



# CS 399: Automating Anamorphic Art using Signed Distance Functions

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## INTRODUCTION

- Anamorphic art refers to the art of arranging rigid objects in space to create 3D representations that appear differently when rendered from different angles.

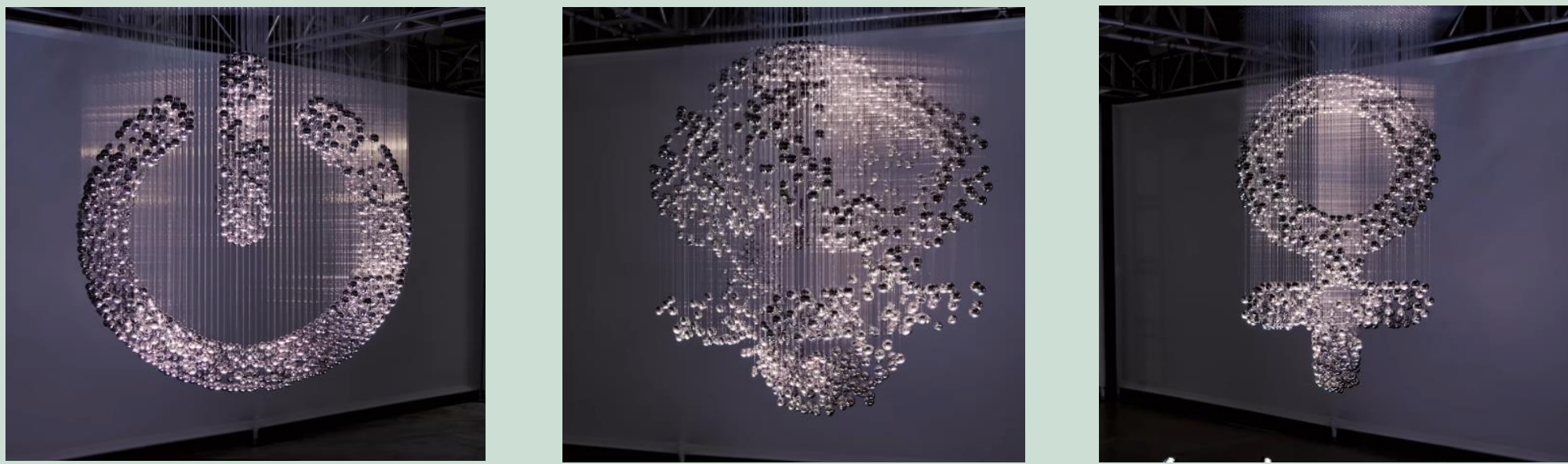


Fig 1. Anamorphic Art Visual Representation

- Signed Distance Functions (SDFs) output the distance from that point to the nearest surface of the object being represented. The sign of the SDF indicates whether the queried point is inside, outside, or on the surface of the underlined object.

$$SDF(\mathbf{x}) = s : \mathbf{x} \in \mathbb{R}^3, s \in \mathbb{R}$$

- Set operations are easy using SDFs.

## PROBLEM STATEMENT

- Efficient Representation of 3D Objects
- Minimizing Intersection Volume
- Aligning True and Projected Images
- Determining Optimal Object Placement

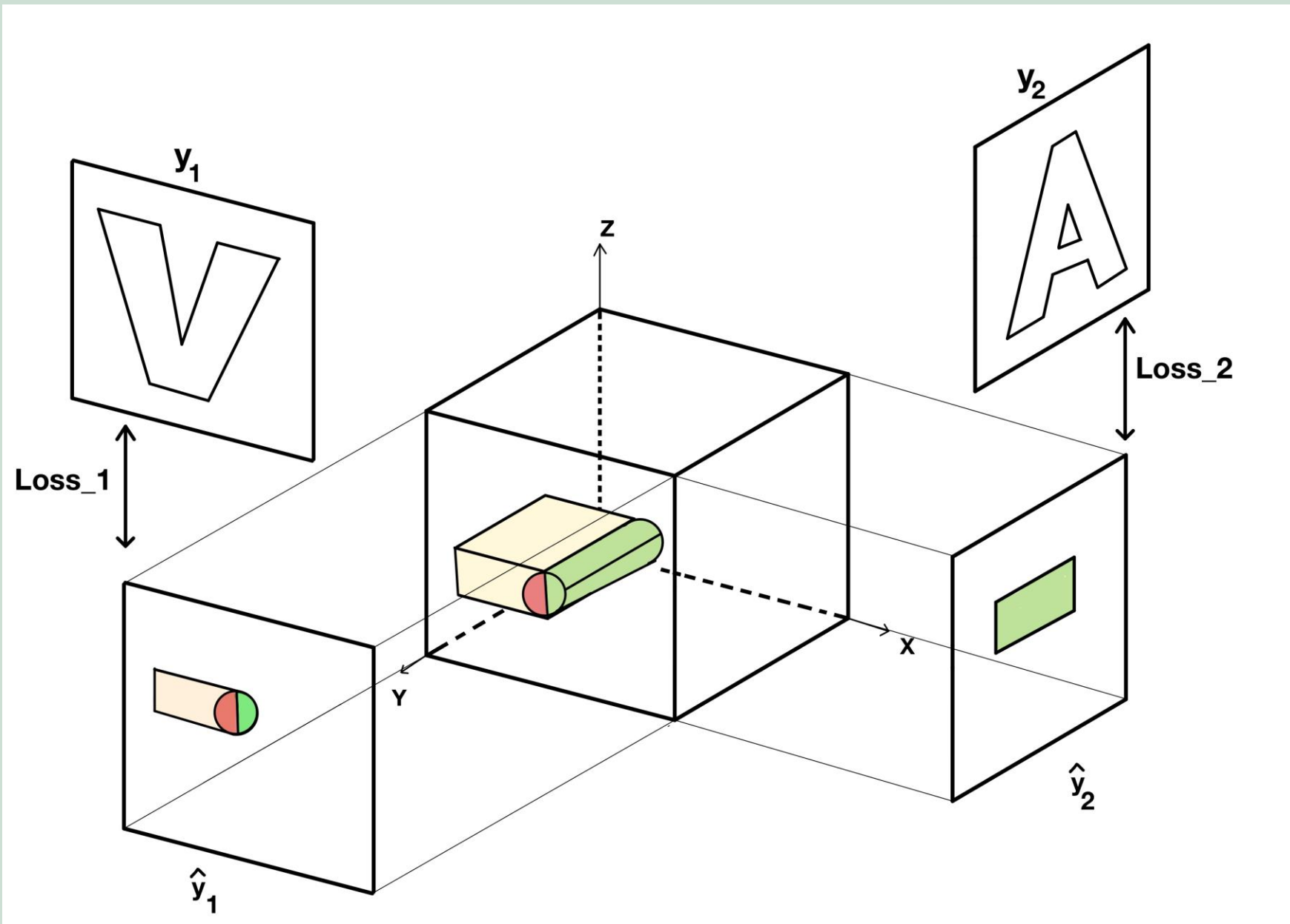


Fig 2. Problem Statement in Pictorial Form

## METHODOLOGY

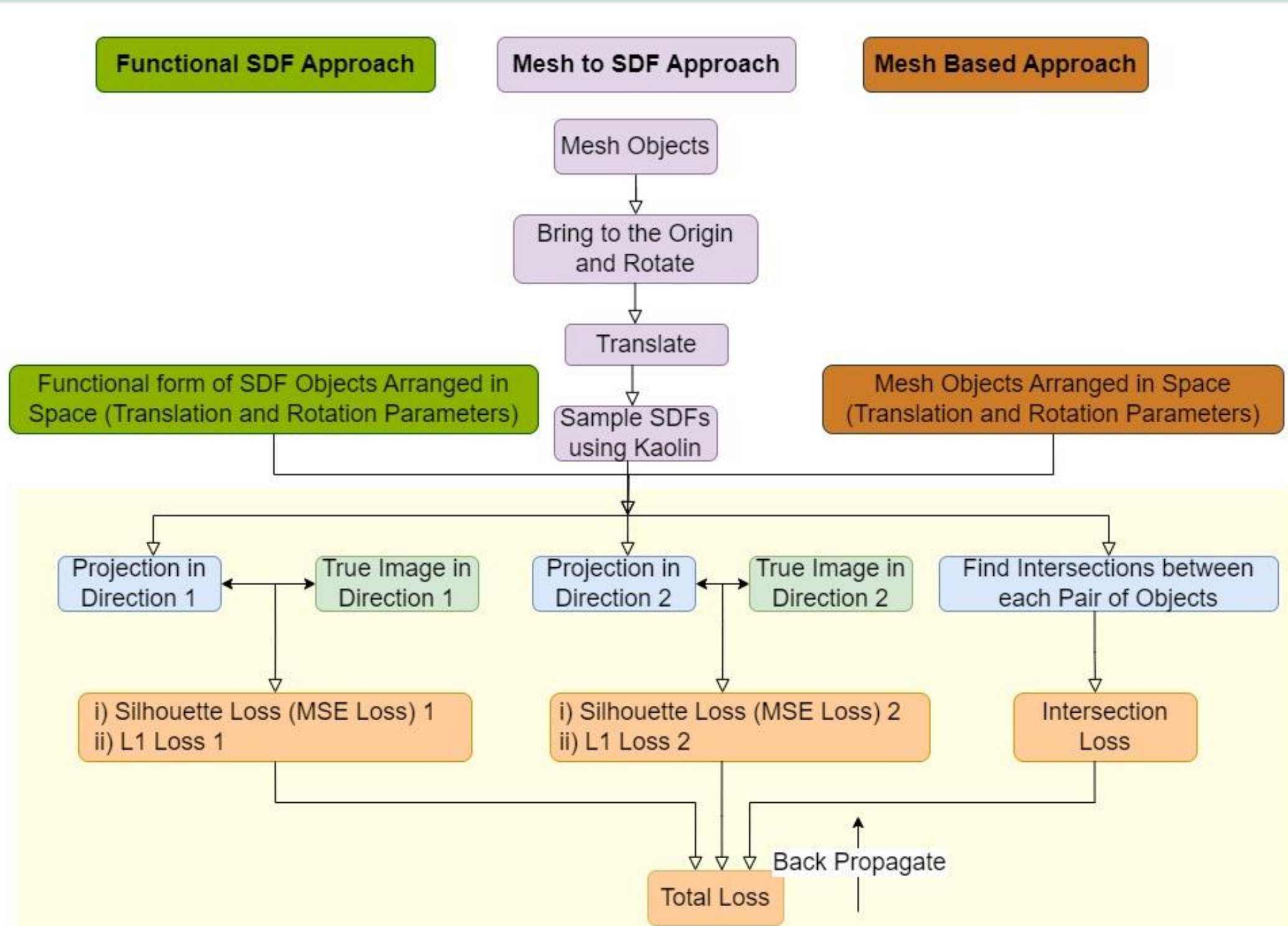


Fig 3. Pictorial Representation of our Workflow

## RESULTS

### APPROACH 1: Functional Form of SDF

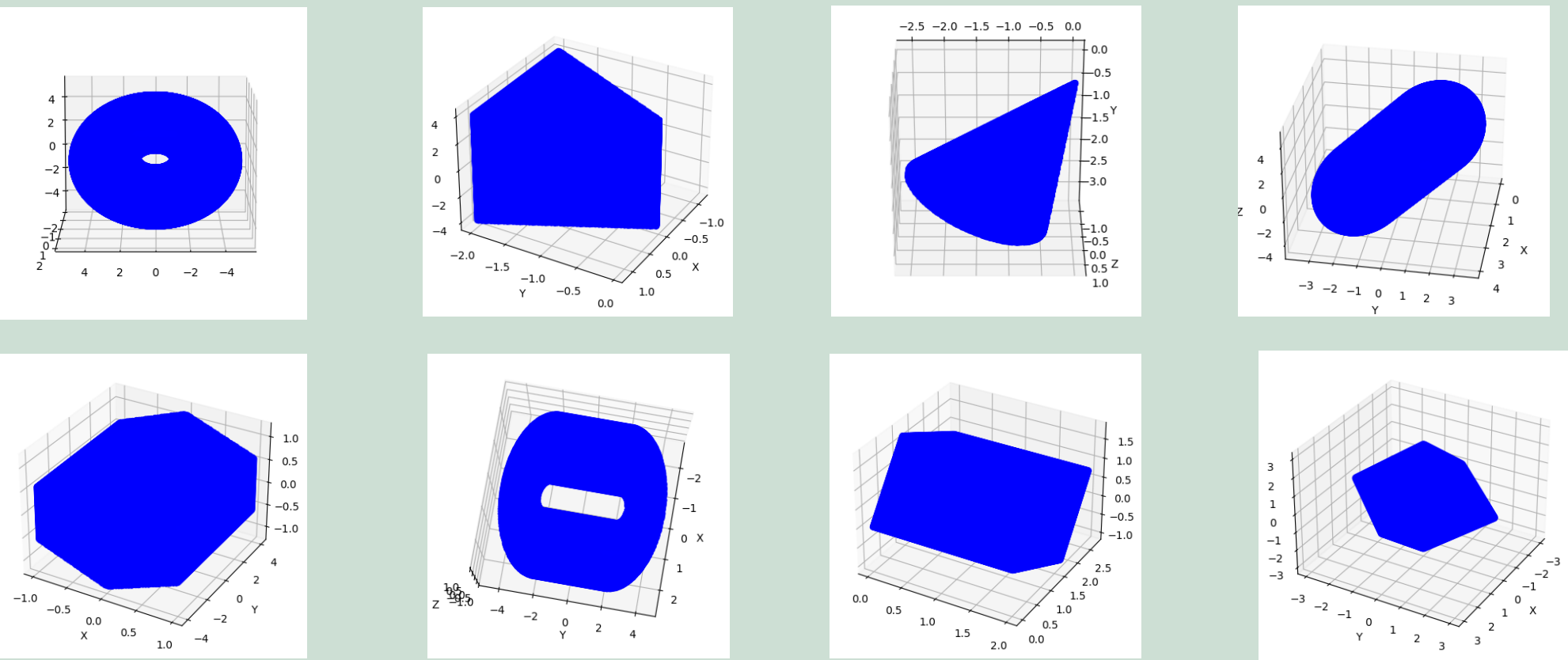


Fig 4. Dataset Prepared using Functional Form of SDFs

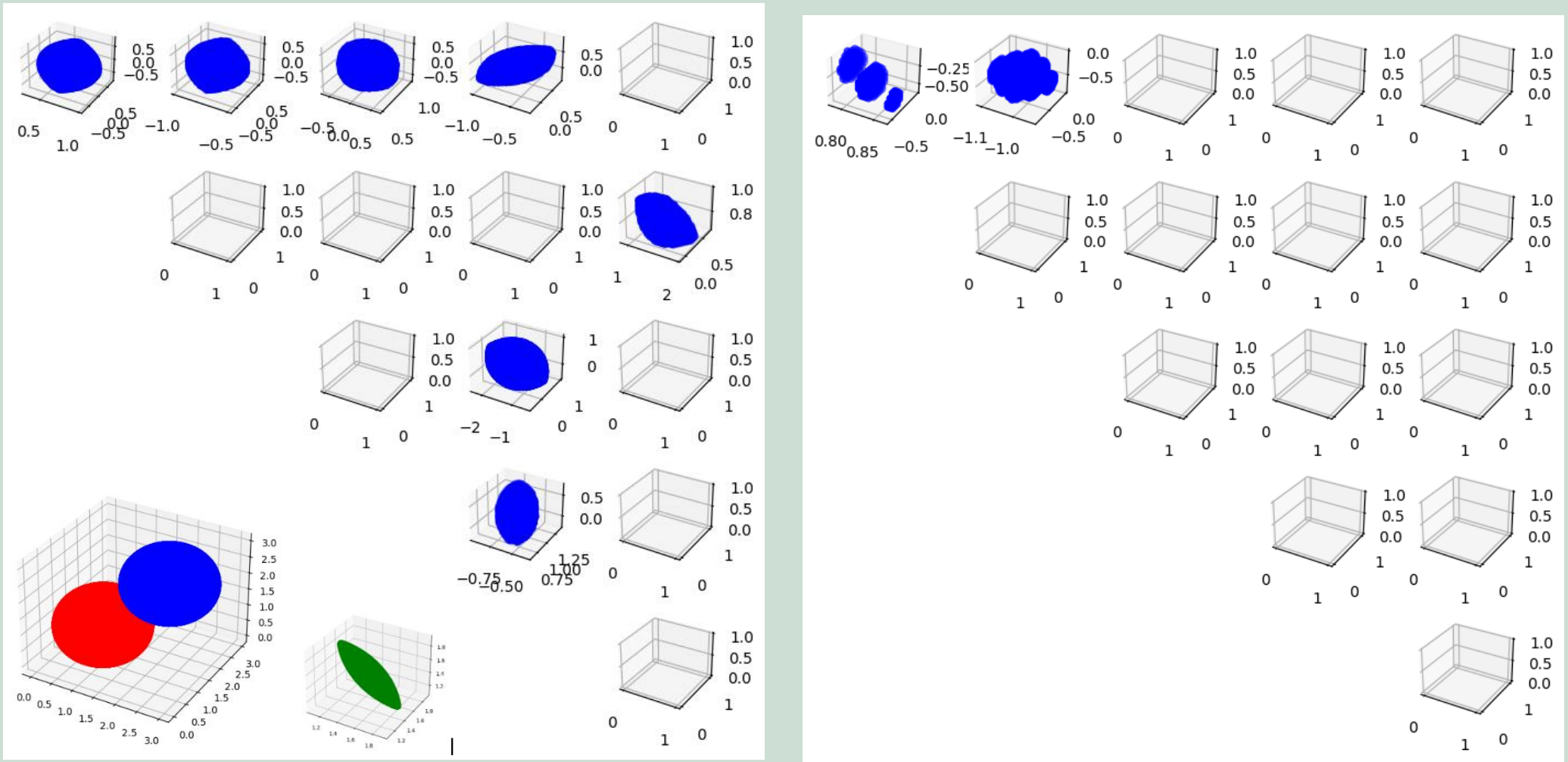


Fig 5. Illustration of Reduction of Intersection Loss

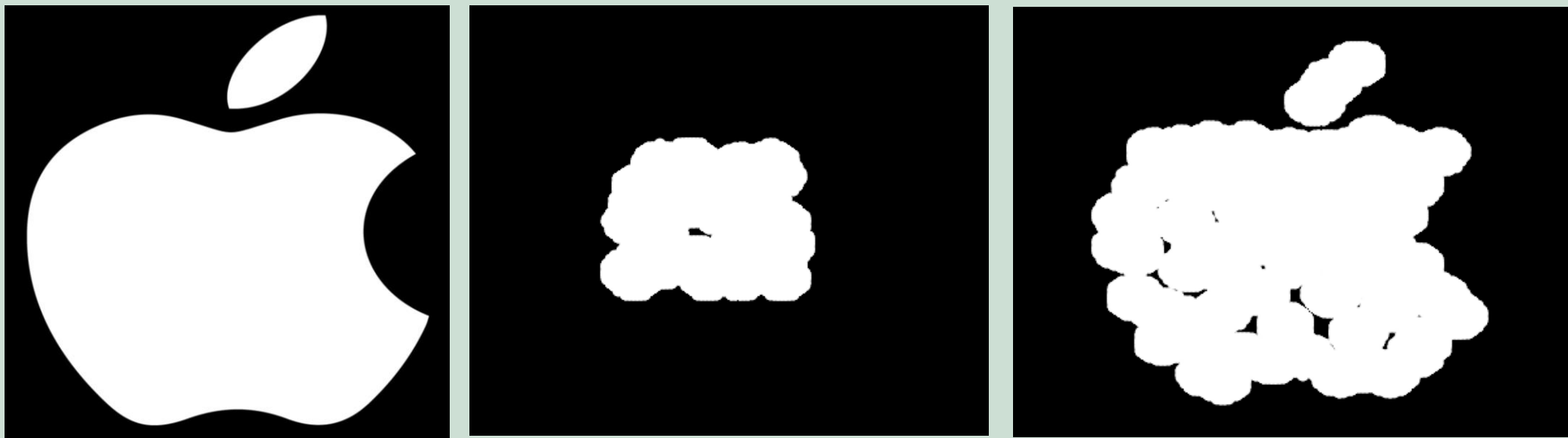


Fig 6. Anamorphic Art using Functional Form of SDF

### APPROACH 2: Mesh to SDF

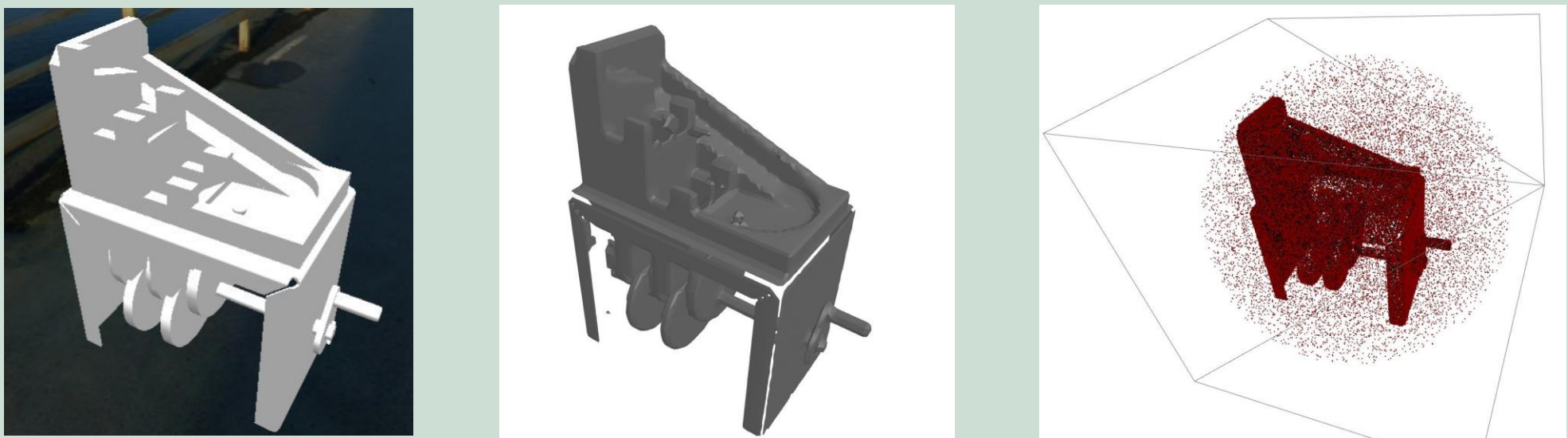


Fig 7. Mesh to SDF Conversion

### APPROACH 3: Mesh Based

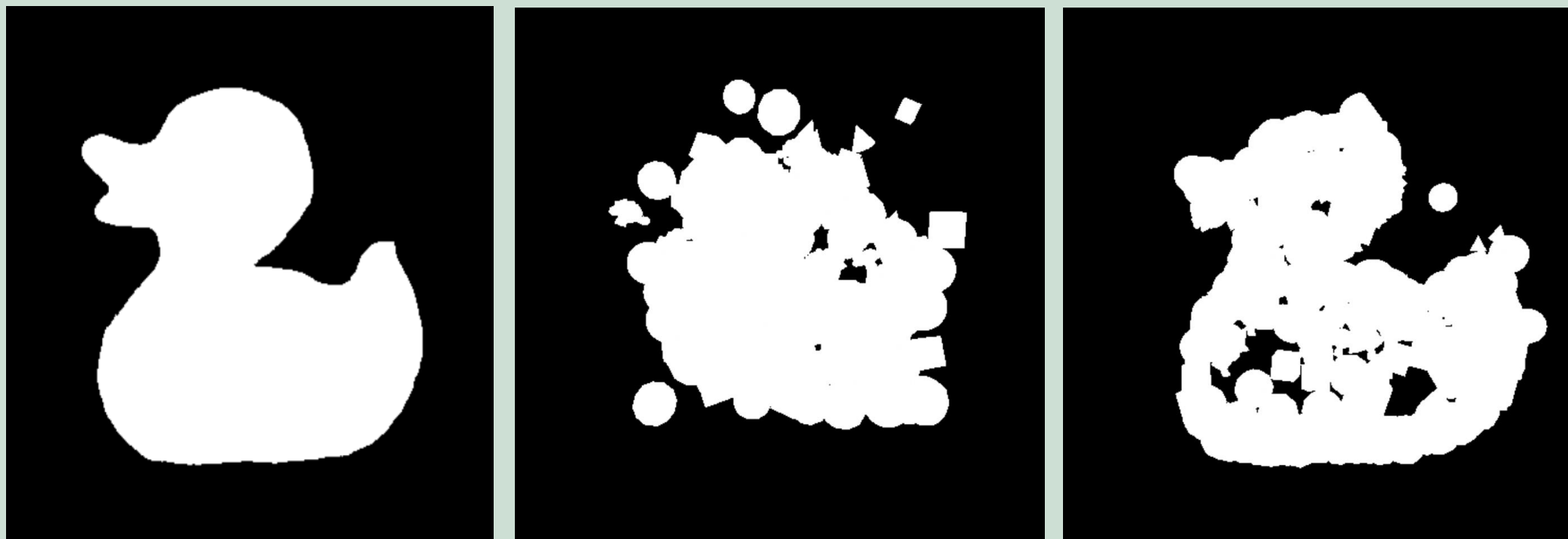


Fig . 8 Anamorphic Art using Mesh Based Approach