

Distortion Estimation Through Explicit Modeling of the Refractive Surface

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Precise calibration is a must for high reliance 3D computer vision algorithms. A challenging case is when the camera is behind a protective glass or transparent object: due to refraction, the image is heavily distorted; the pinhole camera model alone can not be used and a distortion correction step is required. By directly modeling the geometry of the refractive media, we build the image generation process by tracing individual light rays from the camera to a target. Comparing the generated images to their distorted – observed – counterparts, we estimate the geometry parameters of the refractive surface via model inversion by employing an RBF neural network. We present our experimental results on synthetic and real-world data, and analyze the results.

References

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