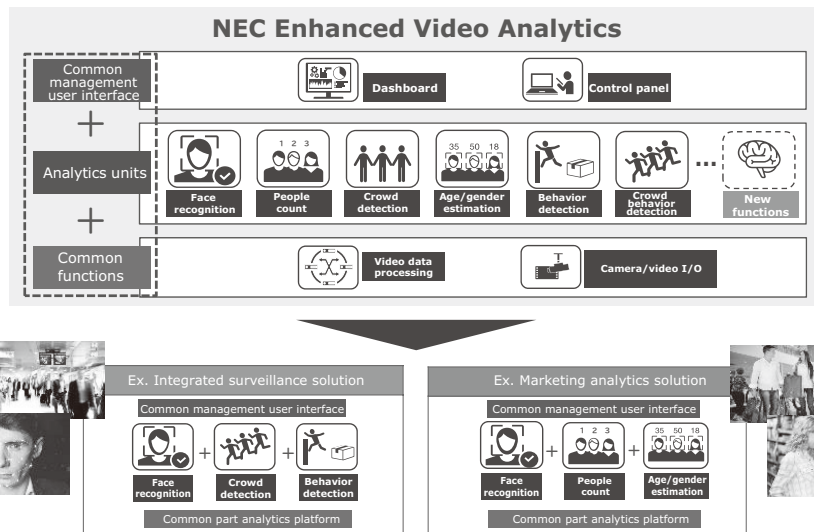


Fig. 1 NEC Enhanced Video Analytics (NEC EVA).

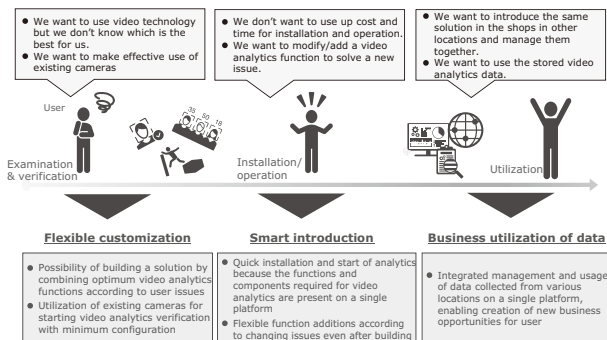


Fig. 2 Values provided by NEC EVA.

include a suspicious person detection based on face recognition, detection of a crowd with a high accident risk based on congestion detection and abandonment/suspicious behavior detection based on behavior detection at the same time. With the solution for retailers, a single system can provide for example, a payment settlement based on face recognition, optimum personnel distribution based on queue detection at cash register using people count detection, and the customer attribute analytics based on age/gender estimation. Naturally, data handling must be secured due to privacy issues. This platform enables flexible design on this point and the database can be placed on site or in a cloud according to the policy of each customer.

Fig. 2 shows the values NEC EVA offers to users. It provides important values in each of the three phases of examination/verification, installation/operation and utilization of the solution. In the solution examination

in phase 1, flexible combination and desired customization of diversified video analytics technologies of NEC EVA are possible in order to implement the optimum solution capable of solving users' issues. Even in a stage at which the optimum solution needed by the user is unclear, it is possible to verify the optimum solution by testing the analytics functions. When the solution building starts after deciding the required solution, the rich range of function components of NEC EVA can be used for quick building/installation. If a new business issue arises during operation, a quick solution can be supported by introducing an additional analytics function. Furthermore, total optimization of the users' businesses by using the analytics data collected from various locations is easy, thanks to linkage with the cloud.

As seen above, the use of NEC EVA enables optimum solution building, quick installation and effective data usage after installation.

3. Examples of Solutions

Here are three examples of solutions that can be implemented with NEC EVA.

(1) Integrated surveillance solution (Fig. 3)

For example, in a large-scale facility such as a stadium or airport, a large number of security cameras are installed for the safety of operations. As the large quantity of video data from them are checked by human labor, there have been issues such as the necessity of having many security guards and the overlooking of scenes. In such a case, this solution detects only the events to be dealt with by

using advanced video analytics techniques such as suspicious persons detection based on face recognition and suspicious behavior and abandonment detection and then alerts the security guards of incidents. This improves the guard operation efficiencies, reduces oversights and improves the safety of both inside and outside the facility efficiently.

(2) Shop customer treatment procedure (Fig. 4)

In a retail shop such as a restaurant or convenience store, video analytics including face recognition and age/gender estimation can be used with each user's agreement for use in the order and accounting processing. It is also possible to recommend the products that may suit each user based on the ordering history and the liking data analytics. The congestion data analytics can also be used to support optimum staff placement by identifying the degrees of conges-

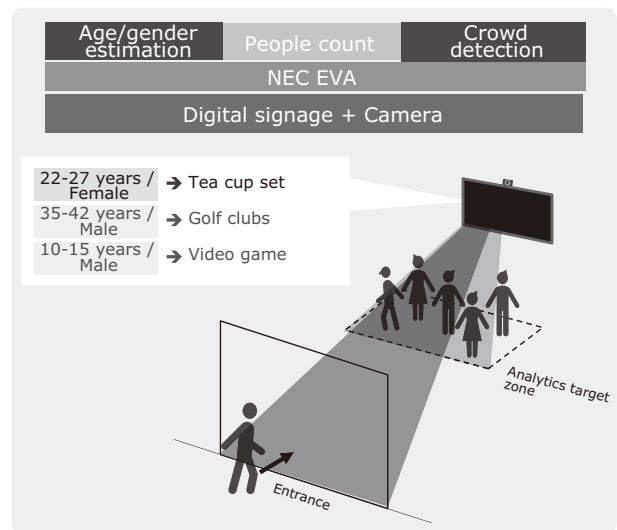


Fig. 5 Solution example 3: Advanced digital signage.

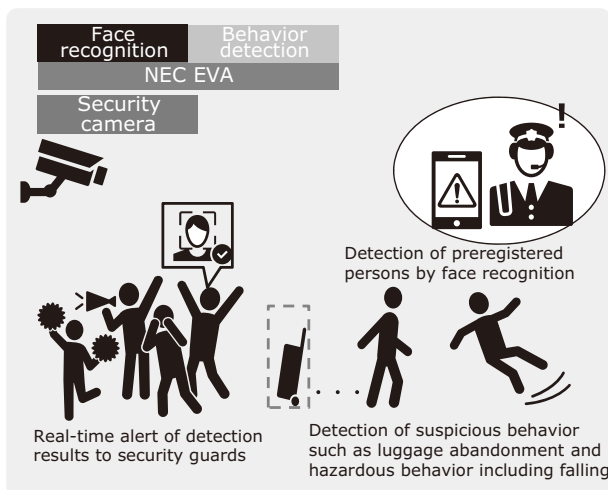


Fig. 3 Solution example 1: Integrated surveillance.

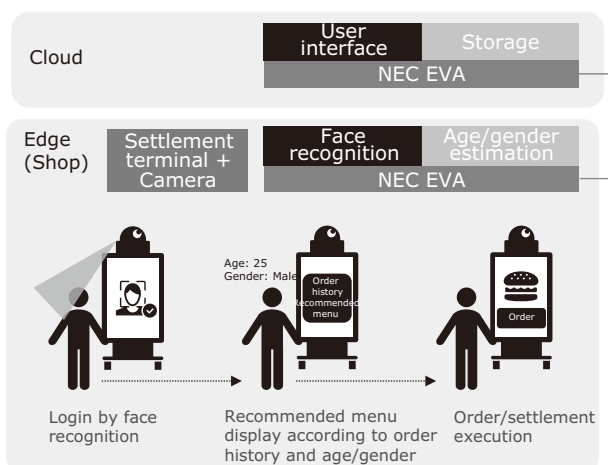


Fig. 4 Solution example 2: Shop customer treatment.

tion in the shop and among the cash registers. This procedure will provide support for customers by comfortable purchasing experiences. In addition, it will also promote application of the self-service system and at the same time reduce the operational costs.

(3) Advanced digital signage solution (Fig. 5)

Digital signage is sometimes used in advertising of merchandise. Even when an advertising content is displayed, it sometimes provides less efficiency as an advert if the content does not mean anything to audiences (showing ads of women's clothes to men). The procedure shown in Fig. 5 estimates the ages/genders of the persons viewing the camera placed on top of the display, checks their headcount and switches the ad content automatically in real time to influence their purchases so that the ad can manifest its original intent sufficiently. This age/gender estimation and people count check utilizes the "age/gender estimation" and "crowd detection" functions of NEC EVA. At the entrance of the shop, the persons entering or exiting are counted by using other cameras and the "people count" function so that the total number of persons visiting the shop on a day may also be clarified. Even when several video analytics functions are to be used as in the present case, NEC EVA is capable of dealing with it flexibly.

4. System Configuration

This section describes the system configuration of NEC EVA. For the mode of provision of NEC EVA, it is roughly divided into the following four layers (Fig. 6).

1. Common analytics platform
2. Video analytics engines
3. Analytics units
4. Common management user interface

Each of the "analytics units" of NEC EVA becomes the unit of video analytics software. The example shown in **Fig. 6** has several analytics units including the face recognition analytics unit, age/gender estimation analytics

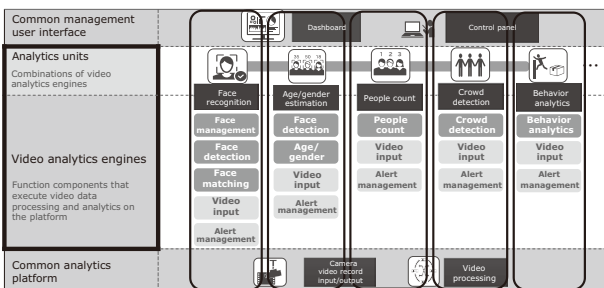


Fig. 6 NEC EVA provision mode.



Fig. 7 Illustration of a sample dashboard.

unit, people count analytics unit and crowd detection analytics unit. The management such as start/stop of these units is in charge of the "common analytics platform". The analytics units are composed by combining the "video analytics engines". For example, the crowd detection analytics unit, which is the software for detecting the degree of congestion of a specified area, is composed of the video data input components that accept video data, the crowd detection engine that detects the degree of congestion from the input video data and outputs the detection result as an alert, and the alert management component that saves the output results in a database. In addition to the above, the "common management screens" include the dashboard that outputs statistics and other information based on the output from the alert management component (**Fig. 7**) and the control panel that manages the analytics units.

It is one of the most impressive features of NEC EVA that the system can be configured by flexibly combining the analytics units according to the purpose and environment of each user. For example, for the surveillance purpose, there is a case in which suspicious person detection and abnormal behavior surveillance in a facility are required. In this case, using NEC EVA makes it possible to implement and provide several analytics units on a single server, such as suspicious person detection based on face recognition and abnormal behavior detection based on behavior analytics. The start stop controls of these analytics units can be subjected to integrated management from the common management user interface, so that the labor of operations can be reduced (**Fig. 8**: Pattern 1).

Flexible, highly extendible system configuration according to purpose and environment of each user

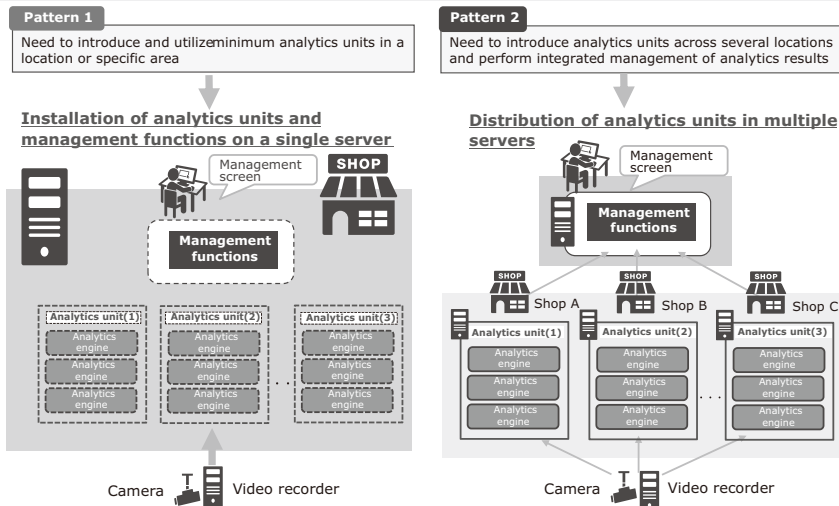


Fig. 8 Illustration of system configuration.

On the other hand, there may also be cases in which different analytics are required in several small shops, for example those in convenience store businesses. Even in such a case, using NEC EVA makes it possible to place the required analytics unit in each of the multiple servers distributed among several shops. It is possible to thus introduce the suspicious person detection procedure based on face recognition in one shop and the people count detection method in another. As in the previous example, integrated management of the multiple analytics engines from a single location is available to reduce the labor of the operations (Fig. 8: Pattern 2).

5. Conclusion

NEC EVA performs video analytics and accelerates digital transformation by automating and improving the surveillance and marketing analytics operations that have previously been done by human labor. With the capability of the speedy building of a solution by combining various video analytics technologies on a single platform, it thereby expands the usage scenes and values of video analytics technologies in public transport systems, streets, stadiums, shops, hotels and so on.

In addition to the face detection, behavior detection and attribute estimation that are available currently, NEC EVA will continue to enhance the functionalities by introducing new video analytics technologies, such as multimodal authentication, by using various authentication technologies and other new video analytics technologies. The aim is to provide new customer values using solutions that make use of the EVA platform.

Authors' Profiles

YOSHIKAWA Masato

Senior Manager
Digital Platform Division

ARAKI Soichiro

Senior Expert
Digital Platform Division

UCHIDA Terutaka

Assistant Manager
Digital Platform Division

YANO Tatsuya

Digital Platform Division

Information about the NEC Technical Journal

Thank you for reading the paper.

If you are interested in the NEC Technical Journal, you can also read other papers on our website.

Link to NEC Technical Journal website

Japanese

English

Vol.13 No.2 Social Value Creation Using Biometrics

Remarks for Special Issue on Social Value Creation Using Biometrics
Committed to Supporting Social Values via Biometrics

Papers for Special Issue

Commitment to Biometrics NEC Is Promoting

Bio-IDiom — NEC's Biometric Authentication Brand
The Future Evolution and Development of Biometrics Studies
Privacy Measures of Biometrics Businesses

Services and Solutions That Leverage Biometrics

The Western Identification Network: Identification as a Service in a Federated Architecture
Use of Face Authentication Systems Associated with the "My Number Card"
Face Recognition Cloud Service "NeoFace Cloud"
NEC Enhanced Video Analytics Provides Advanced Solutions for Video Analytics
New In-Store Biometric Solutions Are Shaping the Future of Retail Services
ID Service Providing Instantaneous Availability of User's Desired Financial Services
Biometrics-Based Approach to Improve Experience from Non-routine Lifestyle Fields
Construction Site Personnel Entrance/Exit Management Service Based on Face Recognition and Location Info
The Importance of Personal Identification in the Fields of Next-Generation Fabrication (Monozukuri)

Core Technologies and Advanced Technologies to Support Biometrics

How Face Recognition Technology and Person Re-identification Technology Can Help Make Our World Safer and More Secure
Advanced Iris Recognition Using Fusion Techniques
Advanced New Technology Uses New Feature Amount to Improve Accuracy of Latent Fingerprint Matching
Safety, Security, and Convenience: The Benefits of Voice Recognition Technology
Ear Acoustic Authentication Technology: Using Sound to Identify the Distinctive Shape of the Ear Canal
Automatic Classification of Behavior Patterns for High-Precision Detection of Suspicious Individuals in Video Images
Facial-Video-Based Drowsiness Estimation Technology for Operation on Low-End IoT Devices

NEC Information

NEWS

2018 C&C Prize Ceremony



Vol.13 No.2
April 2019

Special Issue TOP