

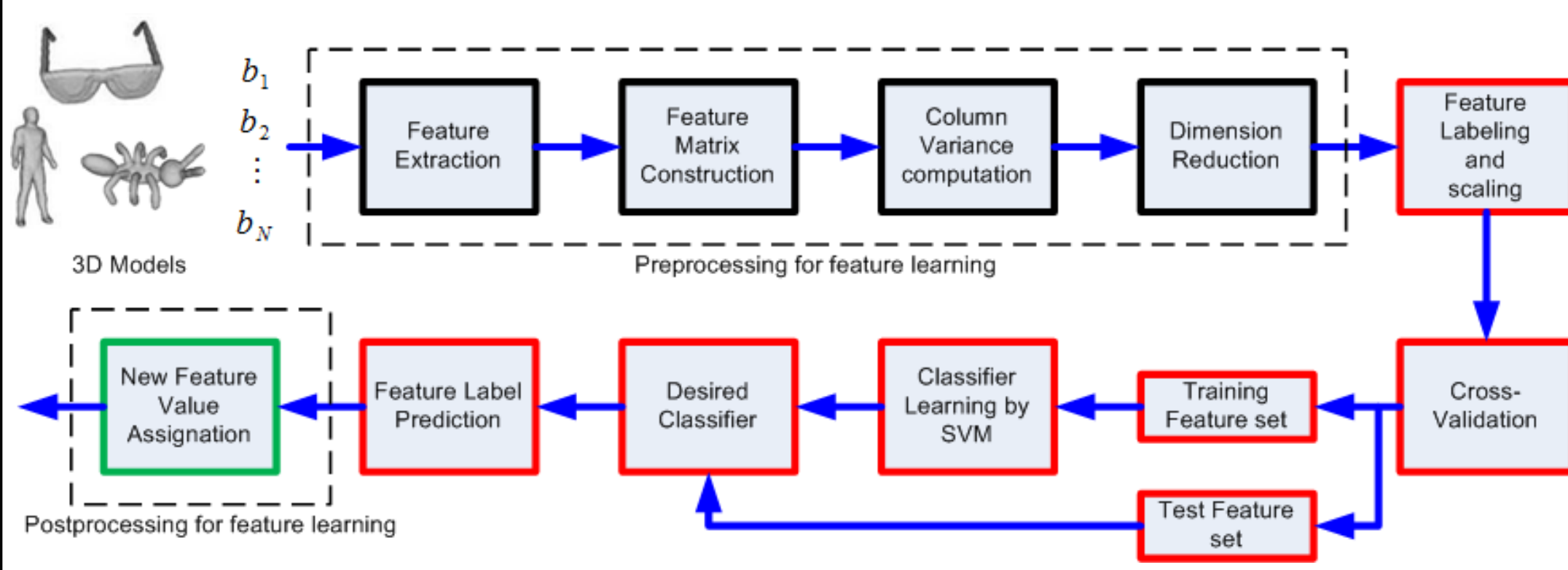
# A Machine Learning Approach to 3D Model Retrieval

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## Motivation & Introduction

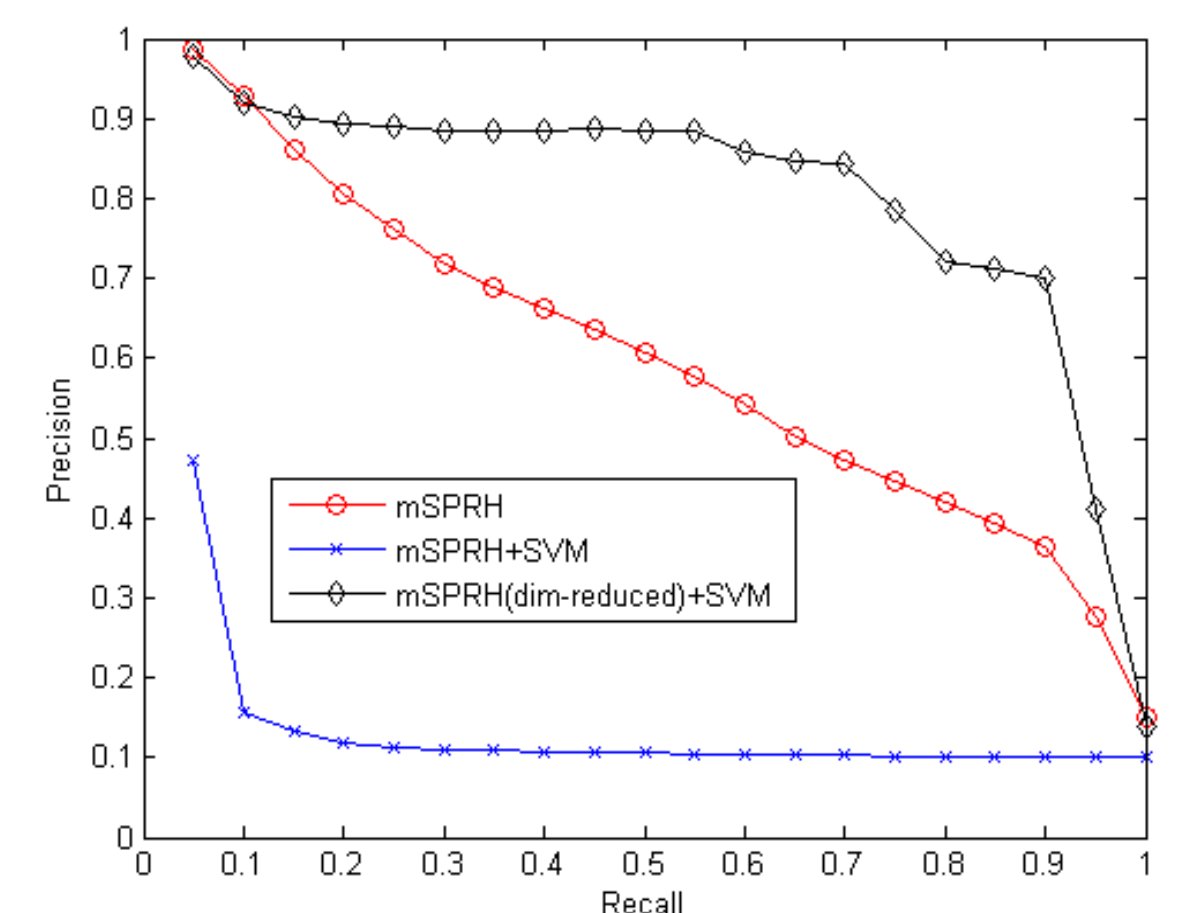
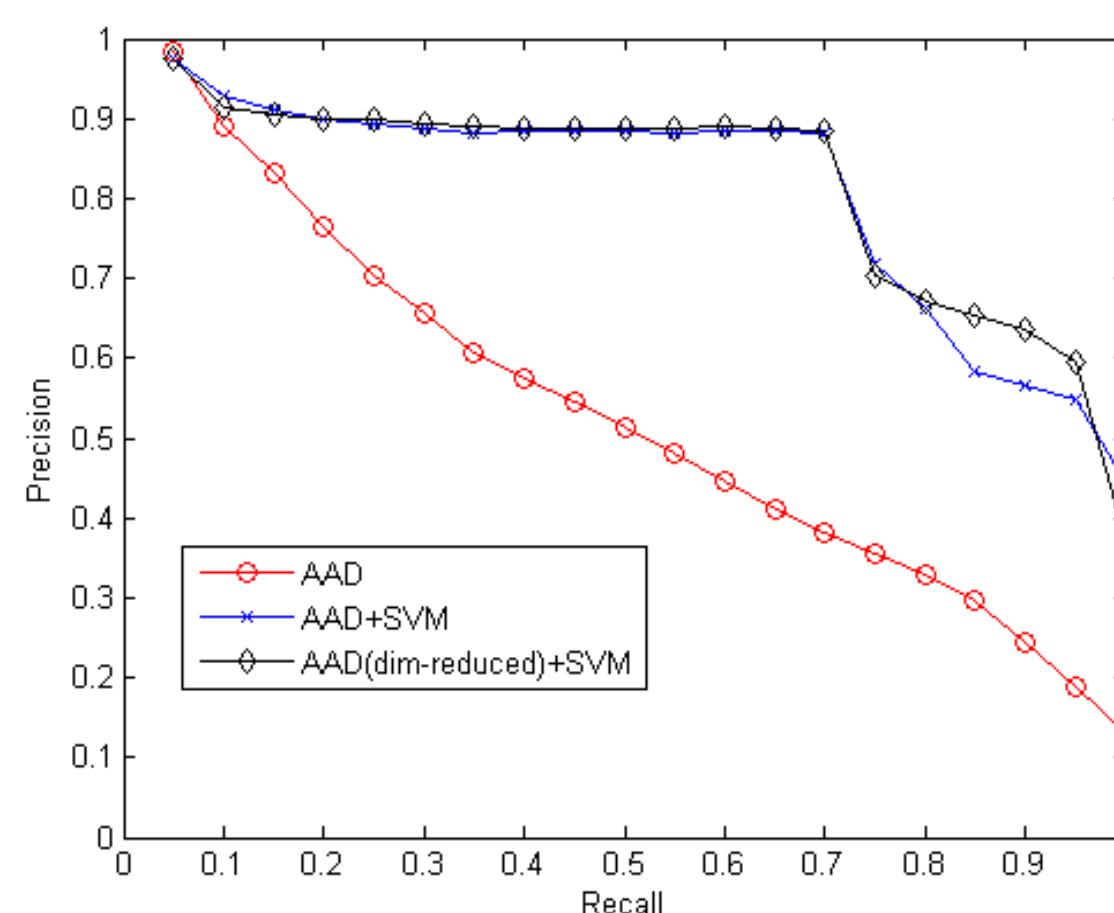
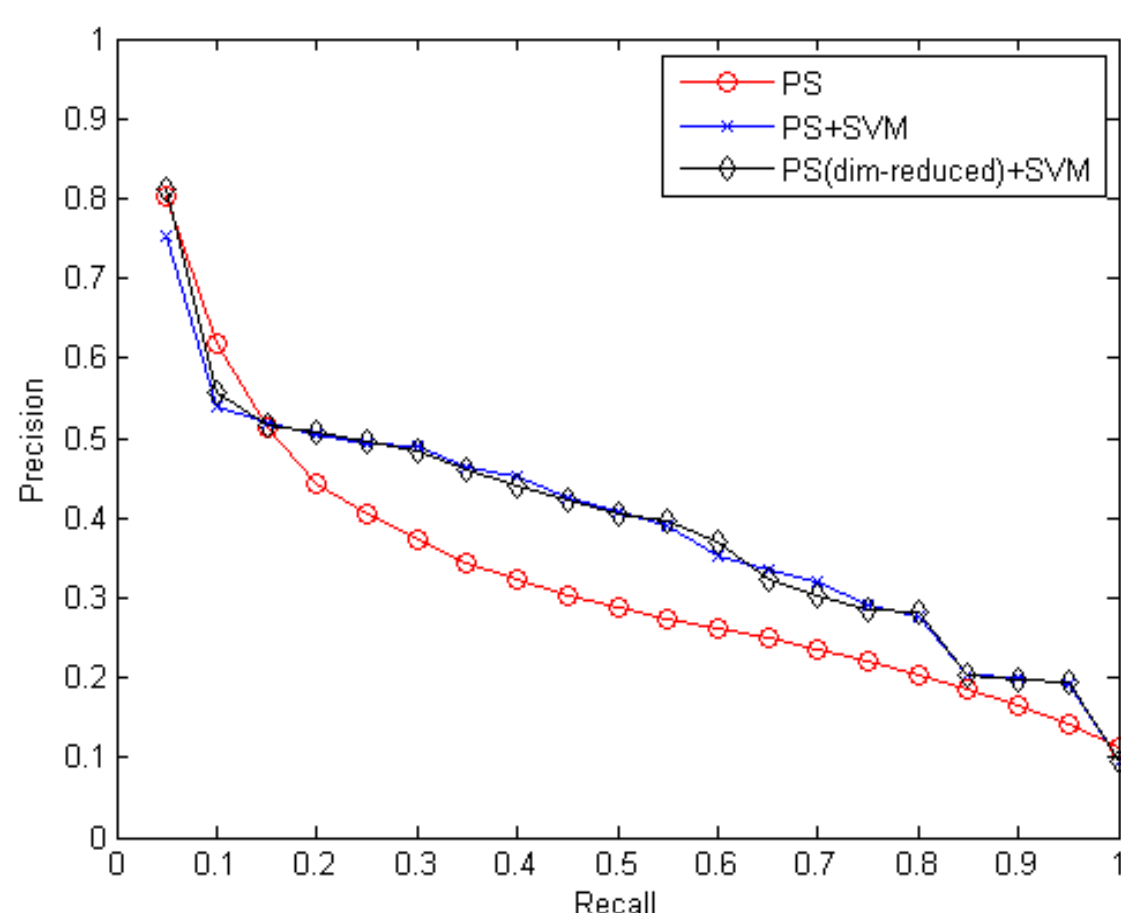
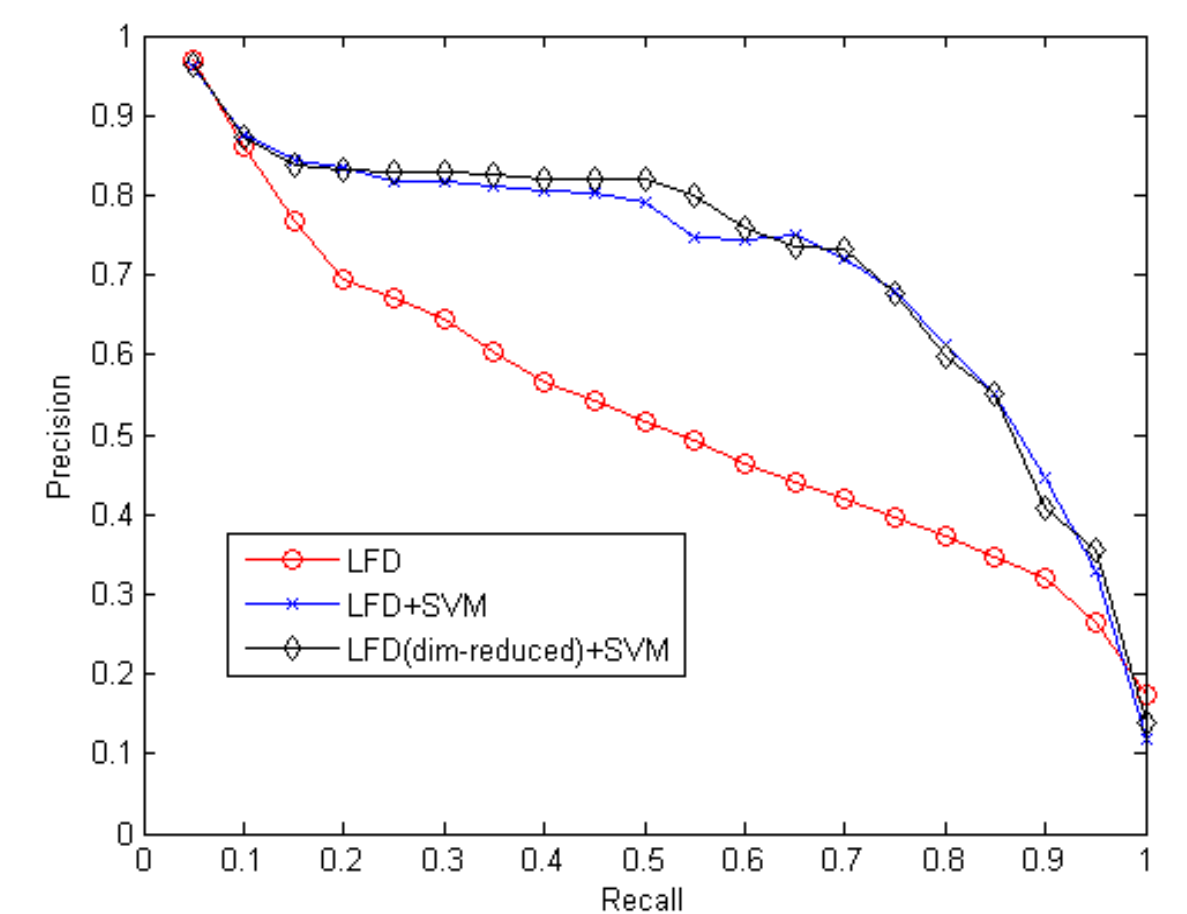
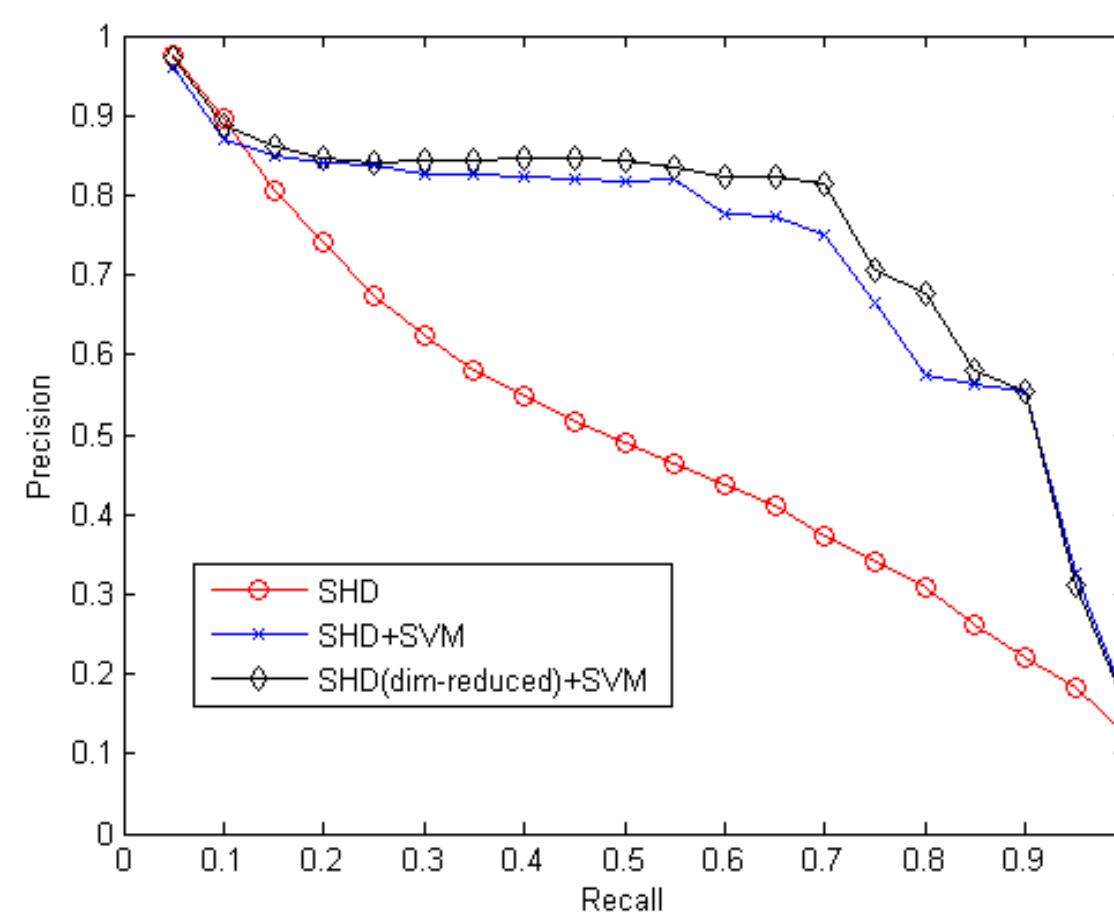
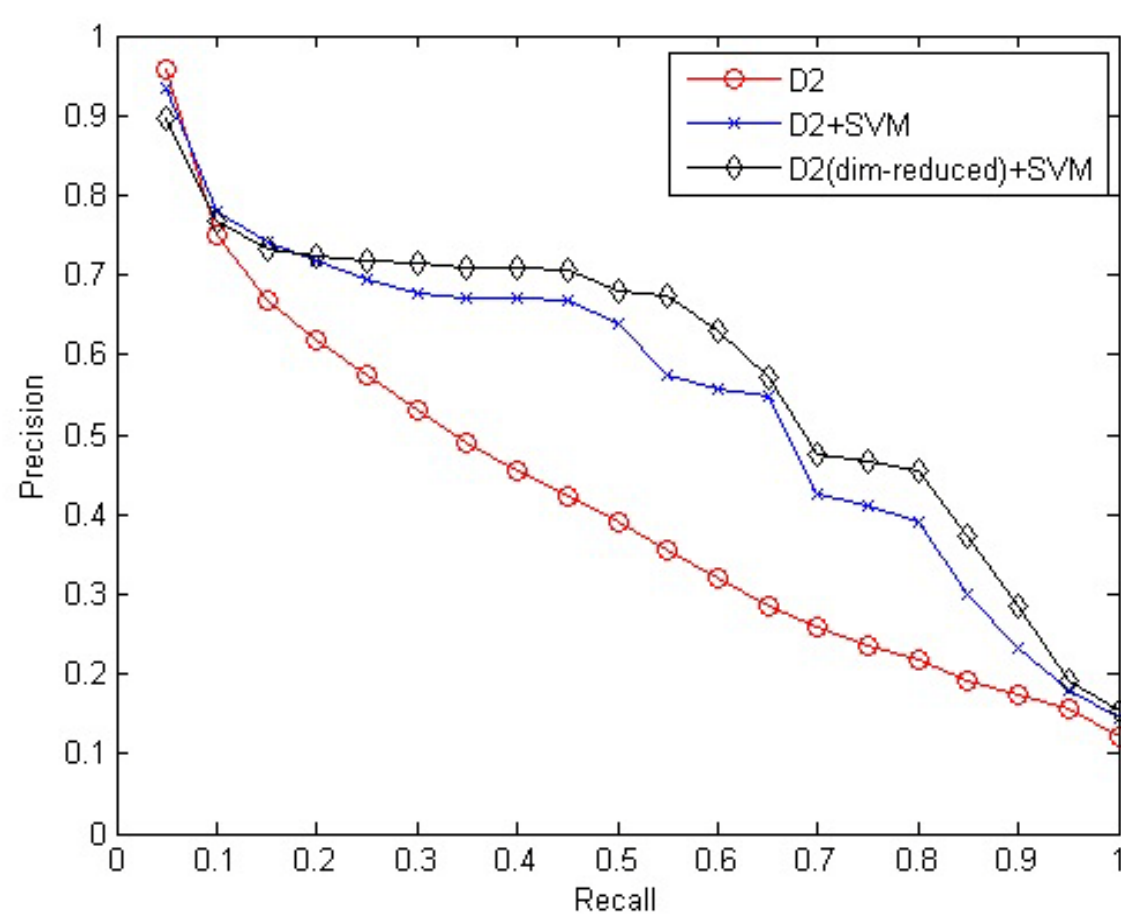
Utilize any existing 3D model matching algorithm to do feature extraction and then select the features with higher discriminant power, and train a classifier by SVM to retrieve the 3D model.



## Data

feature type	Original feature matrix		Dimension-Reduced feature matrix		
	no. of columns	classification accuracy	no. of columns	classification accuracy	saved training time
D2	1024	79.6078% (203/255)	768	82.3529% (210/255)	25%
LFD	4700	89.0196% (227/255)	3760	89.4118% (228/255)	20%
SHD	544	89.4118% (228/255)	462	90.5882% (231/255)	15%
PS	567	62.3529% (159/255)	482	62.7451% (160/255)	15%
AAD	256	92.9412% (237/255)	233	93.3333% (238/255)	9%
mSPRH	625	7.84314% (20/255)	562	93.3333% (238/255)	10%

## Experiments



## Discussion & Future Work

- ❖ **Contribution** - An SVM-based 3D model retrieval system was proposed in this work.
  - ❑ Reduce feature dimension based on the idea of increasing the Fisher information.
  - ❑ SVM algorithm is used to train a classifier and a cross-validation technique is employed to increase prediction reliability.
  - ❑ A new feature  $F$  is assigned to each 3D model after classification, and it has much better discrimination ability.
  - ❑ Demonstrate the superior performance of the proposed approach.
- ❖ **Future work**
  - ❑ Investigate the complexity problem and Lower the complexity further.
  - ❑ Improve the classification accuracy.
  - ❑ Experiments on other databases.