

# Feature-Based Part Retrieval for Interactive 3D Reassembly

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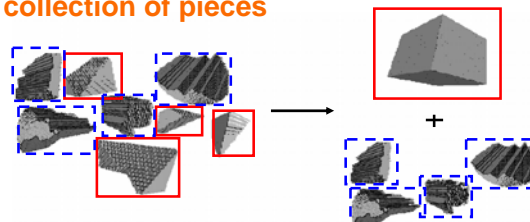
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## Motivation

- ❖ **Archeology**  
Reconstruct broken artifacts
- ❖ **Molecular Biology**  
Identify compatible proteins
- ❖ **Forensics**  
Understand disaster scene

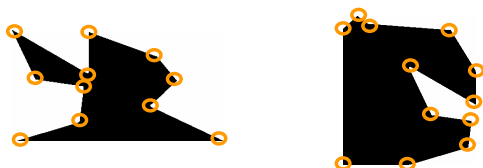
## Goal

Help user to reconstruct 3D object from a large collection of pieces

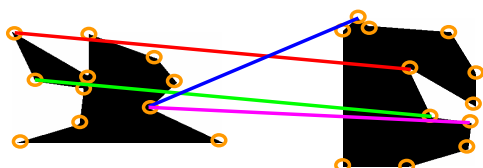


## Approach

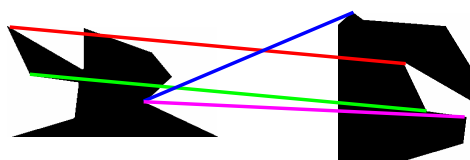
1. Detect interest regions and compute local descriptors



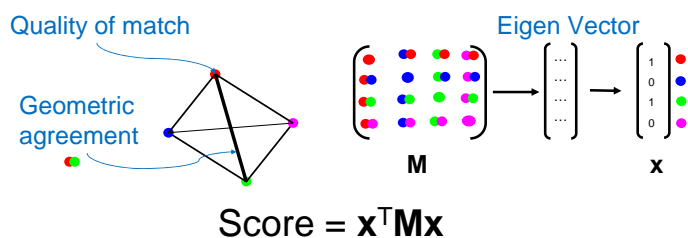
2. Identify candidate descriptor correspondences



3. Quantify geometric compatibility between parts



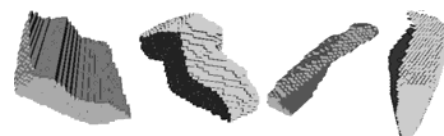
4. Compute final match score using spectral methods



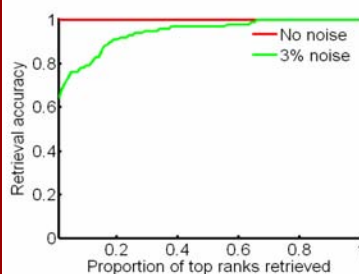
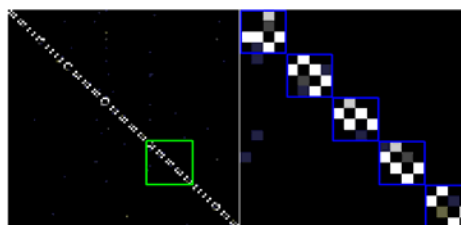
Motivated by [Leordeanu & Hebert, 2005]

## Results

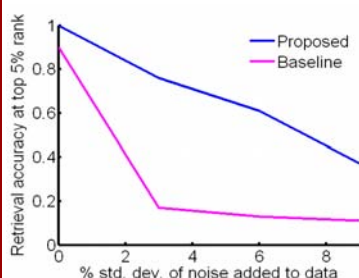
Database of solid objects, each broken into four pieces



System correctly identifies the pieces for each object



- ❖ 100 piece database
- ❖ High retrieval accuracy at low ranks
- ❖ Robust to noise



- ❖ Accuracy at low ranks is crucial metric to evaluate retrieval
- ❖ Significantly outperforms baseline at varying noise levels