

REU Report Meeting Week 8



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Outline – One Shot

- ▣ This Week's Results
 - ▣ YouTube Dataset
- ▣ Next Steps

YouTube Dataset

- 11 Categories, 100 Videos each



Video from Dataset



Method

- Features consisting Bag of Word Histograms for each image
- Designate 5 classes for training
- Perform One Shot training for remaining classes

5 Train , 6 Test

Dimension Reduction	1 Shot	3 Shot	6 Shot	15 Shot
PCA	20.04	20.41	21.71	23.66
Fast SVD	27.42	29.04	33.05	36.21
Fast SVD	29.26	---	34.59	---
Fast SVD	32.83	---	38.16	---
Fast SVD	27.60	---	31.18	---
Fast SVD	32.03	---	37.58	---
Fast SVD	33.90	---	38.52	---

Try something different

Training Classes	Testing Classes	Dimension Reduction	1 Shot	3 Shot	6 Shot	15 Shot
11	11	PCA	85.40	---	---	92.81
11	11	Fast SVD	81.68	89.04	91.69	93.24
5	6	PCA	20.04	20.41	21.71	23.66
5	6	Fast SVD	27.42	29.04	33.05	36.21
1	10	PCA	16.73	18.00	20.05	22.04
1	10	Fast SVD	15.05	15.71	17.97	20.27
1	11	PCA	19.28	20.00	21.10	22.44
1	11	Fast SVD	13.86	14.21	15.71	18.17

Shah's Group Results Overall 71.5%

Leave-One-Out Cross Validation

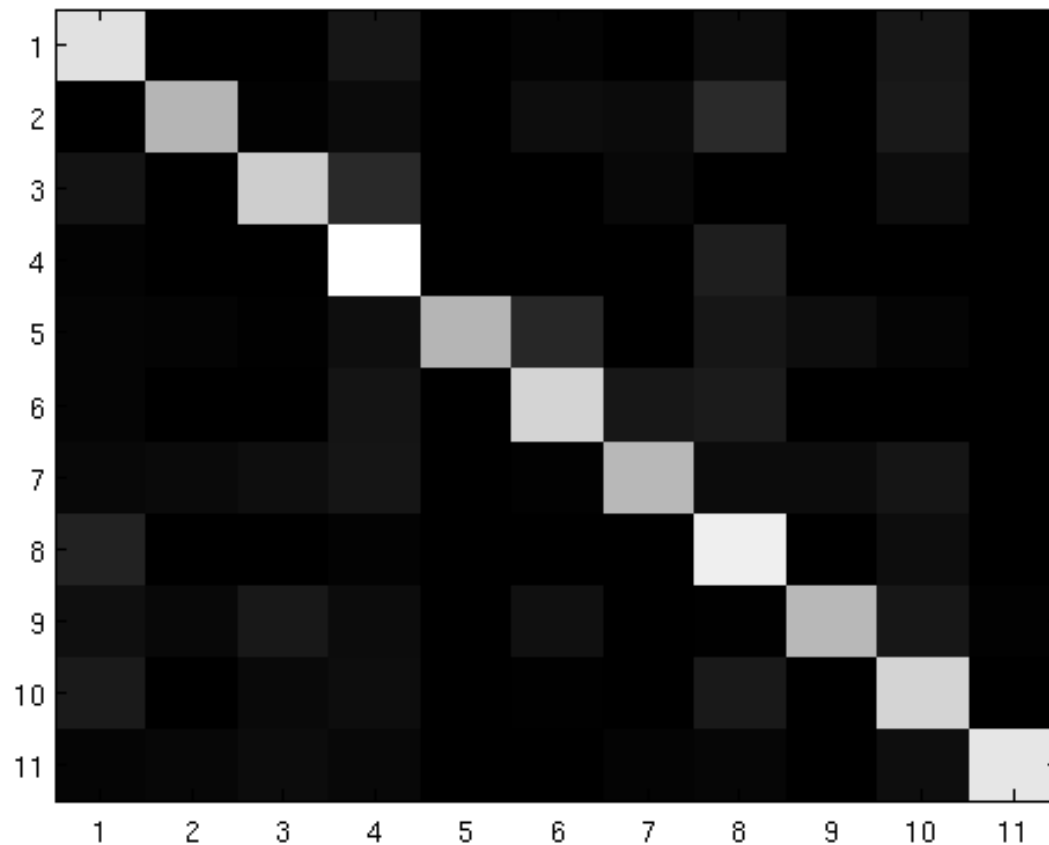
Bball	56.2	1.2	2.5	7.5	1.2	5.0	2.5	11.2	0.0	12.5	0.0
Biking	1.2	72.5	0.0	0.0	13.8	2.5	3.8	0.0	1.2	0.0	5.0
Diving	1.2	6.2	87.5	0.0	0.0	0.0	1.2	0.0	0.0	3.8	0.0
Golf	2.5	0.0	2.5	88.8	0.0	1.2	0.0	2.5	0.0	0.0	2.5
HRide	2.5	16.2	0.0	0.0	71.2	0.0	0.0	2.5	0.0	2.5	5.0
Soccer	10.0	7.5	0.0	6.2	6.2	50.0	12.5	1.2	1.2	3.8	1.2
Swing	0.0	10.0	1.2	0.0	0.0	6.2	65.0	1.2	13.8	1.2	1.2
Tennis	8.8	6.2	1.2	12.5	2.5	1.2	1.2	61.3	0.0	5.0	0.0
Jump	3.8	3.8	0.0	0.0	0.0	3.8	8.8	0.0	76.2	3.8	0.0
Vball	8.8	1.2	3.8	1.2	0.0	5.0	0.0	0.0	1.2	77.5	1.2
DWalk	5.0	1.2	1.2	3.8	2.5	0.0	1.2	3.8	0.0	1.2	80.0
	Bball	Biking	Diving	Golf	HRide	Soccer	Swing	Tennis	Jump	Vball	DWalk

Can we compare more directly

Train and Test Using all Classes, but
separate examples

Train Examples	Test Examples	Dimension Reduction	1 Shot	15 Shot
75	25	PCA	59.57	68.15
75	25	SVDS	63.64	72.68
75	25	Fast SVD	69.85	79.80
50	50	Fast SVD	66.80	71.26
25	75	Fast SVD	61.68	64.07

72-25 SVDS 15 shot



Cross Validation

- Comparison Results look promising
- Test and Train on All Classes
- Train on 90 examples
- Test on remaining 10
- 1 shot, 15 shot
- Average 10 runs, using different 10 test examples for each run

Cross Validation Results

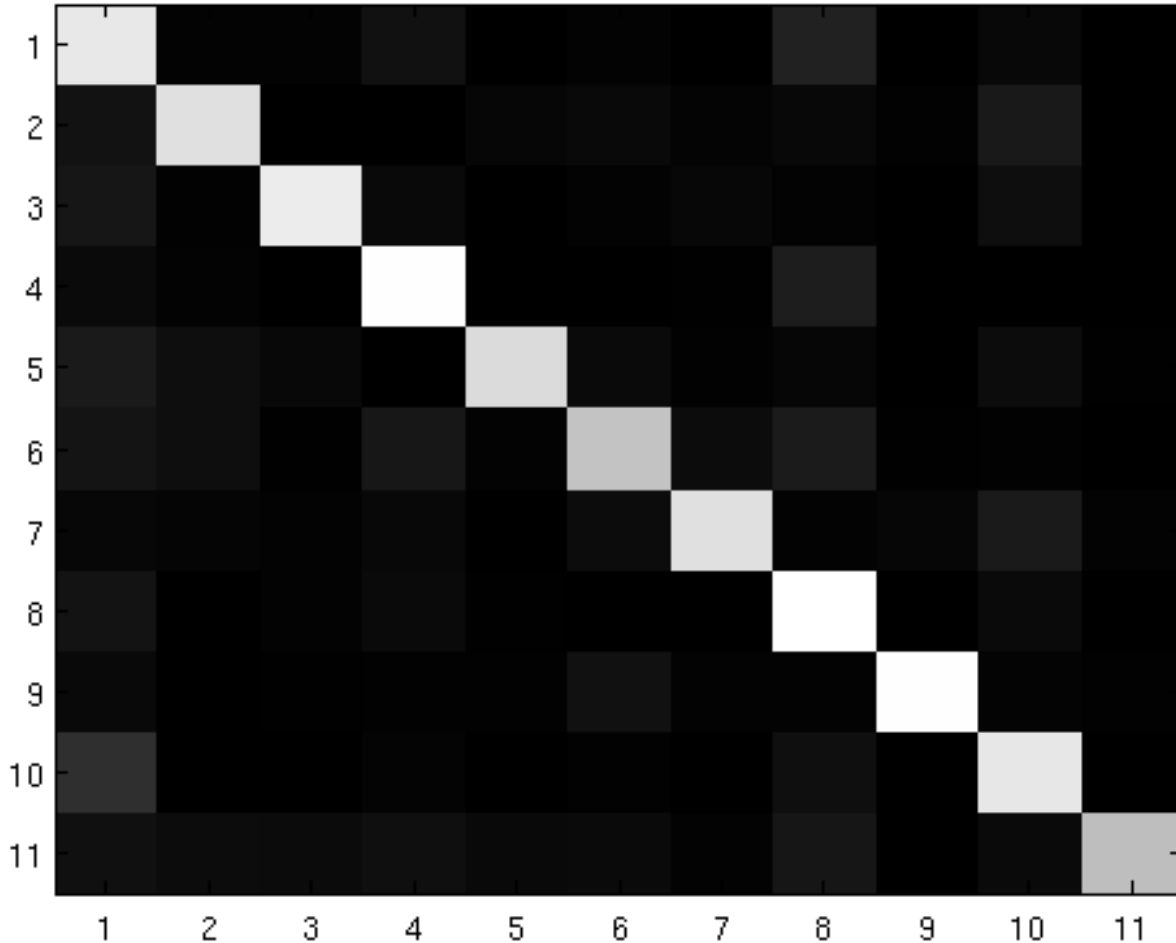
- Testing examples pulled in order

	1 Shot Mean	15 Shot Mean
90-10 Fast SVD	54.03	63.38

- Testing examples pulled randomly

	1 Shot Mean	15 Shot Mean
90-10 Fast SVD	64.57	75.91

Cross Validation Confusion Matrix



Next Steps

- Try different Cross Validation Schemes
 - Switch Dimension Reduction
 - PCA over weekend, will take two days
 - Change number of examples
 - Vary training classes
- Return to Caltech Experiments
 - Adapt SVDS, Fast SVD see how these results compare to the PCA we were using
- Can some of these results inform how we do pure one-shot?