Panasonic ideas for life

Conquering Demanding Lighting Variations In Retail, Financial, and Hospitality Applications

By:
Daniel McGinley
Product Manager
Panasonic System Networks Company

Variable lighting conditions are an ongoing challenge for video surveillance applications such as large retail locations, banks and financial institutions, and hospitality environments. Designing systems that supply usable video in these environments often presents a challenge beyond the capabilities of conventional cameras and auto-iris lenses.

Typically, retail locations, banks and hospitality venues include an abundance of windows. The resulting excessive light can flood the image plane of a video camera. Dramatic differences between light and dark areas complicate the ability of video cameras to view someone standing in the shadows. Dimly lit restaurants, teller stations and checkout counters can also present lighting challenges that undermine video image quality in critical surveillance areas where clear, detailed images are needed the most.

Stark differences contrast between white and black levels in video images and can obliterate faces or other details of a subject in a darker area. The problem is particularly obvious if someone is standing with their back to the sun amid darker internal lighting. Cameras mounted indoors to view outdoor activity are also a challenge. For example, a camera mounted inside a bank may not provide useful video of transactions as cars pass through drive-through lanes and/or individuals that are using ATMs in a vestibule.

These lighting challenges have a practical and negative impact on the effectiveness of video surveillance systems installed for these applications. Video details lost to the dark areas of an image because of lighting variations can make all the difference in whether

a suspicious character can be identified or even whether faces are visible when someone commits a robbery or other crime. Without video systems that can function in changing lighting, it is possible for a facility to be compromised by perpetrators who may be in plain view, but unidentifiable with video. Viewable images are vital to a successful prosecution in court and can also help to discredit personal injury cases or other false claims of liability.

For systems integrators, lighting problems can be the cause of repeat visits to an installation in response to complaints from security management about the inadequacies of video cameras and lenses to capture usable images. The situation can be a real thorn in the side of systems integrators. Each return trip costs money and reduces the profitability of an installation. The total cost of ownership (TCO) mounts and eventually becomes a liability for the installer.

Basic Approach

Manufacturers have historically sought to solve these light issues with approaches from auto-iris lenses to ATW (auto tracing white balance) to adjusting to a slower lens speed.

In difficult applications, however, even cameras using auto-iris lenses cannot compensate for lighting variations, either because of limitations of the camera/lens technology or because lighting conditions can change from day to day or even hour by hour. For example, if a facility faces due east, the image plane may be in bright light through the morning, but in deep shadow through the afternoon.

Some manufacturers also provide lenses that are faster (with F-stops as low as F1.0 or even F0.9), but faster lenses can actually restrict the ability of a camera to compensate for light variations due to inadequacies of the CCD or CMOS technology and the dynamic range of the camera. While increasing the F-stops to F1.2 or F1.4 will help to control the white level, it will not improve the dark levels at all and may even make them worse.

The auto tracing white balance feature on color cameras monitors the light and adjusts the color to maintain white areas. Cameras with this feature automatically adjust color settings for consistent quality in the white areas but cannot compensate for stark lighting variations.

Panasonic's Solutions

Panasonic has addressed these lighting problems from several directions simultaneously, seeking to provide products that can:

- optimize the quality of the video
- satisfy the most demanding lighting conditions
- maximize the value of an integrator's time when using the product
- reduce the TCO of the product/installation and future use with respect to time
- enable the system integrator to generate more revenue
- reduce the time for installation and service

These goals were emphasized during the design phase of Panasonic's latest i-PRO SmartHD cameras, which address specific lighting issues for applications in financial, retail and hospitality environments. Several new camera features have helped to solve lighting problems in these applications including:

Facial Optimization & Detection. In select i-PRO SmartHD cameras, facial optimization works in conjunction with face detection which seeks out the faces in the image plane, applies optimum focus and facilitates the identification process. When used in conjunction with the Panasonic WJ-NV200K Network Video Recorder (NVR) which stores user-selected face images in a database, the camera and NVR combine to provide a highly practical face detection solution with notification. It’s an ideal solution that instantly identifies known offenders or disgruntled employees as soon as they come into the camera’s range.

Adaptive Black Stretch. This feature reconciles the differences between white and black levels to improve images that suffer dramatically from shadows and extreme light

combinations. Adaptive equalization via pixel averaging over the entire image plane helps to even out dramatic lighting differences over the whole image. ABS can mean fewer service calls for an integrator, which lessens the need to visit the site, reduces TCO, and increases the value of the integrator's time.

Auto Back Focus. This feature also helps to reduce the cost of a service call. A service provider can focus the camera remotely, thus reducing the cost of their time and travel. ABF provides a significant reduction in the TCO of a Panasonic camera. For integrators, the feature also promotes end-user satisfaction and loyalty. A system integrator installing a Panasonic product with Auto Back Focus will also realize a substantial time savings in camera installation, amounting up to 20 minutes per camera. On a 32-camera installation, that could translate into more than 10 hours – a tangible and quantifiable benefit from an integrator's perspective.

Super Dynamic 5. An exclusive Panasonic feature, Super Dynamic 5 takes into account multiple issues associated with rendering a superior video image. Super Dynamic 5 incorporates features to help both system integrators and end-users solve critical imaging issues. The latest version of Panasonic's Super Dynamic (SD5) has increased the efficiency of the imaging process by 128x. The combination of Panasonic features made available as a result of SD5 assures both system integrators and end-users that they are using the best possible camera for a job.

Capturing the Details

Panasonic's combination of technologies can provide a clear view of any application, even when extreme or complex lighting is a challenge. Combining advanced features, image processing and other technologies with higher-resolution megapixel imaging, Panasonic's i-PRO SmartHD cameras provide video images that capture the important details. These products demonstrate Panasonic's leadership, rigid quality control and assurance, and fulfill systems integrators’ and end-users’ needs across the full spectrum of retail, financial and hospitality applications.

XXX