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annual report

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Video stills with and without MotionDSP enhancement

MotionDSP brings low-resolution digital video into focus

A pixelated blur in a surveillance video is transformed into a sharply detailed portrait. An infra-red image of what looks like a series of blocks is made to reveal trucks and tanks. Titles on the spines of books emerge from a fuzzy video of a library shelf. This trick of reconstructing high-resolution images from low-resolution originals is called computational super-resolution. Peyman Milanfar, an associate professor in the Electrical Engineering department at UCSC and director of the Multidimensional Signal Processing group, is a pioneer in the field. With funding from the National Science Foundation and the US Air Force, Milanfar and his colleagues developed novel super-resolution solutions described in 5 pending patent applications. In 2005, Milanfar licensed this intellectual property and founded a startup to commercialize software based on his research, along with cofounder Sean Varah. The company, MotionDSP (for Digital Signal Processing, www.motiondsp.com), specializes in resolution enhancement software for video.

Any amateur photographer knows from experience the difficulty of accurately capturing a scene through a lens. Optics are imperfect and movement of the camera or subject, however small, are unavoidable. In digital video, the problem is worsened by the limited number of picture elements (pixels) available. Somewhat counterintuitively, MotionDSP software takes advantage of these inconsistencies and motion to generate sharper images using stable mathematical algorithms.

MotionDSP plans to apply their technology to internet video, consumer imaging, and video surveillance markets. According to Varah, "We're very excited about MotionDSP's opportunities in internet video and consumer-created content. Our development is focused on enabling this 'long-tail' content to reach the broadcast quality consumers demand." Milanfar thinks the timing is right for commercializing this technology. "Consumers are excited to take images and videos with their mobile phones and webcams, and share them on the internet. But they're disappointed with the results. More pixels don't help. You need better signal processing to fix the problem. We hope to be to video what Dolby was to audio."



MotionDSP