

Data-Driven Image Correction for SLA Printing Declan Coster, Shen Wang, Dr. Yaling Liu Department of Mechanical Engineering and Mechanic | Department of Electrical and Computer Engineering

Background

- Laser galvo mirror system is widely used in scanning and manufacturing such as stereolithography(SLA).
- Projected patterns from galvo mirror systems usually have distortion that reduces its accuracy.
- At large distances the distortion can be amplified leading to large error.
- Global or complex in situ imaging are the only solutions that exist currently.
- This distortion limits the usage of laser galvo in high precision or large scale industry applications

Circuit Board Fabrication Metal Printing Laser Scanning LiDAR systems Automobile/Aerospace parts



Galvo Mirror Set Up: Correction at High Frequencies



Global Correction Example Left: Distorted Right: Corrected D. Wang Optics & Laser Technology 2014

Purpose

Create a universal software correction for SLA printing using a data-driven approach.

Workflow



Adjust of Tests

Photos are auto adjusted to generalize the shape photos being analyzed



Image Processing





Why use a bitwise approach to image processing? <u>Accuracy</u>. Some of the newer image processing techniques(edge detections, Hough Transforms, etc.) are not accurate enough for our measurements.



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Threshold Printed







Extract and Interpolate



Wang D, Yu Q, Ye X (2014) Correction of the field distortion in embedded laser marking system. Optics & Laser Technology Volume 57

Hariri A, Fatima A, Avanaki MRN (2018) A Novel Library for the Correction of a Galvo-Scanner's Non-Linearity at High Frequencies. Res J Opt Photonics 2:2.

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