Structural Health Monitoring Using Structured Lights And Infrared Thermography

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Objective: To develop a nondestructive data-driven structural assessment system using structured light-based 3D high resolution thermal scanner.

Introduction

- Large number of aging infrastructure that sustain premature damage leading to early end of service life.
- Conventional methods of inspections limited by the surface properties of structures, accessibility of these massive structures and availability of manual resources.
- 3D digitalization of large structures along with thermal data help in better inspection and stress analysis.

Methodology

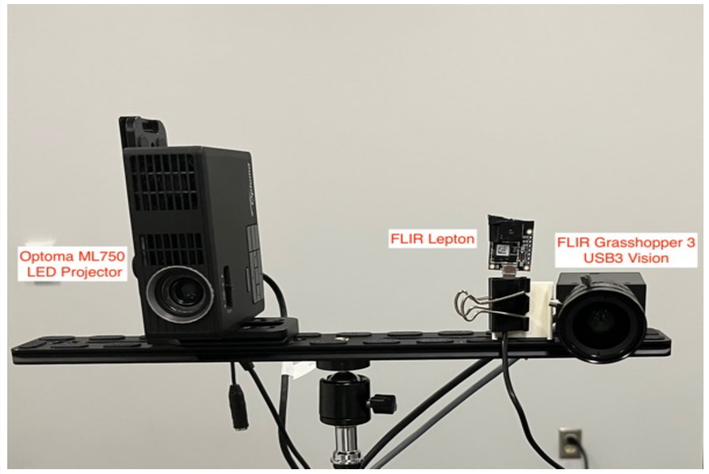

Figure 1: Experimental setup

Results

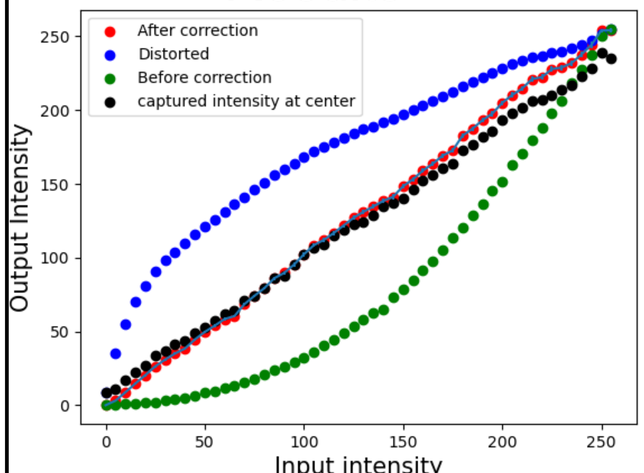

Figure 2 : Projector gamma calibration

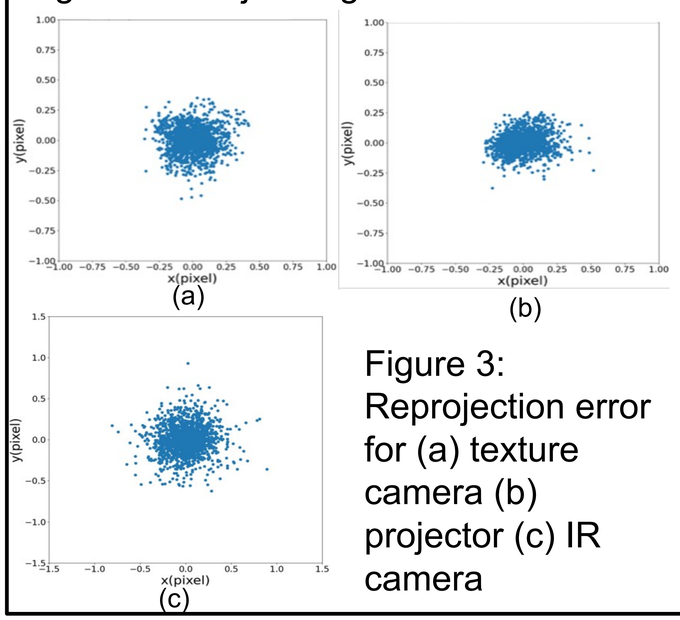

Figure 3: Reprojection error for (a) texture camera (b) projector (c) IR camera

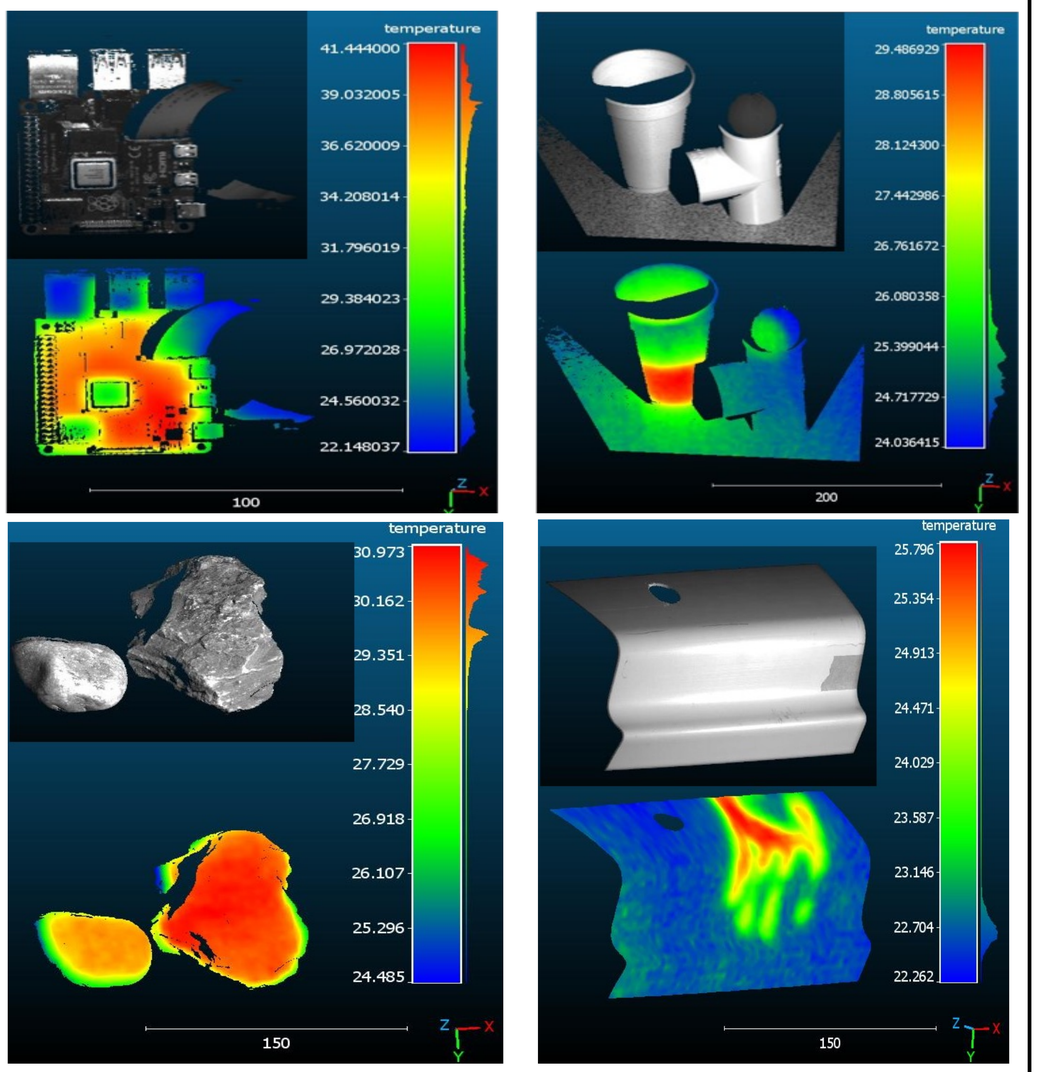

Figure 4: Demonstration of textural and IR 3D reconstruction

Conclusion

Established a well calibrated structure light system that generates 3D point cloud with both textural and thermal information using projective transformations to map thermal information.