WHITE PAPER

Intelligent Zoom Stabilization Technology

Panasonic Video surveillance systems

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1. Introduction

Demands for surveillance camera performance have been on the rise in recent years with increased social worries about terrorism in addition to worries about road, railway, and other accidents. Performance demanded includes higher resolution including 4K, higher data compression based on H.265, and surveillance in low light environments outdoors. In particular, inability to gain satisfactory images as demonstrated by shaky images and the like due to the environment where the camera is set up has become an issue in harsh outdoor environments including those of for urban surveillance.

To overcome those issues, Panasonic has released new H.265 PTZ cameras. A high-level surveillance environment is provided by PTZ cameras optimized for outdoor surveillance.

2. Panasonic's Intelligent Zoom Stabilization Technology

PTZ cameras have been equipped in recent years with high-magnification zoom functions for outdoor surveillance uses, enabling surveillance from farther away. On the other hand, the issue of shaking with high-magnification zoom images has come up due to the effects of wind and the like as cameras are installed at high places to allow surveillance from a distance. That issue is overcome with two technologies.

- Technology to detect the camera's physical shaking and correct image shaking
- Technology to detect shaking in the image itself and correct that

Panasonic has developed PTZ cameras equipped with the two technologies above. Those deliver stabilized video with reduced shaking even at high-magnification zoom, allowing for wide area surveillance.

3. Intelligent Zoom Stabilization Technology

A higher level of image stabilization is achieved by combining two technologies: detection of physical shaking by gyro sensors and vector detection from images using input images.
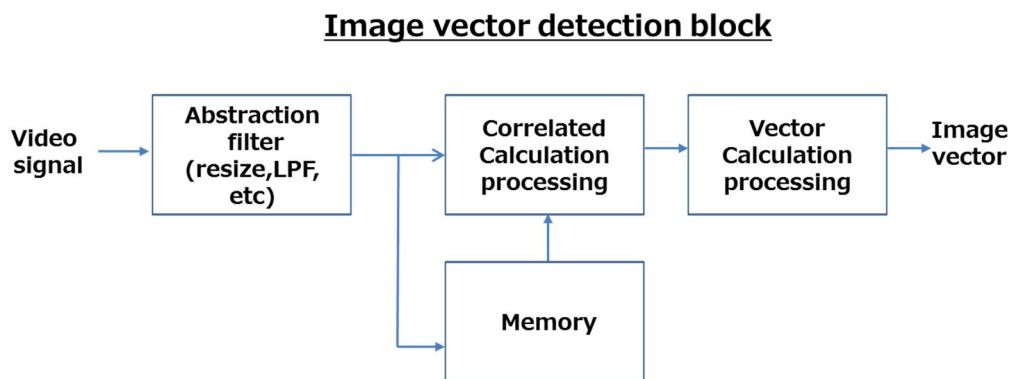
3.1 Gyro Detection

By acquiring data from gyro sensors at high speed, vibration of up to 30 Hz is detected and video cropping position is adjusted according to the vibration to achieve image stabilization. This is effective in reducing vertical and horizontal vibration and rolling shutter distortion mainly when recording from medium to long distances.
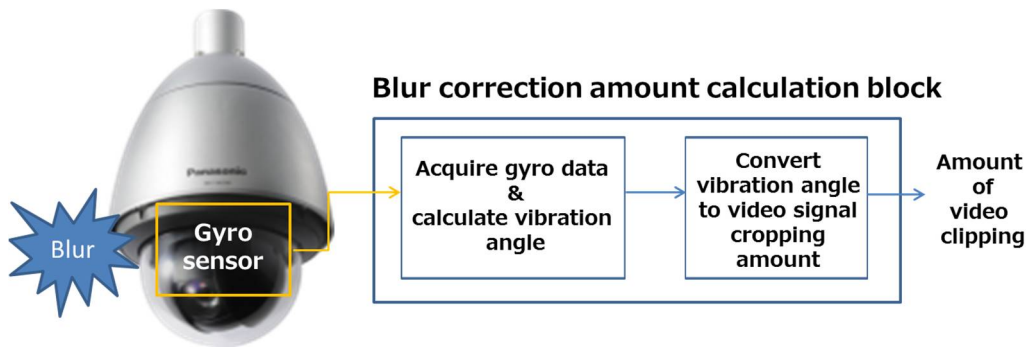
3.2 Image Vector Detection

With Panasonic's own image processing technology equipped to image processing LSI circuits, minute vibration up to 15 Hz can be detected and video cropping position is adjusted according to the amount of motion between image frames to achieve image stabilization.

3.3 Intelligent Zoom Stabilization

Previously, either a gyro detection method or a motion vector detection method from images (vector detection) was adopted, not both. But each of those methods has its own issues as noted below.

(Gyro detection)
There is a limit to the S/N ratio of vibration detection, so video blurring due to slight vibration cannot be sufficiently corrected in some cases. (Frequently occurs at high magnification.)
(Vector detection)
Images are used in detection, so detection accuracy may not be stable in some cases due to recording conditions such as the subject moving.

To overcome those issues, Panasonic has constructed the "Intelligent Zoom Stabilization function". That function is based on the gyro detection method and combines the vector detection method as well.
By utilizing gyro sensor information, vector detection accuracy is stabilized and minute shaking that cannot be completely corrected with gyro detection can be detected by image vector and corrected to achieve stable images even at high magnification zoom.

4. Conclusion

With the Intelligent Zoom Stabilization function equipped to Panasonic's new H.265 PTZ cameras, stable images can be obtained even with super telephoto images. Urban surveillance and wide area surveillance such as on highways can be achieved, and the function can be deployed to applications for video analysis by stable images, thereby building higher-level outdoor surveillance solutions.