

CENG 589—Digital Geometry Processing

ASSIGNMENT II

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April 8, 2025

3 Weeks

Intrinsic Symmetry Axis Detection (start early!) {100 points}

Your task is to find the intrinsic reflectional symmetry axis of a given 3D model. This axis divides the mesh into two intrinsically reflective components like the right part of the figure below. To do so, you will follow 2 approaches which include hidden tasks like finding the shape extremities (use FPS for that).

1. Start geodesic isocurves [1] from two extremities and take the first intersection of them with sufficient overlap.
2. Use pairwise harmonics for intrinsic reflectional symmetry axis detection as described in [2].

1 Geodesic Iso-Curve Signature, VMV 2016.

2 Pairwise Harmonics for Shape Analysis, TVCG 2013.

Some good intrinsic symmetry axis detection papers for further reading:

3 Finding Surface Correspondences Using Symmetry Axis Curves, SGP 2012.

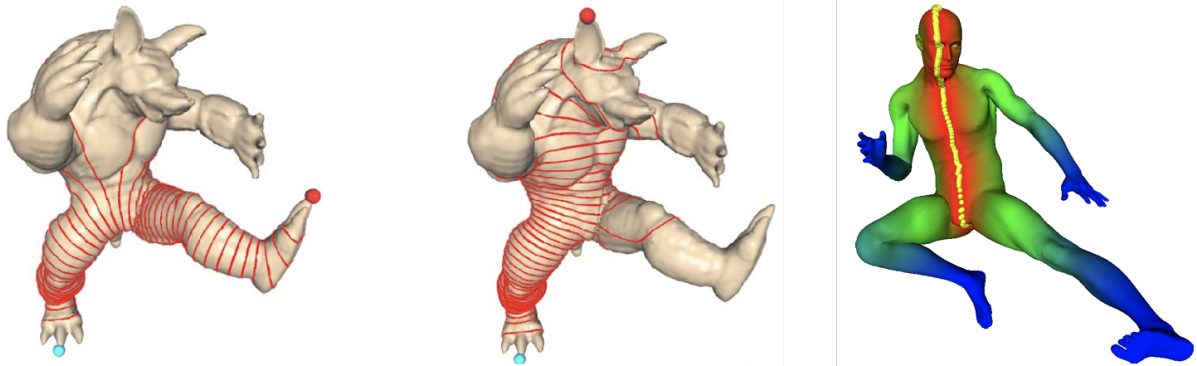
4 Global intrinsic symmetries of shapes, SGP 2008.

5 Fast and accurate intrinsic symmetry detection, ECCV 2018.

6 Approximate symmetry detection in partial 3d meshes, CGF 2014.

7 Partial intrinsic reflectional symmetry of 3d shapes, TOG 2009.

8 Multiscale partial intrinsic symmetry detection, TOG 2012.



Submission This assignment constitutes 20% of your final grade. Good luck. Test with the meshes in <https://segeval.cs.princeton.edu> and send to ys@ceng.metu.edu.tr your code, executable, and a report containing screenshots as well as your interesting observations.