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Pixel-wise rational model for a structured light system

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Abstract

This Letter presents a novel structured light system model that effectively considers local lens distortion by pixel-wise rational functions. We leverage the stereo method for initial calibration and then estimate the rational model for each pixel. Our proposed model can achieve high measurement accuracy within and outside the calibration volume, demonstrating its robustness and accuracy. © 2023 Optica Publishing Group.

Index Keywords

Calibration, Rational functions; Lens distortion, Measurement accuracy, Rational models, Stereo method, Structured light systems, System models; Pixels; article, calibration, measurement accuracy

References

- Marrugo, A. G., Gao, F., Zhang, S.
(2020) *J. Opt. Soc. Am. A*, 37, p. B60.
- Zhang, S., Huang, P.
(2006) *Opt. Eng*, 45, p. 083601.
- Gonzalez, A., Meneses, J.
(2019) *Appl. Opt*, 58, p. 4610.
- Yang, Y., Miao, Y., Liu, X., Pedrini, G., Tang, Q., Osten, W., Peng, X.
(2022) *Opt. Lett*, 47, p. 3564.
- Feng, S., Zuo, C., Zhang, L., Tao, T., Hu, Y., Yin, W., Qian, J., Chen, Q.
(2021) *Opt. Lasers Eng*, 143, p. 106622.
- Vargas, R., Marrugo, A. G., Zhang, S., Romero, L. A.
(2020) *Appl. Opt*, 59, p. D163.
- Yang, Y., Miao, Y., Cai, Z., Gao, B. Z., Liu, X., Peng, X.
(2022) *Opt. Lasers Eng*, 149, p. 106818.
- Peng, S., Dong, L., Zhai, Y., Zhang, S., Hu, Y., Hao, Q.
(2022) *Opt. Lasers Eng*, 156, p. 107089.

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