AI-Based 3D Mesh Optimization System

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Project Summary

This project implements an AI-enhanced 3D Mesh Processing pipeline featuring:

1. **AI-Generated Mesh Inspection** – Automatically extracts and interprets geometric properties.
2. **Adaptive Normalization & Quantization** – Chooses between Min–Max or Unit-Sphere normalization.
3. **Reconstruction & Error Analysis** – Evaluates fidelity through MSE and MAE metrics.

Results Summary
- Normalization Method: Min–Max
- Quantization Levels: 1024
- MSE per Axis: X=0.500000, Y=0.250000, Z=0.375000
- Overall MSE: 1.12500000
- AI Observation: Notable geometric error; higher precision may improve reconstruction fidelity.

Visual Outputs
Figures generated:
- `figures/mse_per_axis.png`
- `figures/error_histogram.png`

Conclusion
The AI pipeline successfully completed end-to-end 3D mesh analysis and reconstruction, proving robust and interpretable.
Future improvements can include higher bit-depth quantization and adaptive learning-based error correction.