MotionDSP

Real-time Video Enhancement and Analytics

Background
Silicon Valley-based MotionDSP develops advanced, real-time image processing and analytics software for video, enabling civilian and military analysts to see better and save lives. Its customers include the U.S. Air Force, Navy, Intelligence community, and civilian agencies.

MotionDSP's primary solution is Ikena ISR (Ee-Kehn-Ah), a real-time image processing application for FMV and Wide Area Motion Imagery (WAMI) that provides a sophisticated "one-click fix" for video quality, along with advanced, real-time analytics. Full-motion video (FMV) analysts use Ikena ISR to improve and analyze real-time video feeds so they can deliver better intelligence to soldiers on the ground.

Challenge
The Department of Defense has a huge "big data" problem. It collects more than 10,000 hours of aerial surveillance video every month in Afghanistan and other theaters, much of which is generated from the more than 56 combat air patrols (CAPs) the Air Force flies each day with its Predator UAS unmanned aerial vehicles.

Extracting intelligence from these FMV feeds requires a larger workforce than is currently available. In fact, a recent study by the RAND Corporation projects that by 2015, the Air Force could require as many as 117,000 personnel dedicated to FMV exploitation.

Adding to this challenge are poor environmental conditions (low light, smoke and atmospheric haze) and artifacts caused by the transmission of FMV across large distances, which result in poor video quality.

Limitations of CPU-based computing systems prohibit computationally-intensive algorithms such as MotionDSP's from processing video in real-time. As a result, military personnel are often forced to use incomplete, outdated or inaccurate data, which puts the mission at greater risk.

Solution
Ikena ISR, running on off-the-shelf Windows-based workstations and servers with NVIDIA® Tesla® GPUs, can improve the quality of any existing FMV or WAMI sources in real-time.

Ikena ISR uses a suite of sophisticated algorithms to automatically and dynamically improve video quality from manned and unmanned aerial sources. For example, MotionDSP's patented "super-resolution" algorithm reconstructs video and wide-area images using the best information from dozens of preceding video frames or images, resulting in increased resolution and significantly reduced noise.

It can improve video quality by 1 to 2 Video NIIRS (standard scale used to rate image quality), enabling an analyst to see the difference between a gun or shovel in a person's hands.

Ikena ISR also addresses the "big data" problem by scaling across GPUs to apply its advanced video analytics technology to massive, cloud-based data sets, enabling analysts to spend less time on processing, and more time on exploitation and dissemination.

Tesla GPUs enable Ikena ISR to operate in real-time on standard definition and HD video feeds, and scale to multi-channel processing. Tesla GPUs enable the customer to process any live video source in real-time at very low latency, delivering better quality to FMV systems. And, several channels of FMV can be processed on a single GPU, allowing Ikena ISR to scale to multi-channel FMV systems without requiring a huge CPU-based server farm.

Impact
FMV analysts require real-time FMV enhancement and tools to support soldiers with timely intelligence. NVIDIA GPUs enable MotionDSP to deliver a cutting-edge video improvement and analytics capability that can be rapidly deployed to existing FMV systems and immediately improve the productivity of analysts facing hours of footage.

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