Real-time Non-rigid Reconstruction using an RGB-D Camera

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SUPPLEMENTAL MATERIAL

1 Active Stereo Camera

We built a stereo rig using two off-the-shelf multi-spectral cameras (JAI AD-080CL). Each of the cameras simultaneously captures visible light and near-IR light through the same optical path (i.e., through a single lens) by leveraging two CCD sensors. The first sensor is a color Bayer CCD that only captures visible light and the second one is a monochrome imager that captures only near-IR light. A prism, located behind the lens, diffracts the light to both sensors (see Figure 1). The resulting visible and IR images are aligned within one fourth of a pixel. Both the RGB and the IR sensor have a native pixel resolution of 1024×768 and the camera runs at a maximum framerate of 30Hz. We use a pair of synchronized JAI cameras in a stereo configuration with a baseline of 60mm.

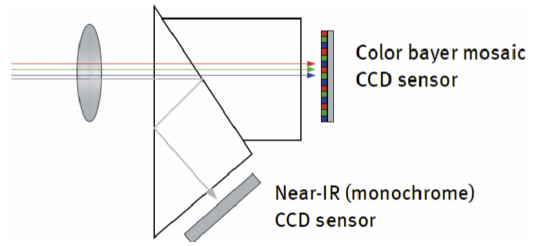

Figure 1: *Multi-spectral camera*

We actively illuminate the scene with an off-the-shelf infrared emitter which is also used in the Microsoft Kinect camera (we decoupled the emitter from the Kinect to achieve a smaller form-factor). The Kinect emitter consists of an IR laser and a diffractive optical element (DOE) that augments the 3D scene with a pseudo-random dot pattern. The artificially introduced feature points greatly improve the robustness of the patch-based stereo matching algorithm we present in the paper.