



Automating Lattice Inspection: Agentic Analysis of X-Ray CT Data

Team Agentic Atoms

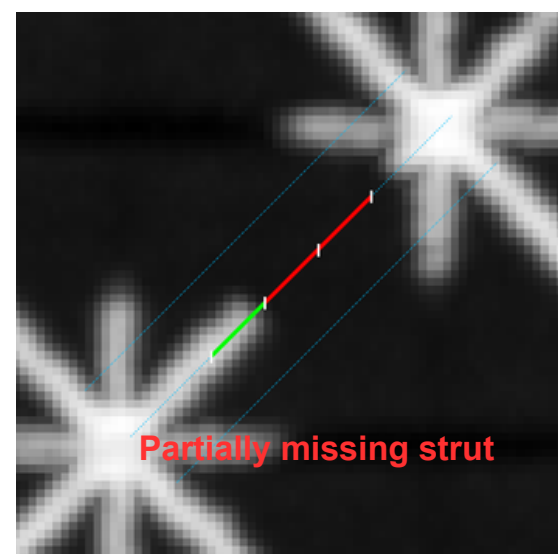
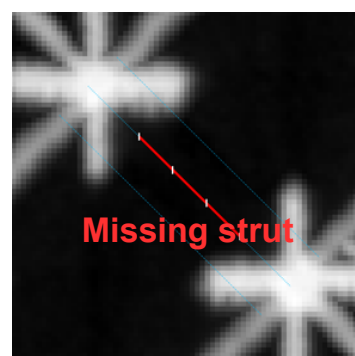
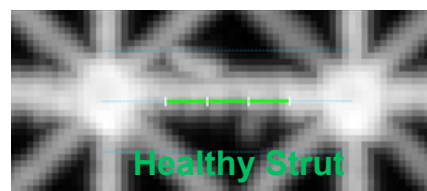
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ABSTRACT

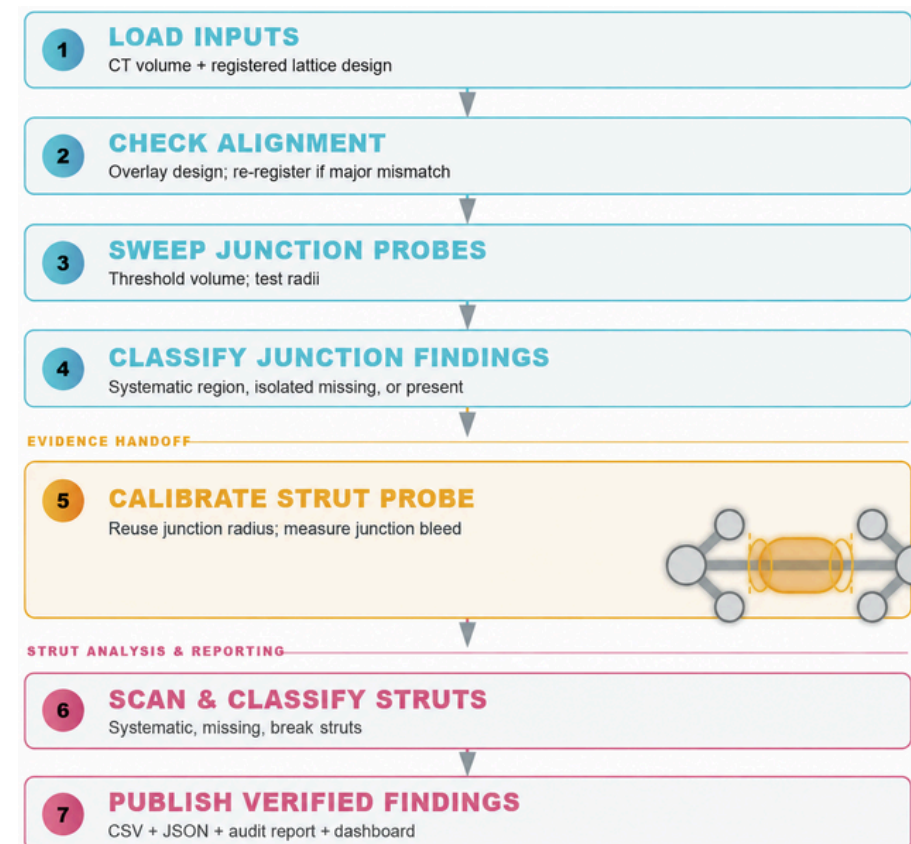
Advances in 3D additive manufacturing have enabled the creation of objects with complicated internal structures such as low density high strength metal lattices. These materials are particularly suited for a diverse set of applications in science, medicine and aviation. However, assessing the quality of these parts has been challenging and time consuming. We explore methods for defect detection and implement a simple, classical defect detection pipeline augmented with an VLM agent for hyperparameter selection, data analysis and visualization complete with an interactive 3D dashboard.

GEOMETRIC CHECKS MADE FLEXIBLE BY AGENTS

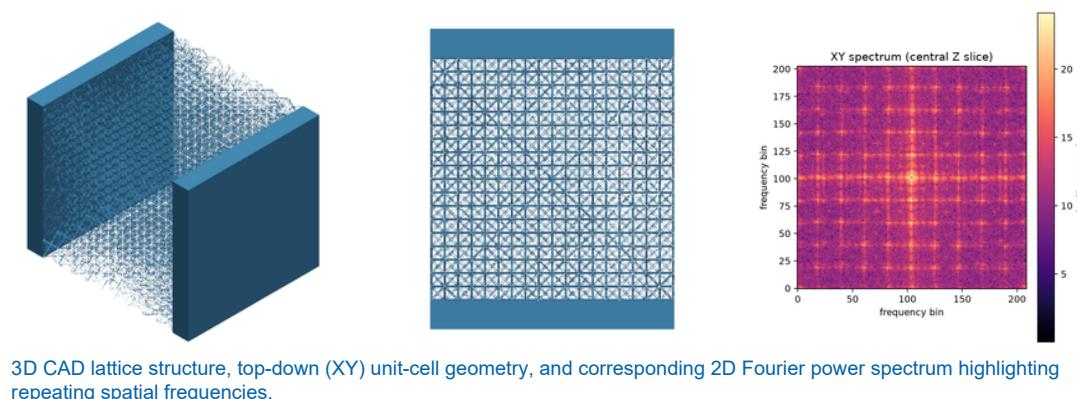


Geometric check for material within bounding cylinder. Cylindrical radii can be tuned by an agent to account for errors in alignment / registration.

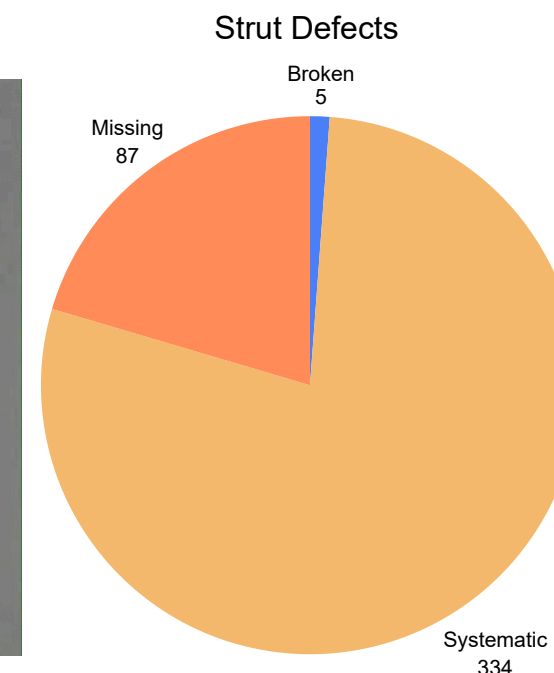
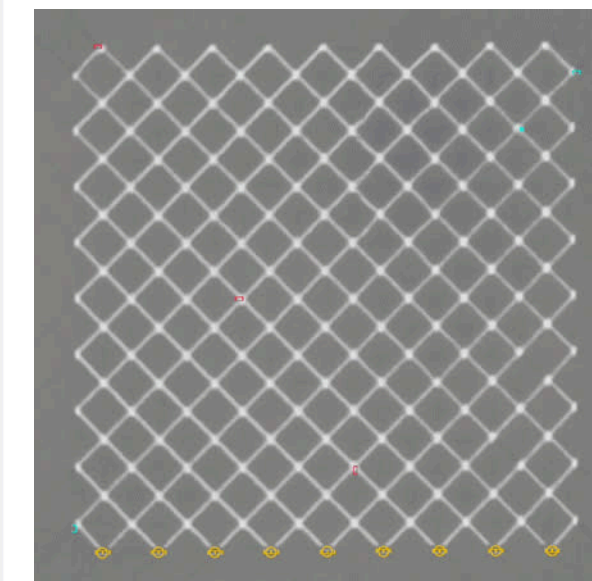
WORKFLOW



EXPERIMENTAL: FOURIER FINDS PITCH BUT NOT PRECISE CELLS



RESULTS



VALIDATION

- Manually validation — we visually confirmed the agent is accurately flagging defects
- Inspected generated projections used by agents
- Classification — Confirmed agent was able to detect and classify machined off face as a systematic defect

CONCLUSIONS

- Agents can automate traditional computer vision methods
- Agents can use multimodal input to visually reason about complex 3D structures
- Automated defect detection is able to reduce bottlenecks in defect detection



View our results! 3D Visualization of lattice with missing struts

AI Agents can augment traditional computer vision methods and accelerate analysis and visualization