

REU Report Meeting Week 9



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Outline – One Shot

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

YouTube Dataset

- 11 Categories, 100 Videos each



Methods

- ▣ One-Shot Learning of Classes
- ▣ Leave-One-Out Cross Validation

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	---

“Videos in wild” 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

Baseline

How well could we do, training on everything?

Training Classes	Testing Classes	Dimension Reduction	1 Shot	3 Shot	6 Shot	15 Shot
II	II	PCA	85.40	---	---	92.81
II	II	Fast SVD	81.68	89.04	91.69	93.24

Can we compare more directly

Train and Test Using all Classes, but
separate examples pulled randomly

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

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

Person by Person Cross Validation

“96-4”

Neighbors	Optimization 3 sets, 1 train, 10 test
1 'shot'	50.85
15 'shot'	59.70
25 'shot'	60.14
96 'shot'	61.28

Conclusions

- Method is heavily disturbed by these different videos
- Results show some possible inconsistencies that may need to be explored

Caltech Experiments

- Try different dimension reductions strategy
- Anthony will have additional results on his Caltech experiments

Recall

- Trained on Caltech 256
- One Shot on Caltech 101

Neighbors	Our Method	Fei-Fei, et al	Grauman and Darrell
1	9.73%	----	17.5%
3	11.00%	10.4%	28%
6	14.73%	13.9%	----

FastSVD vs. PCA

- Training on 256, Testing 101

Neighbors	PCA	FastSVD
1	9.73%	5.40%
3	11.00%	5.97%
6	14.73%	7.36%

- FastSVD doesn't give a similar benefit in this instance

Next Steps

- ▣ Can we do better at recognizing an action in a very different video?
- ▣ Reevaluate features
- ▣ How can we improve on our one shot results and use that knowledge to help answer the first question?
- ▣ Run additional one-shot experiments
- ▣ Continue one-shot experiments with the Caltech datasets.