Hanwha Vision

White Paper

WiseStream Ⅲ technology

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1. Introduction

With the widespread use of high-resolution video surveillance and the increase in video encoding frame rate, the size of encoded video data is ever-growing. This large volume of data can place a burden on the infrastructure that processes them. Against this backdrop, a variety of methods have been developed to reduce the size of encoded video data selectively depending on the significance of objects in the video.

Hanwha Vision's new video encoding data reduction technology 'WiseStream Ⅲ' complements the conventional and less efficient data reduction scheme which detected the entire movements in the screen including non-critical areas in the video (Waving foliage at the background, or fountain). With AI, the new technology identifies major objects and apply separate object areas, reducing the size of encoded video data. The technology can minimize the image blur of objects with the same amount of data while lowering the size of encoded video data by up to 80% depending on the proportion and the complexity of major objects in the video.

2. WiseStream Ⅲ technology

Hanwha Vision WiseStream Ⅲ technology utilizes the results of AI object detection to differentiate the image quality of areas where objects are detected versus not detected, effectively reducing the encoding data.

2.1. Object based quality control

Since AI was introduced in video surveillance, there has been an increase in managing major information other than video information as data to expand its applications.

With the help of AI, WiseStream Ⅲ reflects the information of detected objects to image quality control. To reduce the data size, it controls the image blur of areas with detected objects and those with none. Figure 1 well illustrates the result of major object detection using AI. Areas with highlighted boxes had main objects detected, while the rest of the areas was categorized as non-detected.

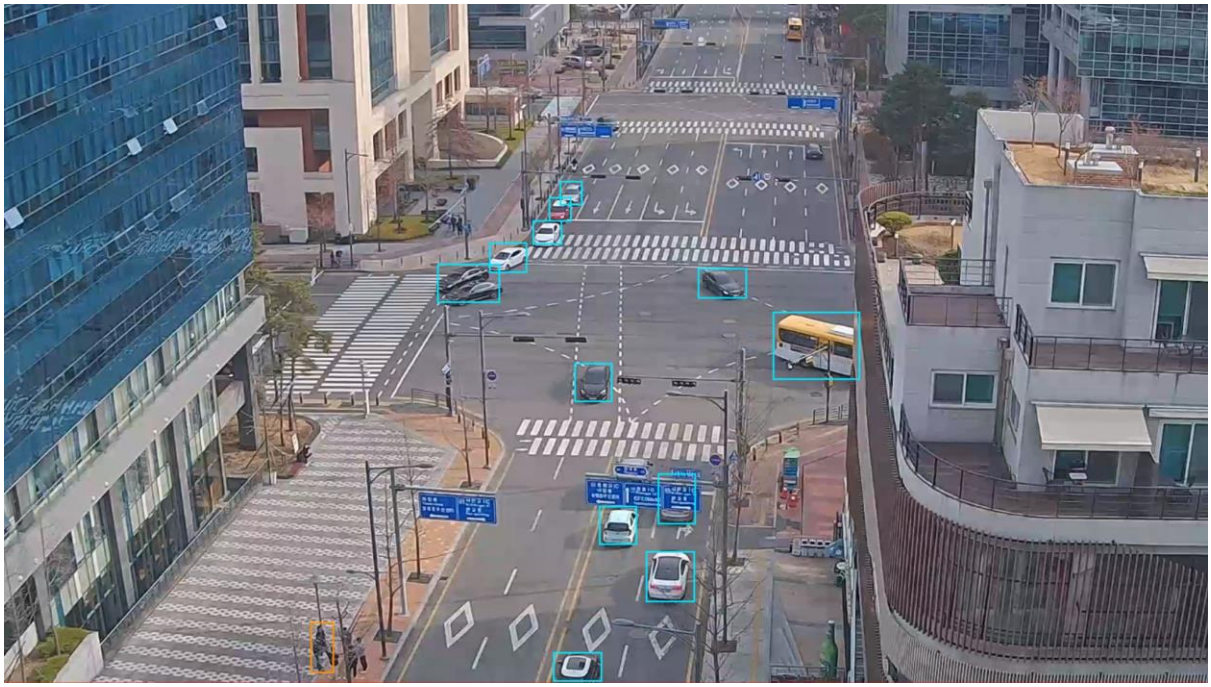

Figure 1: Example of object detection

3. WiseStream Ⅲ configuration

When using WiseStream Ⅲ technology, user setup is provided for controlling encoding data. Users can adjust configuration values considering the desired quality of video and the network environment.

3.1. Configuring WiseStream Ⅲ modes

WiseStream Ⅲ can be configured in four modes of Off/Low/Medium/High.

When in Off mode, WiseStream Ⅲ is not used. Low / Medium / High modes are used to configure the level of data reduction depending on objects, controlling the amount of data by taking into account the share of major objects detected in the video for each mode. In each setup mode, if the areas with major objects detected are small, the data reduction can get closer to a maximum level. This range is the target for control and subject to variations depending on encoding video. Generally, the more complex the encoding video is, the lower the maximum data reduction of each setup mode is compared to the target, relatively intensifying blur in areas where major objects are not detected. The range of reduction can be described as follows.

- Low: Around 30~70% reduction compared to Off mode. Image quality of object non-detected areas is blurred compared to Off mode.
- Mid: Around 35~75% reduction compared to Off mode Image quality of object non-detected areas is blurred compared to Low mode.
- High: Around 40~80% reduction compared to Off mode. Image quality of object non-detected areas is blurred compared to Mid mode.

3.2. Change in the data size

Tests for image quality and transfer rate (bps) of WiseStream Ⅲ were conducted on Off and High modes for the same video and the results are as follows. In High mode, the image quality of areas where objects were detected was maintained, while that of non-detected areas was relatively blurred. In the sample video, the data size was down by up to 78%.

(Figure 2, Test value measured for 33 seconds)

Figure 2: WiseStreamIII (left) Off, (right) High

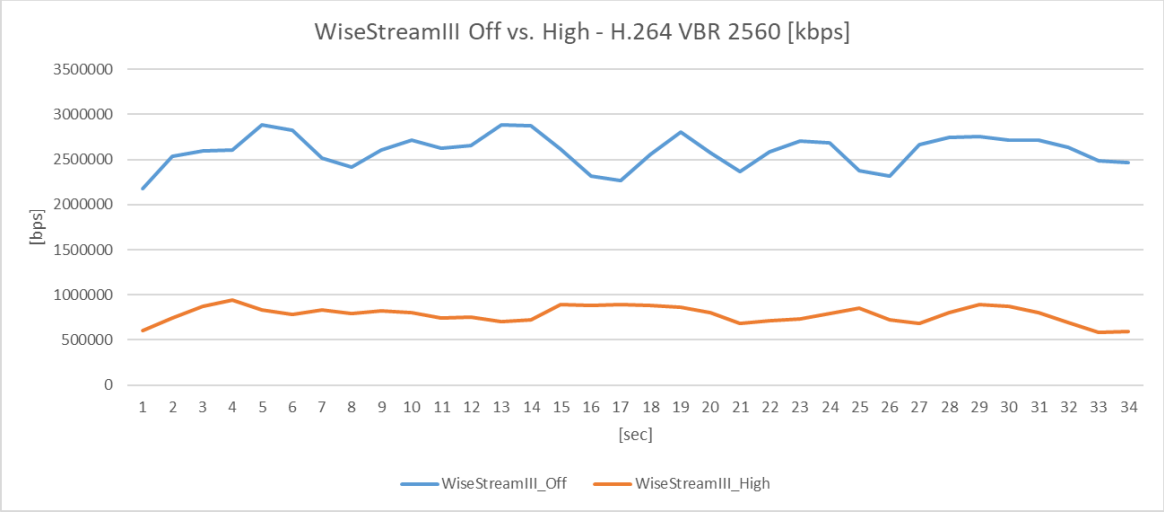

Figure 3: WiseStream Off vs. High Bps

- Off bps : Avg. 2498 [kbps] (Reduced by an average of 2%)
- High bps : Avg. 747[kbps] (Reduced by an average of 71%), 33 seconds 565[kbps] (Reduced by 78%)

4. Conclusion

As the size of video data to be processed in video surveillance is ever increasing, the importance and the necessity to develop technologies that can effectively reduce the data size is growing as well. Hanwha Vision WiseStream Ⅲ utilizes AI to greatly reduce the data size while maintaining the image quality of main areas, offering data reduction of up to 80% in the environment where the complexity of time and space is limited in the video.

Hanwha Vision WiseStream Ⅲ technology can provide clear image quality with smaller data size, enabling users to add more cameras without the need to install additional network devices or use the same video recorders to save longer video.

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