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Adaptive Scaling for Image Sensors in Embedded Security Applications

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—Image sensors are widely used for multiple applications today. The security applications imply not only data acquisition, transmission, and display, but also embedded or in-the-cloud image processing algorithms as motion or intruder detection.
In this paper, we analyze the impact of image scaling on the image processing algorithms, with focus on object detection. Different methods for image scaling are presented and their impact on the algorithms are measured.
We propose an adaptive scaling mechanism, that implies the selection and dynamic adaptive configuration of one of the available hardware engines (interpolators), in order to optimize the power consumption and the bandwidth used for data transmission. The artificial intelligence processing outputs are used as a source for these configuration changes. Besides the optimal decision on enabling the appropriate re-sampling interpolator, the parameters computed (in order to configure this selected hardware block) are the quality of the scaling and the image resolution.
The hardware implementation for this mechanism is presented and the measured results are discussed.
The conclusion we drew is that an adaptive scaling mechanism in embedded security applications significantly improved the object detection algorithms and optimized the used data transfer bandwidth.

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