Overview
Objective: describe 3D shape of generic objects in terms of qualitative, higher-order properties

Contrast objective with
Category Specific
Structural Maps (Depth, Normals)

Historical motivation
Artists

Data source possibilities
Ordinary Objects
Limited shape diversity
Categories/shape correlation

Attributes
We investigate twelve 3D shape attributes inspired by past work in vision

Curvature Properties
Contact Properties
Volumetric Properties

3D Shape Attributes
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Gathering Data
242 Artists
2109 Works
14,319 Images
Art/Shape Correlation

Sculpture Data
Image Samples
Positives
Negatives
Planar Surfaces
Point/Line Contact
Thin Structures
Rough Surfaces
Has Holes

Learning
Shape Embedding
Objective: learn features such that two views of same work are closer than two views of different works by a margin

Sculpture Attribute Results
Qualitative
Quantitative (AUROC)

Mental Rotation
Idea: do two images show the same object but rotated?
Easy setting: all pairs (ignore same viewpoint cluster)
Hard setting: remove "easy" positives via BOW-SIFT

PASCAL VOC Results
Most
Plurality Count