The Advantages of Industrial Cameras for Face Recognition Applications

Where are industrial cameras typically deployed?

When considering typical applications for industrial cameras, one often thinks about the most common image processing tasks in industrial production, quality assurance, traffic monitoring or in the medical field.

Technical solutions using industrial cameras with image processing are now increasingly appearing in recognition disciplines to improve, for example, the accuracy of face recognition in surveillance and border control applications. Here, cameras are used for identifying faces and comparing existing images and biometric characteristics.

For marketing departments, analysis of customers and their behaviors are tremendously important. Recognition and counting functions work better with industrial cameras than with IP cameras or webcams in categorizing customers and identifying their walking paths.

Benefits of industrial cameras for facial recognition solutions

Digital cameras serve a critical role in recognition applications, delivering the data needed for difficult and often security-critical decision-making processes and actions. For this reason, quality and precision of the image data are decisive factors, along with the ability to properly configure the cameras' parameters.

For highest image quality, industrial cameras transmit raw data, unlike IP cameras and webcams, which compress images and video streams and therefore lose important image information critical to successful recognition applications.

Industrial cameras typically work with standards from the machine vision field, including GigE and USB 3.0 interfaces. These ensure maximum stability and the capacity to transmit data-rich, uncompressed images and a high number of frames per second.

In addition, this type of camera ensures long-term availability and a long life cycle, and furthermore offers an outstanding price/performance ratio. Their selection promises a consistently high performance level for years of an installation. The simple, robust design and compact size of these cameras allow for mechanically simple integration into a system and steady operation in unforgiving industrial environments.

Industrial cameras work with fixed, configurable operating distances and defined speeds, a key factor for many facial recognition applications. In contrast, IP cameras designed for surveillance use auto-focus to bring the person or target into clear view. This focusing process demands more time. Using industrial cameras, a person or target can be detected quicker and more effectively.

Furthermore, industrial cameras feature a fixed lens and detailed configuration options for precise setup of the camera. The frames-per-second rate can be increased without loss of image quality. Furthermore, global shutter imaging sensors eliminate the distorted images common to the performance of webcams and IP cameras.

GenICam (Generic Interface for Cameras), a common standard for industrial cameras, can be used to change certain sensor parameters. If, for example, a scene has adequate lighting, the standard black level can be adjusted to optimize identification. Software Development Kits (SDKs) also facilitate these special settings.

Consumer webcams, by contrast, tend to be easier to operate, but are highly limited in their configuration options and in capturing distance. Those cameras lack options for turning off or manually adjusting the many automated functions: exposure time, gain, white balance. A fixed focal length often produces image

distortions and/or objects too small for reliable detection. Industrial cameras always put all configuration options in the user's hands, so they in turn can address the demands of the most challenging facial recognition applications.

Let’s have a look at two examples where industrial cameras are the right choice.

Use of industrial cameras in retail settings

In retail stores, industrial cameras pair with face recognition technology to support multiple use cases. The software can compare faces to image databases and identify known individuals. Retail staff can react in real time to greet valued customers, observe or react to known shoplifters, and stop banned persons from entering.

Real-time face recognition applications rely on precise camera configuration and uncompressed video streams to increase the accuracy of the comparison tasks. Users also benefit from the cameras’ reliability, as it sets up quickly, operates continually, doesn’t require reboots and knows how to recover after a loss of power.

Anonymous facial analysis over time allows the software to compute people count, demographical information, people movement in time and space, and to detect frequent visitors and crowds. The analysis of traffic patterns and demographical statistics can provide businesses with precise visitor data to make interior design, advertising placement, staffing and other operational decisions.

Since the technology can analyze a face for gender, age and ethnicity as people approach a camera, it can trigger the display of a targeted message on a digital sign or other advertising/message devices.

Use of industrial cameras for border control applications

Airports around the world are opting for the installation of eGates at border control points to facilitate automated passport checks. Such eGate solutions need fast, accurate face recognition technologies to instantly verify the live images of travelers against biometric photos stored in passports, other ID documents and/or facial image databases. Industrial cameras provide the best image quality required for such high-security applications; their small size allows for easy integration into the eGate components.

Summary

Industrial machine vision cameras are used in diverse applications, including industrial production, quality assurance, medicine and now, facial recognition. Their particular feature set, with the ability to transmit raw image data without loss-inducing compression, a fixed focus, and global shutter sensor, guarantees the richest image information required for the most accurate face recognition solutions.

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