Docket #: S04-192

High Speed Videography

Stanford Researchers have patented an improved technique for capturing and processing dynamic and high speed scenes using a collection of precisely timed video cameras. This system uses multiple synchronized image sensors with precise time delays to capture high-speed video. If the cameras are closely packed together, the system can be used as a continuously streaming high-speed camera. If the cameras are spread further apart, the system can be used to capture multi-viewpoint video of dynamic events (sports, performances, etc) at effectively higher frame rates without using expensive high-speed cameras and capture systems. Capturing with a higher effective frame rate simplifies space-time view interpolation creating new images of a scene that appear to have been taken from a place and time not in the captured set of images. An example would be slow-motion replay from a smoothly varying virtual camera position.

Applications

- High-speed videography
    - Sports: for analysis of athlete's performance or competition finishes
    - Medical testing
    - Dance: for analysis of dancer's motion
    - Military test and evaluation
    - Industry trouble shooting: manufacturing, vehicle impact testing, ect...
- Movie special effects
- Enhanced video playback for consumer television

Advantages

- Enables continuous streaming
- Longer capturing duration: minutes instead of seconds of video capture
- Eliminates the need for a trigger

- Cost-Effective: eliminates rolling shutter distortions allowing the use of inexpensive CMOS sensors
- Modular & Scalable – can scale to higher speeds by simply adding more cameras to the array
- Processing of new visual outputs with minimal computational load
- Flexible
- Capture from widely spaced cameras with staggered trigger times enabling playback of real, live scenes from a variety of angles and varying speed for sports, dance, and other action filled scenes

Publications

- CVPR'04 Proceedings of the 2004 IEEE computer society conference on Computer vision and pattern recognition Pages 294-301

Patents

- Published Application: 20070030342

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