Yıldız Teknik Üniversitesi
Elektrik Elektronik Fakültesi
Bilgisayar Mühendisliği Bölümü

Transfer Learning (TL) for HSI with ImageNet Pre-Trained Models

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Transfer Learning Pre-Processing

- VGG16 - DenseNet121 –

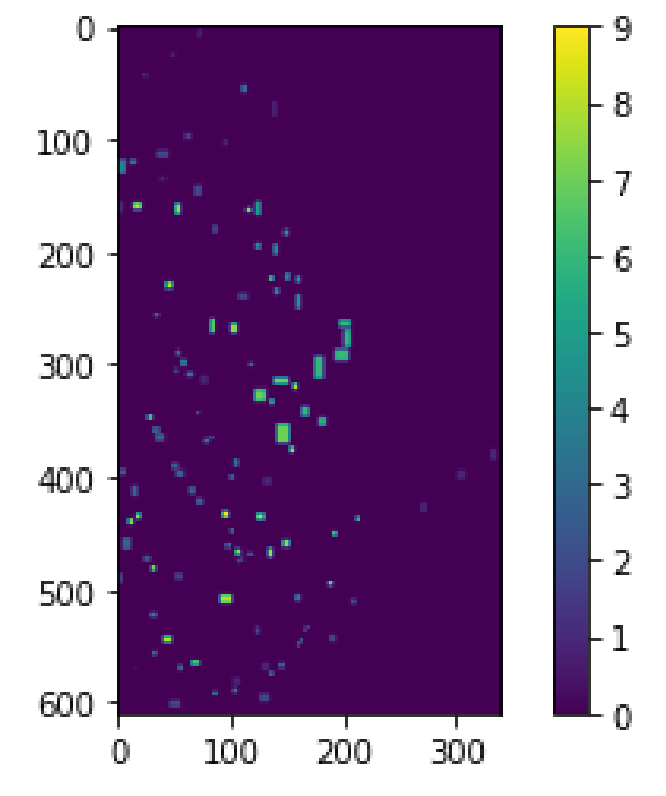
  ResNet50V2 - InceptionResNetV2
- 610x340x103 → PCA → ImageCubes → Resize → (3921, 224, 224, 3)
- Xtr , Xts

  (3921, 224, 224, 3), (4000, 224, 224, 3)
- Ytr , Yts

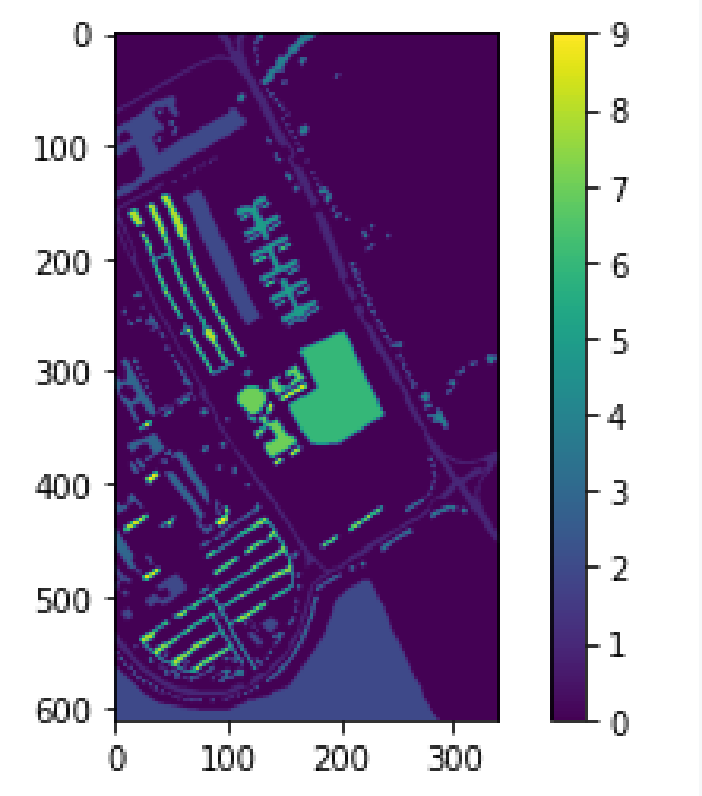
  (3921, 9), (4000, 9)

Labels

Train data Labels



Test Data GT



MODELS AND RESULTS

1-VGG16 Model Evaluation

VGG16 frozen, last 3 layers are trainable

VGG16				
frame	epoch	train acc	test acc	kappa
3x3	100		75.72	68.70
	250		75.42	68.69
	10	83,3	73.40	66.28
7x7	100		75.0	68.06
	50			
	10	95,4	74.75	67.62
9x9	100		73.15	65.75
	50		73.22	65.52
	10	94,2	72.17	64.48
11x11	100		74.65	67.32
	50		75.40	68.15
	10	98,1	75.90	68.91

2-DenseNet121 Model Evaluation

DenseNet121 frozen, last 3 layers are trainable

DenseNet121				
frame	epoch	train acc	test acc	kappa
3x3	10	93	75.67	68.43
	50	98,6	73.02	66.20
7x7	10	98,5	66.17	58.20
9x9	10	99,5	71.49	64.35
11x11	10	99,3	77.30	70.44
	50	99,8	77.47	70.54
	100	1	76.99	70.16

3-ResNet50V2 Model Evaluation

ResNet50V2 frozen, last 3 layers are trainable

ResNet50V2				
frame	epoch	train acc	test acc	kappa
3x3	10			
	50	98	75.19	68.47
7x7	10	98	61.02	52.96
9x9	10	98,7	60.39	51.86
11x11	10	99,9	76.99	70.16
	50	99,5	71.49	63.29

4-InceptionResNetV2 Model Evaluation

InceptionResNet frozen, last 3 layers are trainable

InceptionResNetV2				
frame	epoch	train acc	test acc	kappa
3x3	10	66,6	55.25	44.79
	50	77,88	60.60	51.64
	100	82,84	64.92	55.50
	250	84,57	66.75	57.87
0,001	150	83,09	68.32	59.40
0,001	350	88,8	64.55	55.82
7x7	10	73,83	55.29	44.42
9x9	10	77,9	60.62	50.18
	100	90,9	61	
11x11	10	81,6	62.05	51.50
	50	94	61.72	51.87
	10	71,84	55.47	45.12

Evaluation

- VGG16 Modeli (11x11)

	10	98,1	75.90	68.91

- 2-DenseNet121 Modeli (11x11)

	50	99,8	77.47	70.54

- ResNet50V2 Modeli (11x11)

11x11	10	99,9	76.99	70.16

- InceptionResNetV2 Modeli (3x3)

0,001	150	83,09	68.32	59.40

THANK YOU