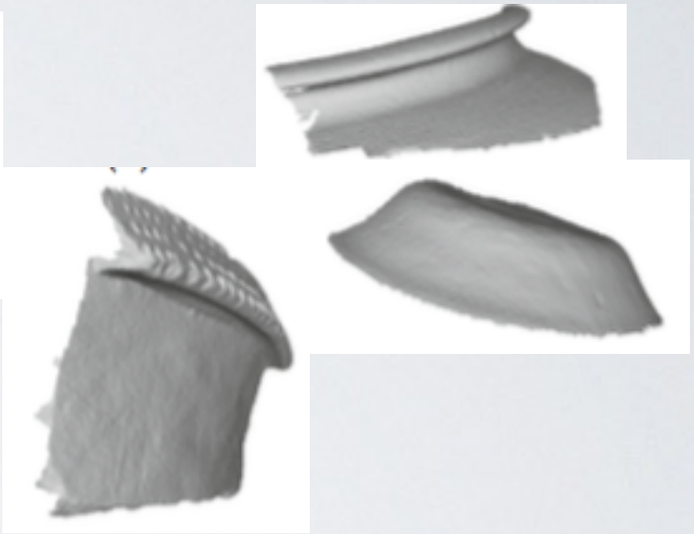
RECOGNITION OF TEOTIHUACAN POTSHERDS



Tepalcatl project: Early Postdoc.Mobility SNSF

Edgar Roman-Rangel. UniGe.
Stephane Marchand-Maillet. UniGe.
Diego Jimenez-Badillo. INAH, Mexico.

OUTLINE

- Introduction
- Current data
- Research work
- Challenges

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- Analyzing ceramics, and **potsherds** in particular.
- One of the most abundant and studied objects in Archaeology.

Images from the project Urban Archaeology by INAH

Aztec deities. Image from [1].

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- One of the most abundant and studied objects in Archaeology.
- Information about daily practices of ancient groups.
- Thousands of potsherds in a common excavation site.

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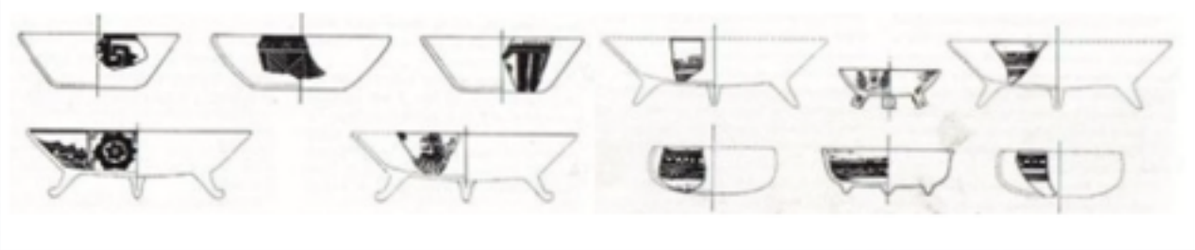
Introduction: Challenges

- Manual analysis: tedious.
- Storage vs further use.
- Small potsherds (~5 to 20%) of a complete piece.
- Diagnostic?
- 3D scanning.



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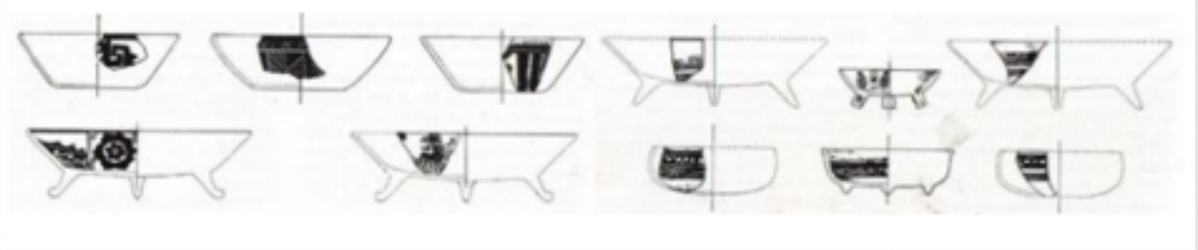

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- Can we help here?

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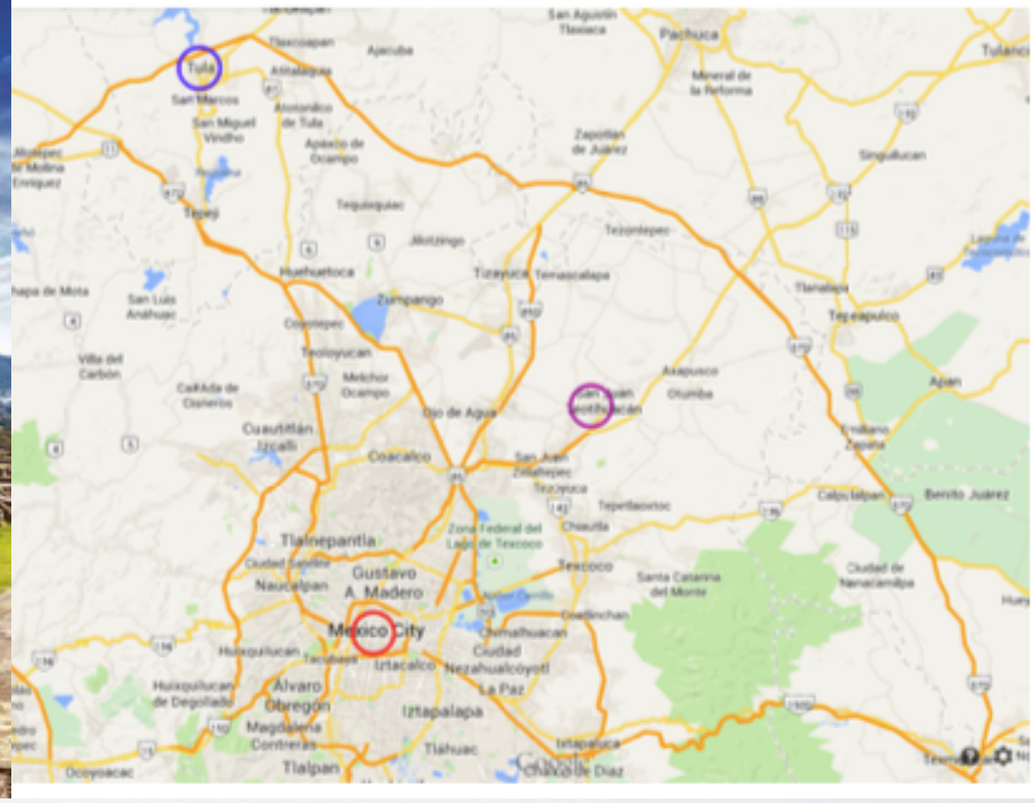

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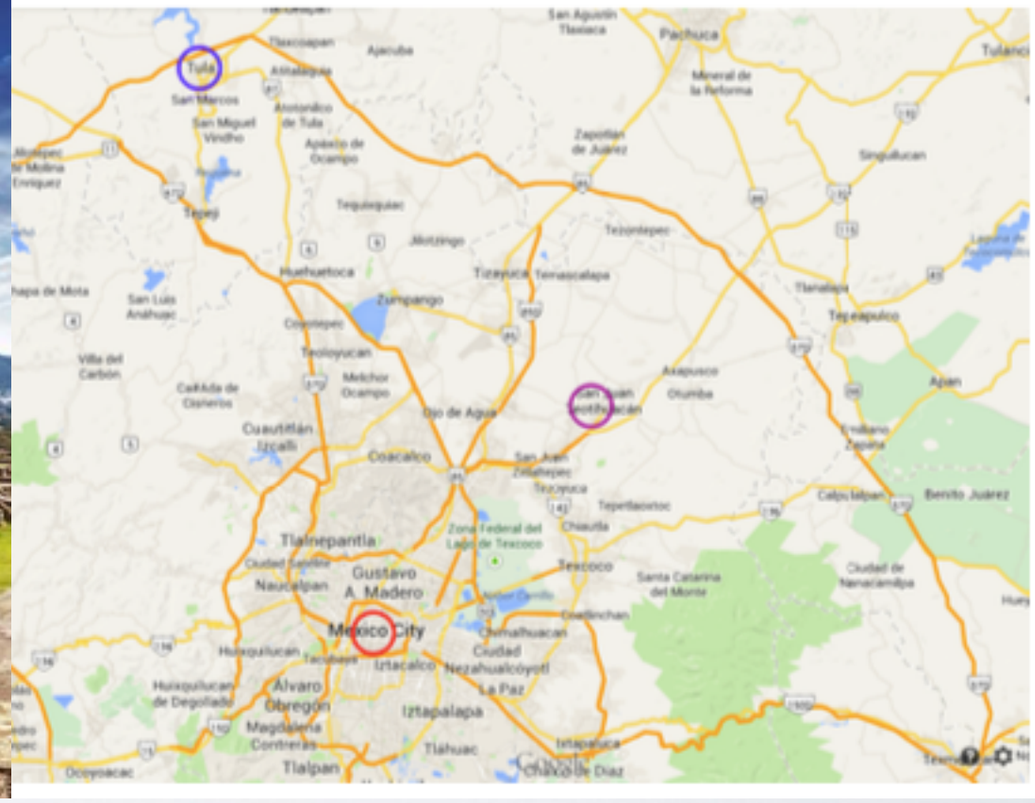
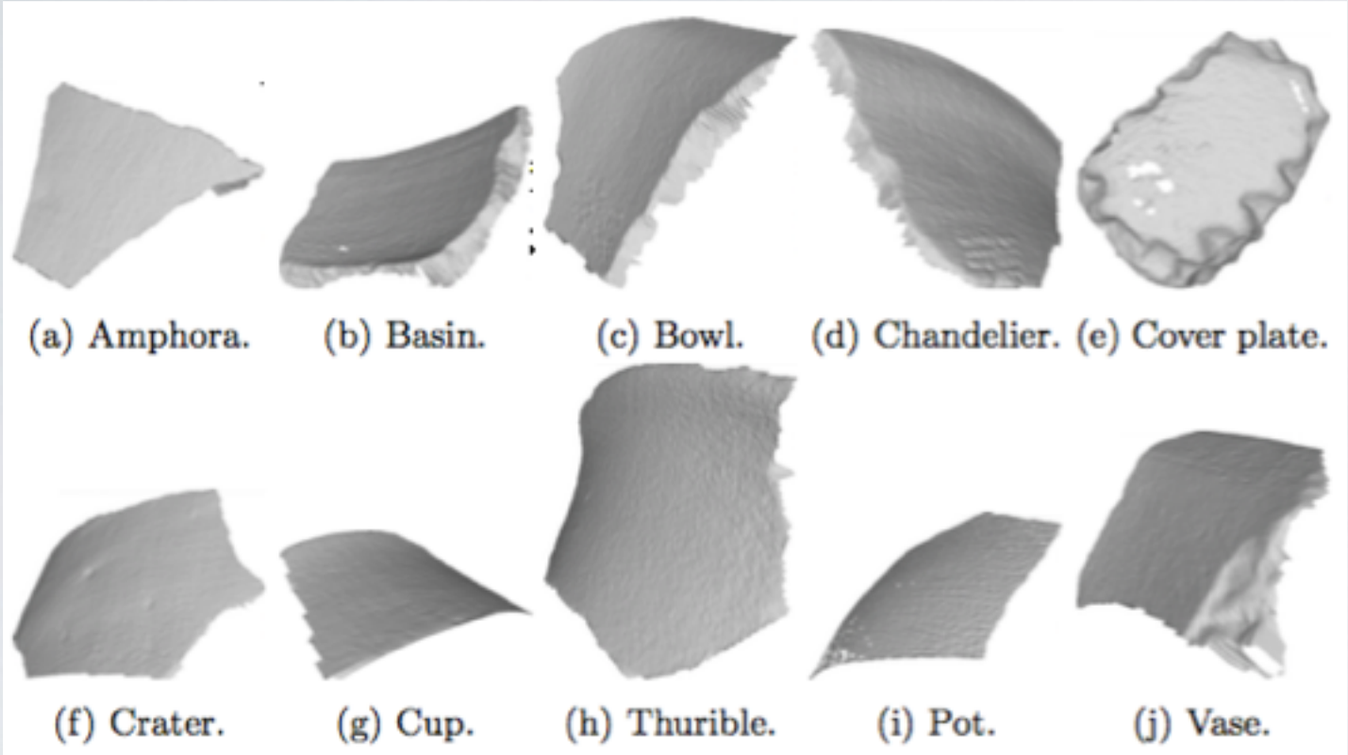


- Teotihuacan: city of gods (where men can become gods).
- Developed between 1st and 7th century C.E.
- Most important cultural, commercial, religious, and political center at the time.
- Aztecs claimed to descend from them.
- Mainly known through oral traditions (not official records).

Current Data: Examples



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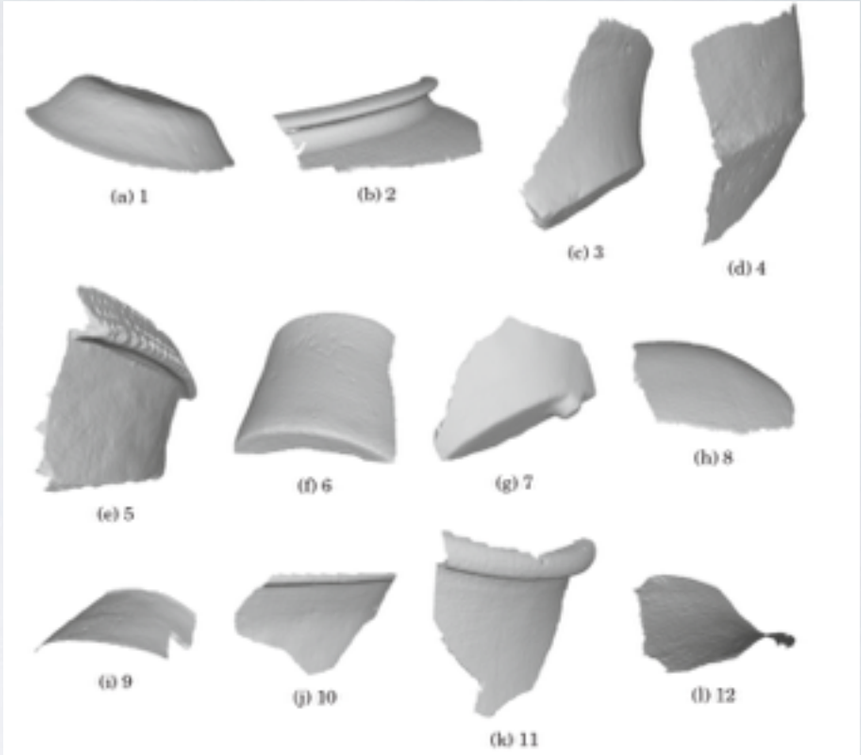

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Plate
Pot
Bowl
Crater
Censer
Vase
Vase support

Curved
Highly curved
Curved with slight border
Curved with clear border
Convex
Flat

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[5] Roman-Rangel et al., "Classification and Retrieval of Archaeological Potsherds Using Histograms of Spherical Orientations". JOCCH, 2016.

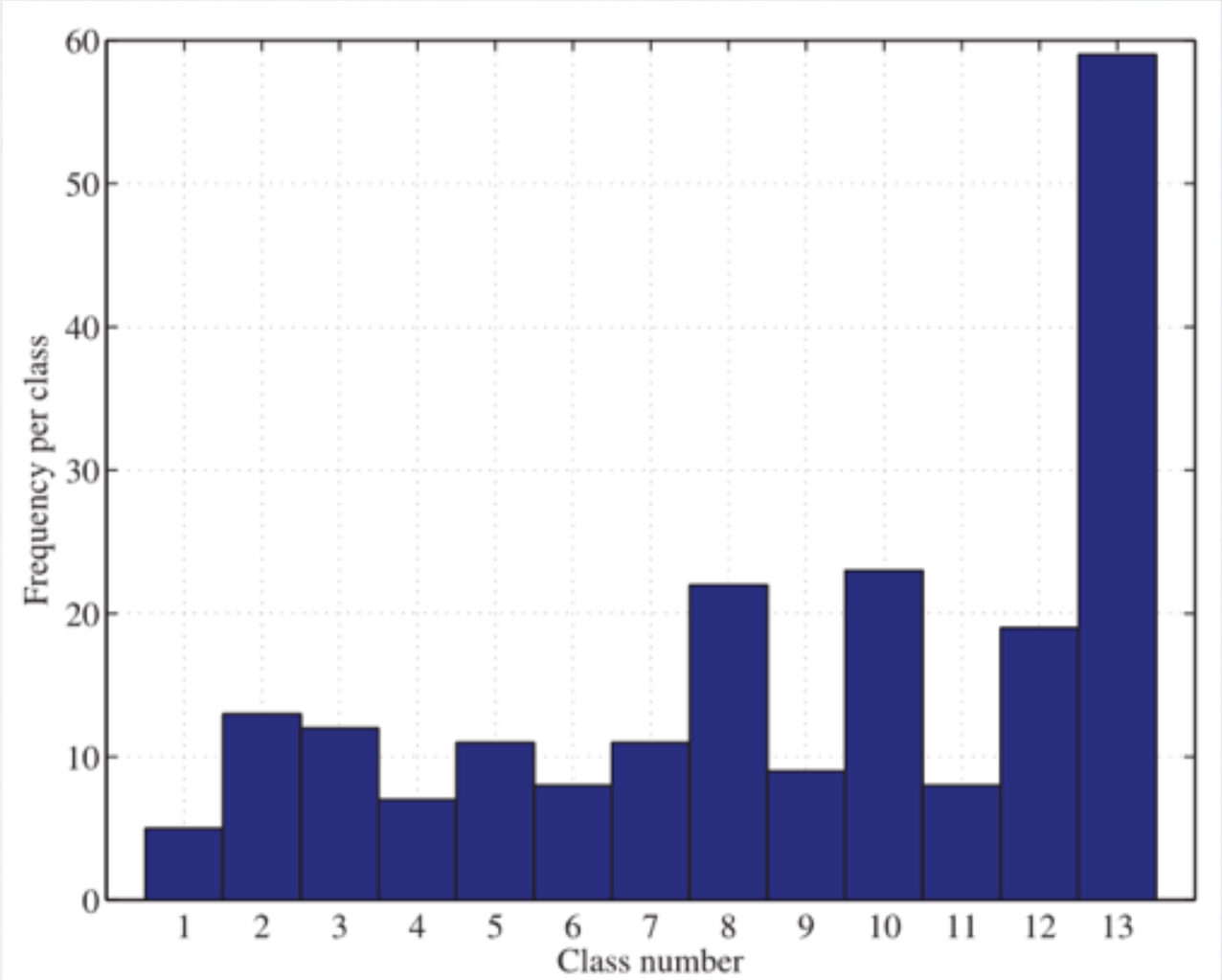
Current Data: Dataset

67 diagnostic potsherds:

Plate
Pot
Bowl
Crater
Censer
Vase
Vase support

140 non-diagnostic potsherds:

Curved
Highly curved
Curved with slight border
Curved with clear border
Convex



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Research Work:

- Scanning.
- Description.
- Similarity Analysis.
- Retrieval and classification.

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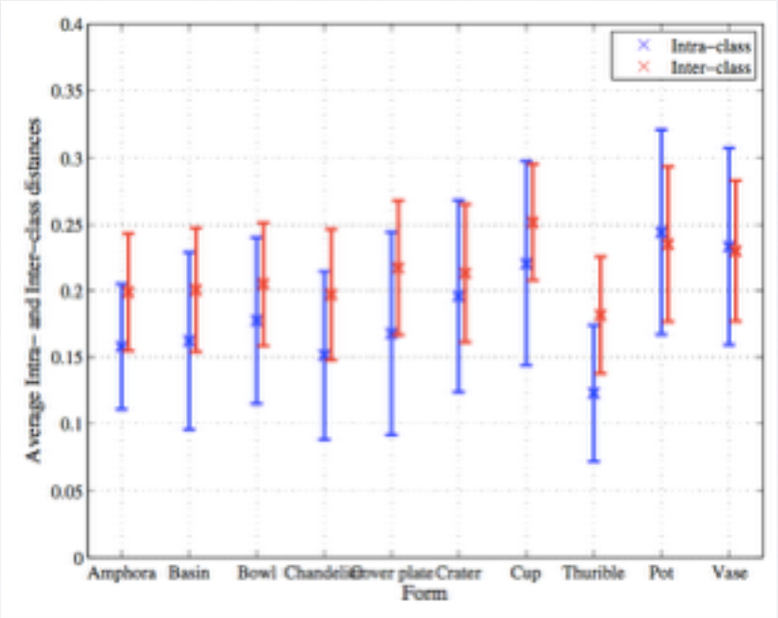

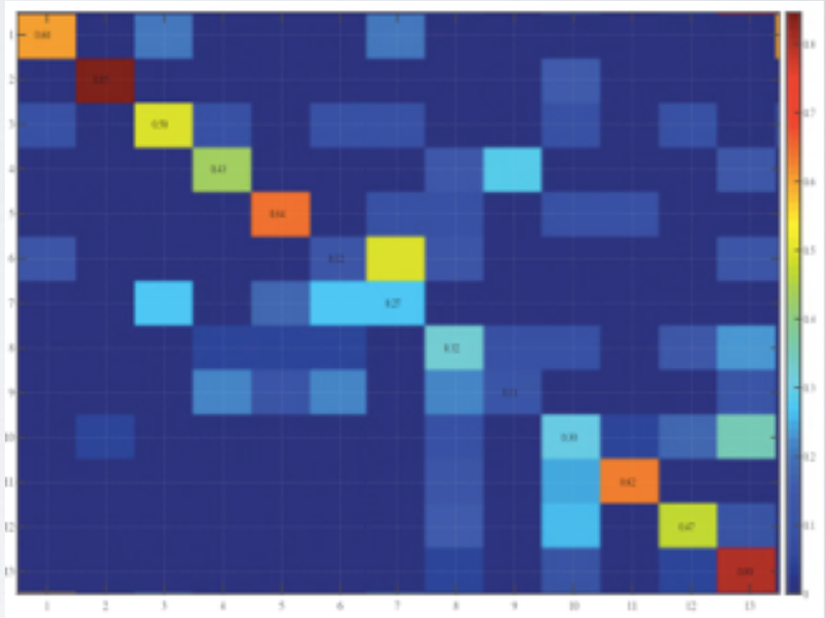

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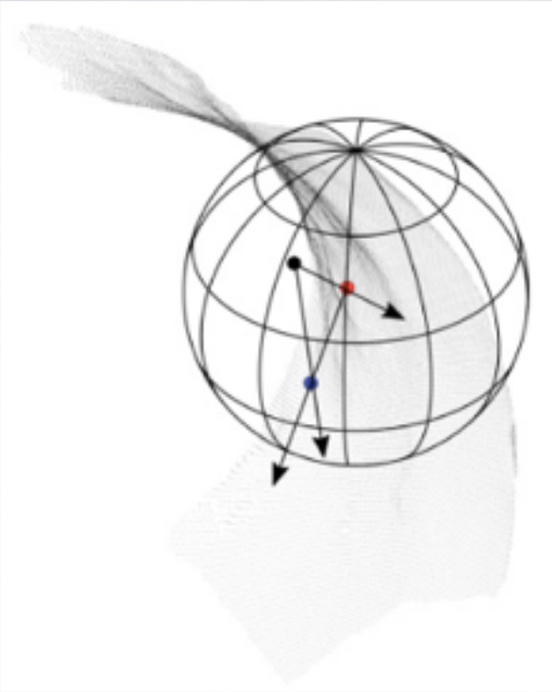

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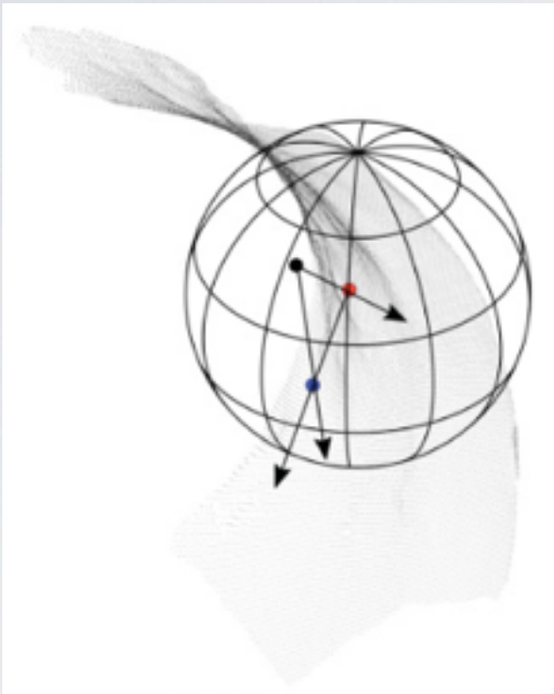

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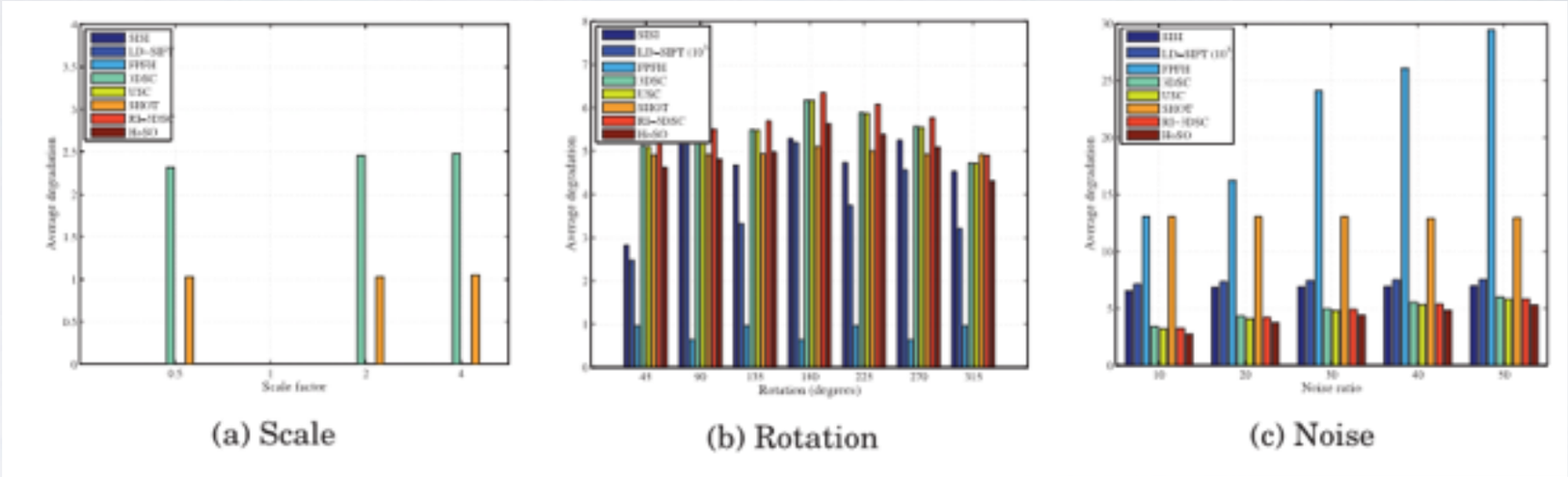

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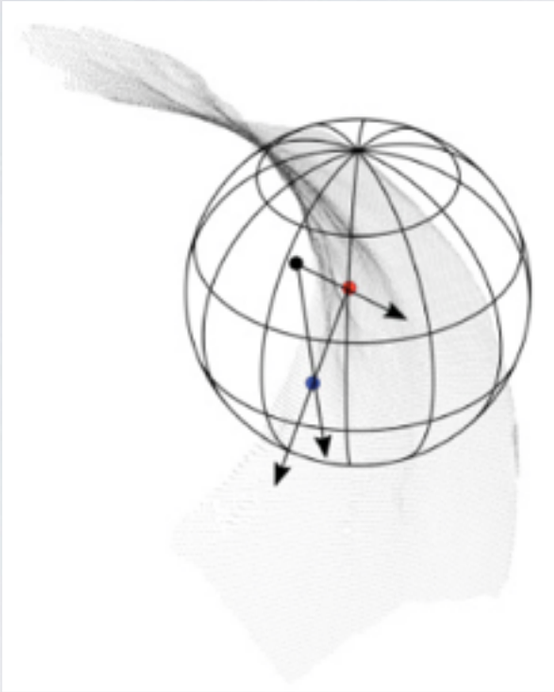

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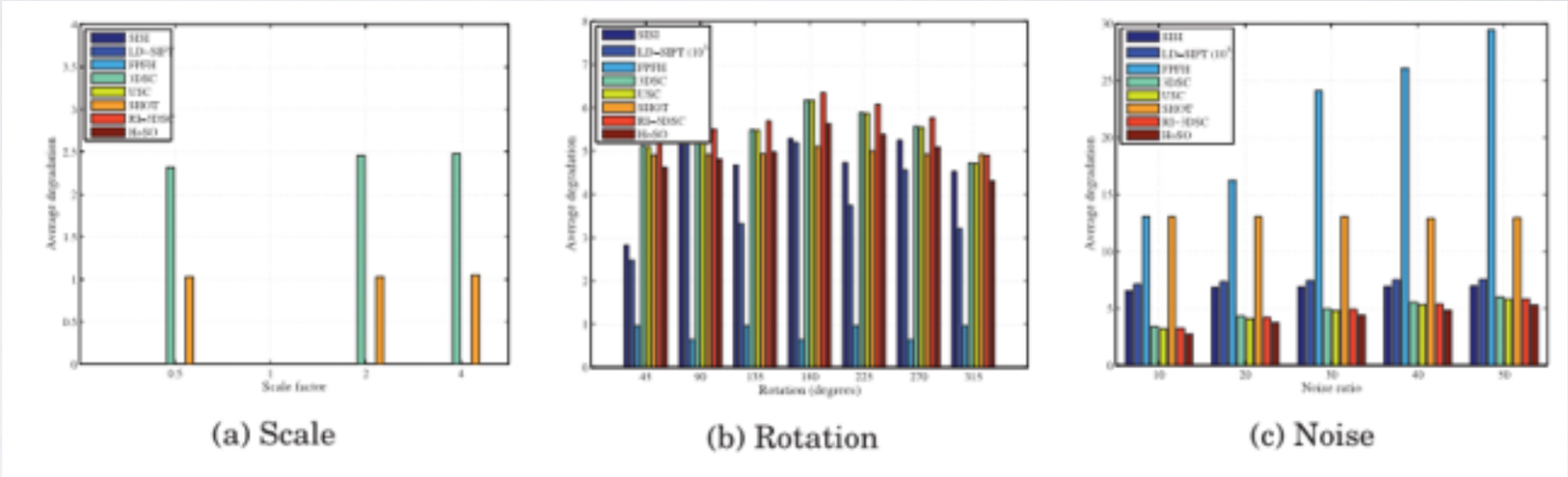

Table III. Average Classification Accuracy Obtained by Each Local Descriptor and Each Classification Approach Using Bag-of-Words with Vocabularies of 100 Visual Words

Descriptor	*k*NN	SVM-Linear	SVM-Polynomial	SVM-Gaussian	Neural Network
SISI	0.266	0.329	0.314	0.324	0.305
LD-SIFT	0.362	0.433	0.391	0.443	0.366
FPFH	0.213	0.167	0.233	0.219	0.342
3DSC	0.391	**0.529**	0.443	0.510	0.418
USC	0.522	0.514	0.519	0.557	0.472
SHOT	0.541	0.443	0.452	0.457	0.499
RI-3DSC	0.411	0.362	0.386	0.381	0.331
HoSO	**0.589**	0.519	**0.591**	**0.591**	**0.521**

Note: Best results are highlighted in bold.

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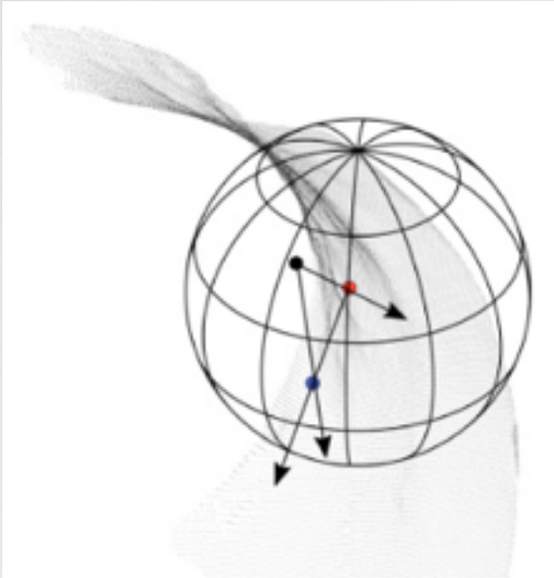

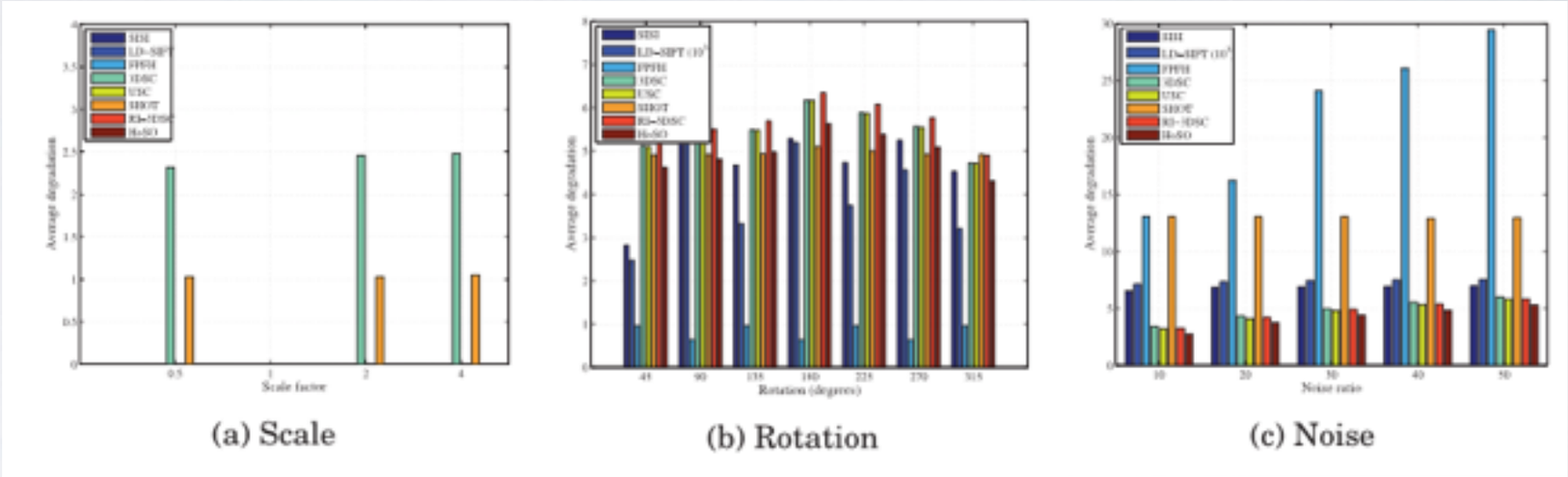

(a) Scale (b) Rotation (c) Noise

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Network
05
66
42
18
72
99
31
21

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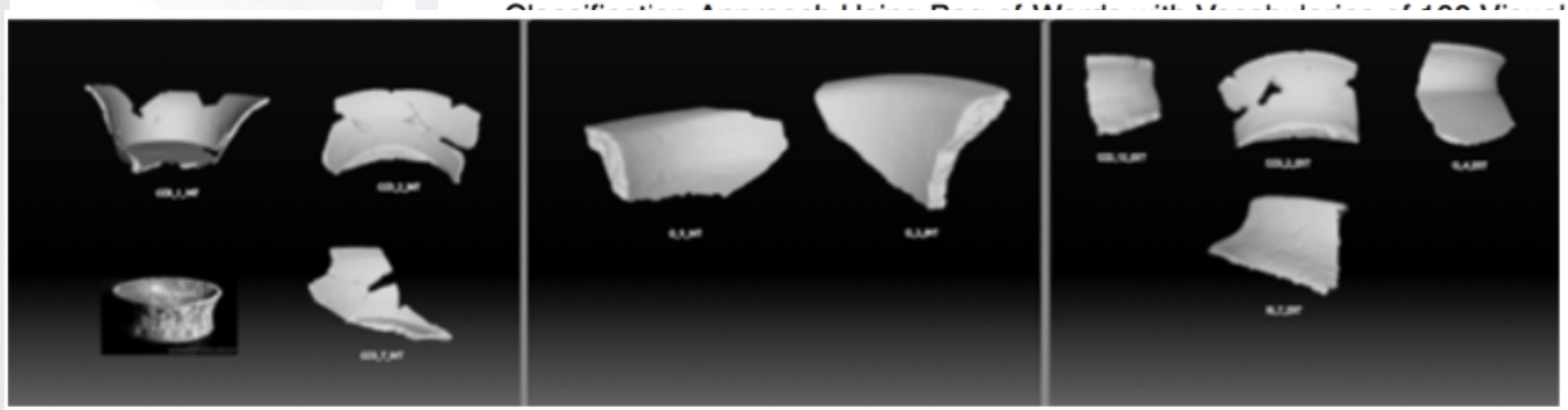

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- New research questions and challenges.

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- Disseminate.

Thank you.

Q&A

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