

Solution Brief

Optimal Video Denoising
Artificial Intelligence



Make Unwatchable Videos Watchable with iSIZE BitClear

iSIZE AI-based video denoising significantly improves the quality of compressed content by leveraging AI acceleration on Intel CPUs



The BitClear solution is being recognized for its innovation and recently received notable awards:



IBC 2022

Best of Show Award



NAB 2022

Product of the Year Award

Understanding Key Video Transcoding Challenges

Whether advertising products to targeted audiences or educating staff through webinars, nearly every organization uses video in one form or another to effectively communicate information. With OTT video consumption and revenue expected to double between 2020 and 2026¹, it's quickly becoming easier than ever to remotely access, stream, and share information in real-time. However, when video distortion occurs due to bandwidth or connectivity limitations, it can result in loss of customer confidence in the brand, an increase in transmission costs, and the intended message may be misinterpreted or missed entirely. Depending on the situation, this could lead to costly consequences such as a loss of users or advertising revenue potential from poor video quality.

Drops in video quality occur predominantly due to poor WiFi or satellite connections, or multiple transcoding steps between video hosting and distribution platforms. Traditional video processing solutions often discard parts of media data and then overly compress the media file to: (a) satisfy storage or bandwidth requirements; (b) maintain real-time processing capabilities necessary to keep pace with evolving market trends. The effects of this include blurring, blocking and ringing artifacts, aliasing on edges and loss of texture information. The effects of such quality loss become even more amplified by the expansion of live streaming, which makes up nearly 30% of the video consumption market², and the continuing trend of reuploads/reshares of media files across multiple platforms.

As solution providers continue to struggle alleviating key market challenges, customers need an innovative solution that advances traditional media compression approaches to better align with the future of the industry.

BitClear Denoises and Upscales Low Resolution Videos

iSIZE leveraged its deep learning specialty in video delivery to create BitClear, an AI-based neural network technology focused on denoising and upscaling of heavily compressed video assets to recover original quality. BitClear enables customers to share, host, or otherwise provide higher quality media content that better engages the targeted audience. The solution achieves this goal by using pre-trained AI models to remove compression artifacts and optionally upscale the video content.

Unlike competing approaches, BitClear operates in real time and at scale without manual tuning, as it is trained to disentangle the source and noise manifolds and recover video details without changing the aesthetics of the decoded video.



AI-based post-processing after decoding (AVC, HEVC, VP9, AV1)



One frame latency



Single pass processing per content for an entire ABR ladder

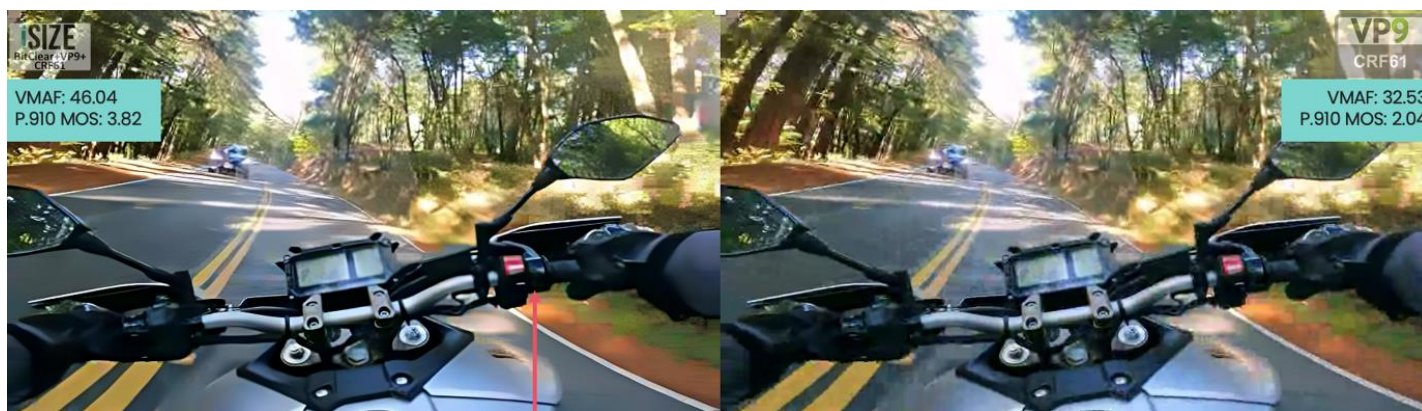


Improves visual quality as measured by perceptual quality metrics and subjective quality tests



Integrates with Intel® Distribution of OpenVINO™ toolkit and ONNX, easy to plug-and-play within any existing workflow

BitClear is the only solution of its kind that can denoise and upscale live content and offer significant quality improvement compared to traditional video denoising solutions³, especially when significant impairments exist in the input content. In addition, most commercial denoising solutions introduce latency into the video feed and require manual tuning, which is not suitable for live field operations¹. iSize’s solution enables customers to overcome this challenge while enabling real-time use cases and without introducing latency.



How BitClear Works



Depending on customer preferences or requirements, the solution can be deployed on-premise or on the cloud. When a low-quality or heavily compressed media file is received, the BitClear solution removes compression artifacts after decoding to restore video quality. The content can then be sent for further processing or transcoding, or it can be stored, streamed, or shared to the customer’s chosen destination.

Solution Features and Capabilities



Real-Time Processing

- Enables multiple input video assets in real-time (at 25/30 fps)³
- Upscales video in real-time to allow single-pass processing with single-frame latency on GPUs, high-performance Intel® Xeon® processors, or other CPUs.



Codec Independent

- Processes any highly compressed content and produces a higher-quality output that improves the value of the asset
- Operates on all types of codecs and upholds all necessary standard compliance



Superior Quality

- Revives video back to the maximum possible resolution quality without affecting the artistic intent of the original creator
- Enables video denoising speeds up to 10 times faster than competing state-of-the-art denoising technology



Scalability Optimization

- Scales across high volumes of content with neural network architecture
- Satisfies standard perceptual quality metrics and visual quality as assessed by human viewers under controlled test conditions
- Deploys on both the cloud or on-premise

Key Industries and Applications



Media and Gaming

- Social media and user-generated content
- Cloud gaming and live game streaming
- Live commerce and livestream shopping
- Streaming legacy content



Communications / Virtual Interaction

- Emergency response operations
- Situational awareness
- Live messaging
- Traffic management
- Satellite image transmission
- Security e.g. CCTV



Education

- Autonomous vehicle
- Remote diagnostics
- Virtual communication



Government

- Campus security
- Orientation and instructional training
- Live video conferencing

“Our work with iSIZE focused on using deep neural solutions to improve pre and post processing of video at scale to deliver enhanced viewing experience to our end users, while providing significant operational efficiencies.”

Video Engineering Lead – Media & Entertainment

Integral Intel Components

iSIZE's proprietary deep learning-based models can run on all Intel hardware and are fully optimized for Intel® Xeon® Scalable processors, using the Intel® Distribution of OpenVINO™ toolkit, advanced features, and AI accelerators.

Intel® Distribution of OpenVINO™ Toolkit enables the BitClear solution to optimize and deploy with ease across an expanded range of deep-learning models. The runtime (inference engine) tunes the solution for higher performance by compiling the optimized network and managing inference operations on end customer-specified devices. Additionally, OpenVINO™ auto-optimizes through device discovery, load balancing, and inferencing parallelism across CPU, GPU, and more. The updated version includes better alignment to TensorFlow conventions, fewer parameters, and minimizes conversion⁴.

Intel® Xeon® Gold Processors offer flexible performance support for higher memory speeds, enhanced memory capacity, and up-to four-socket scalability. With built-in AI acceleration and optimization that goes silicon deep and ecosystem wide, Intel® Xeon® Scalable processors take embedded AI performance to the next level with Intel® Deep Learning Boost (Intel® DL Boost)⁵ to increase model optimization by up to five times when compared to non-optimized models running on other CPU instruction sets⁶.

Conclusion

BitClear provides maximum video quality improvement by offering a customizable solution with faster video denoising, real-time processing, codec flexibility, and increased video input upscaling without changing the aesthetics of the transcoded media file.

About iSIZE

iSIZE is a deep-tech company that specializes in deep learning for efficient, intelligent, and sustainable video delivery. iSIZE patented technology is powered by the latest AI innovations to enable clients to reach more users, provide better experiences and reduce the financial and environmental costs associated with video delivery. iSIZE products provide innovations spanning encoding, denoising and generative video content creation. They reduce latency, enhance video quality, and integrate easily with any existing codec by using a deep neural network that improves itself over time, without breaking any standards. This unique approach results in substantial bandwidth, energy and cost savings for video entertainment platforms, gaming, VR/ AR, IoT, VoD and live streaming services.

Learn More

- [Intel® Xeon® Gold Processor Product Page](#)
- [Intel® Distribution of OpenVINO™ Toolkit Product Page](#)
- [iSIZE Solutions Website](#)
- [iSIZE Intel® Network Builders Page](#)



1. Digital TV Research, [Global OTT TV and Video Forecasts 2022](#), 2022
2. Oberlo, [Online Video Consumption Statistics](#), 2022
3. iSIZE, [BitClear Datasheet](#), 2021
4. Intel, [Intel® Distribution of OpenVINO™ Toolkit](#), 2022
5. Intel, [Why Intel is the Right Partner for Business vs. AMD](#), 2022
6. Cisco, [Global 2022 Forecast Highlights](#), 2022
7. Intel, [Scalable Video Technology](#), 2022

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