Our 3D Vision Data-Sets in the Making

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Transparent Objects

- Exending previous work with transparent objects.

- Transparency acieved via CT scan

- Aim 1: Can we reconstruct

- Aim 2: does computer graphics replicate reality, e.g. in synthetic data sets

Over the previous years, we have at the Section for Image Analysis and Computer Graphics at the Technical University of Denmark been working on generating high quality data sets for computer vision via our lab setup using a 6-axis industrial robot. We are currently in the process of making three new data sets aimed at 3D vision, with a special focus on the more challenging aspects, such as radiometry and the modelling of non-rigid objects.

3D & BRDF Data Set

- Measure 3D geometry and BRDF (radiometry) of objects

- Our setup is augmented with a light boom

- Aim 1: Can we reconstruct geometry and BRDF
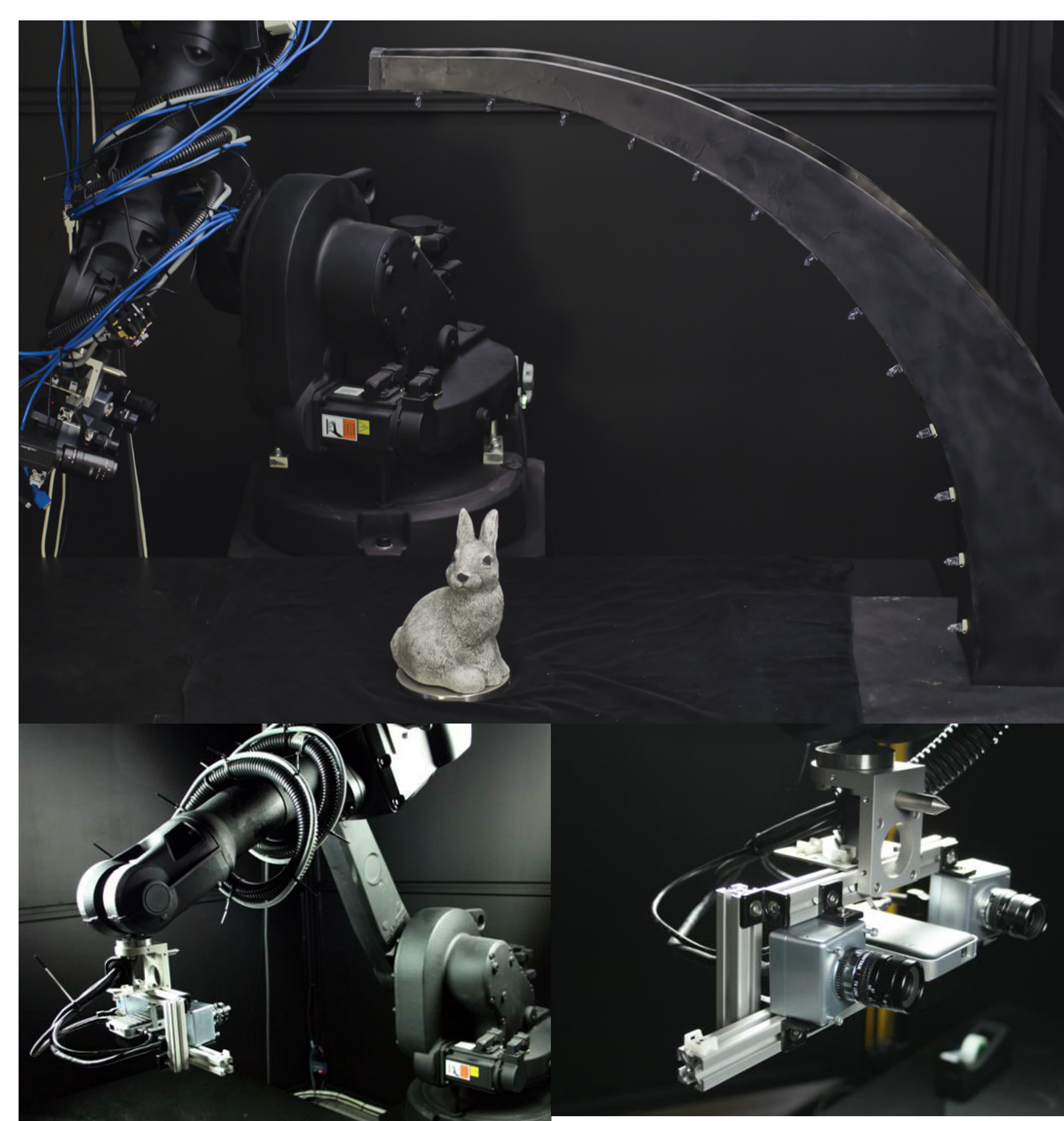- Aim 2: Evaluating photometric stereo

Figure 3. Robot arm carrying cameras for capturing stop motion frame and structured light data. A Gray code pattern is currently being projected onto the object. Overlay: Actuators for manipulating the geometry of the mask. The image of the mask has been superimposed on an image of the actuators, illustrating their functionality.

Non Rigid 3D Data Set

- Achived via stop motion and actuators in physical objects

- Aim: Evaluating non rigid structure from motion

- Admittedly no motion blur, but there is always a tradeoff between reality and observability in ground truth data.

Figure 1. Preliminary images from our data set. Glassobjects: bowl, sphere, teapot) with markers placed on. Hereafter, three calibration and rendering tools part of the pipeline: chrome sphere (environment light evaluation), a black and white checkerboard (coordinate estimation), and an X-Rite ColorChecker®.

Figure 2. Capturing the BRDF of an object with known geometry. All illumination directions and view-directions are covered for each type material present on the object.
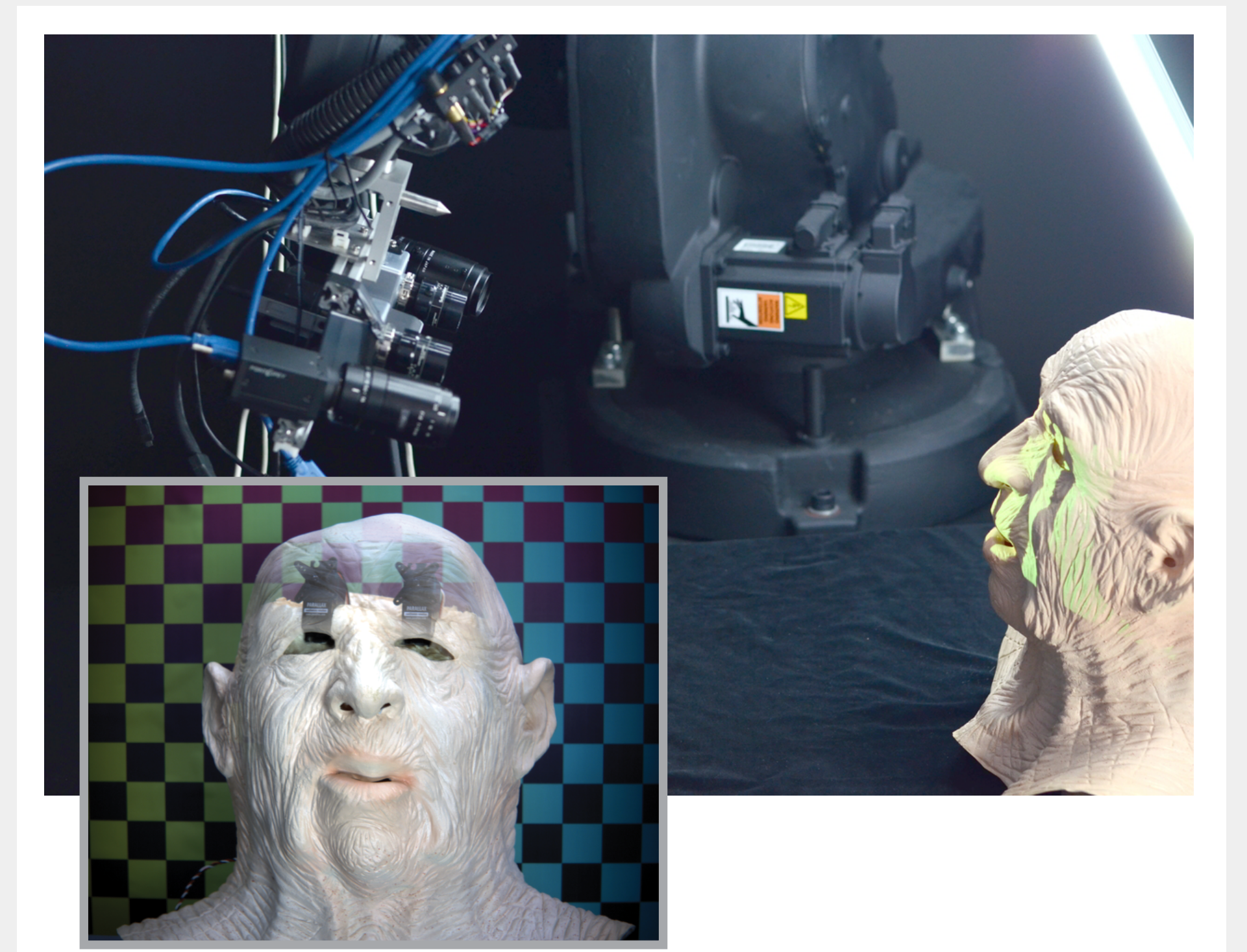
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