High-speed compressive imaging with standard cameras via rolling shutter effect

Gil Weinberg[1] and Ori Katz[1]*

[1] Department of Applied Physics, Hebrew University of Jerusalem, Jerusalem 9190401, Israel

gil.weinberg@mail.huji.ac.il

Abstract

We propose and demonstrate a novel approach that allows taking videos at a very high-speed of over 100,000 frames per second (FPS) of sparse scenes, a 60x temporal improvement of the same CMOS camera, at the same pixel resolution. This suggested approach relies on exploiting the standard electronic rolling shutter image acquiring mechanism. A light scattering diffuser, placed on a pupil plane, optically encodes the imaged scene, ensuring full scene information will reach every camera row. The encoded image is decoded by compressed sensing algorithms for a short video at a very high frame-rate.