Results

Resnet18

2-stream resnet model for our classification problem

Legend:

- Conv1: s=3, p=2, k=7, f=64
- Max pool: s=1, p=1, k=3
- Conv2: s=1, p=1, k=3 , f=64

- Block1: s=1, p=1, k=3 , f=64
- Block2: s=1, p=1, k=3 , f=128
- Block3: s=1, p=1, k=3 , f=256
- Block4: s=1, p=1, k=3 , f=512

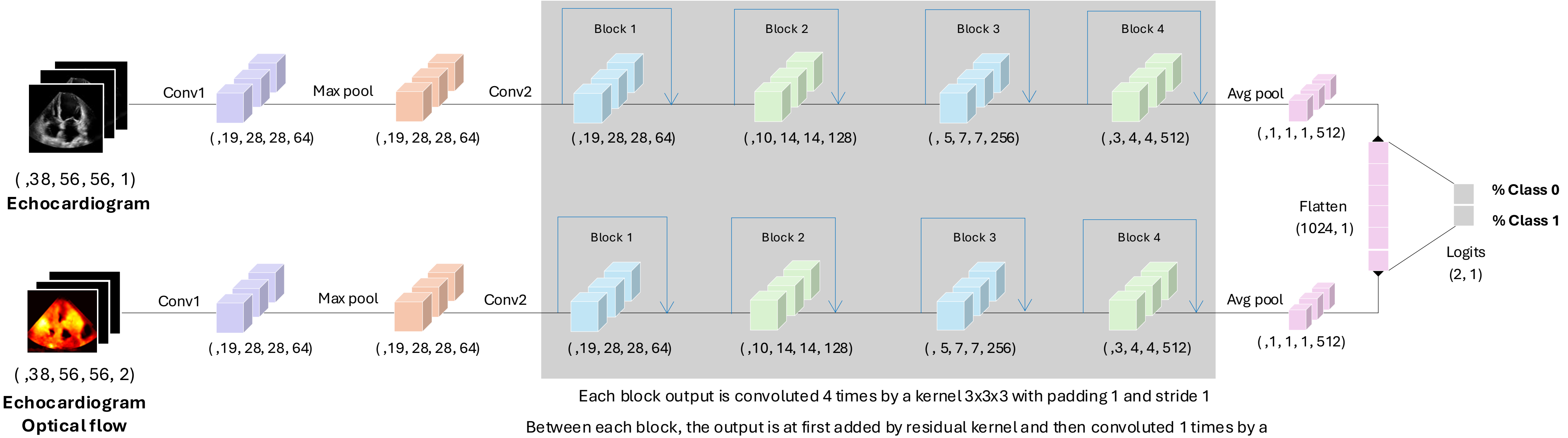
- Between Block1, Block2: s=2, p=0, k=1 , f=128
- Between Block2, Block3: s=2, p=0, k=1 , f=256
- Between Block3, Block4: s=2, p=0, k=1 , f=512

- Avgpool: s=1, p=1, k=3

Resnet Connection: s=1, p=0, k=1, f will be same as the next kernel

- OBS: After every convolution, the output will pass through batch normalization, then activation function ReLU.

- Logit: Activation function softmax



Each block output is convoluted 4 times by a kernel 3x3x3 with padding 1 and stride 1

Between each block, the output is at first added by residual kernel and then convoluted 1 times by a kernel 3x3x3 with padding 0 and stride 2

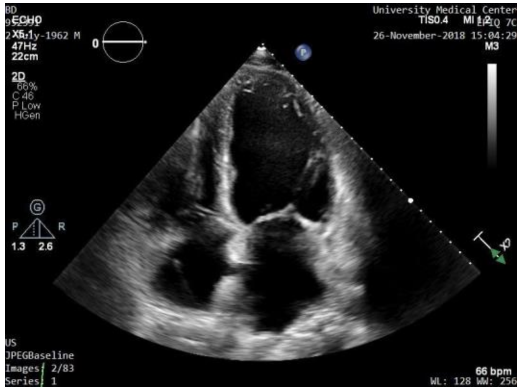
Source: my mind

Date: 09/19/2024

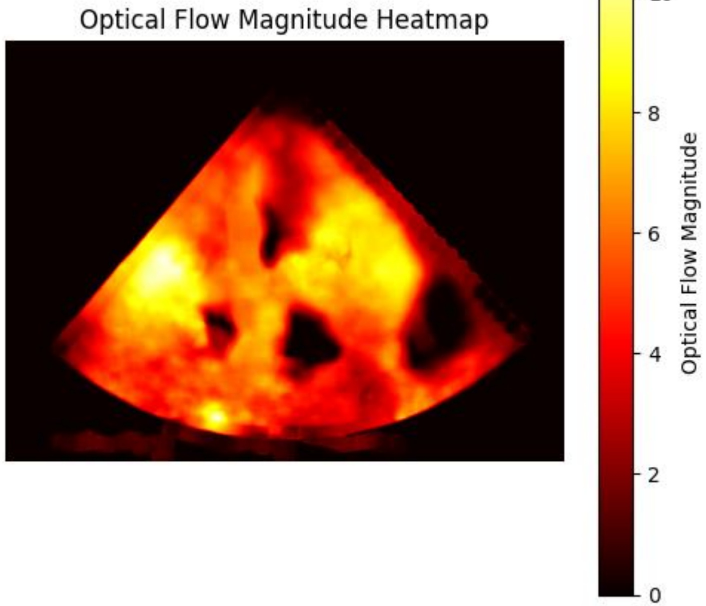
Private dataset cropping

Optical flow calculation was crucial for cropping all images accurately without loosing information

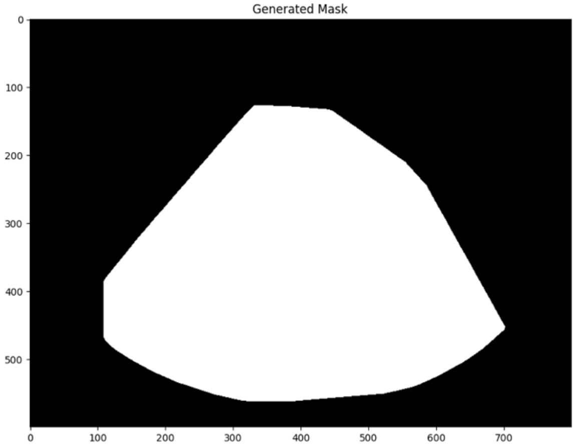
Original image



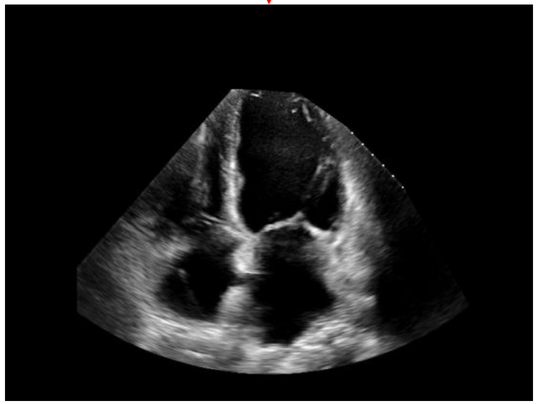
Compute the optical flow for each frame and get the average



Chose a threshold (>=3.5) value for optical flow to compute a mask using convex hull



Take the difference between the original image and generated mask



Source: Personal computer on folder /Users/dannilin/Desktop/19072024_cropping - cópia

Date: 08/27/2024

Training Echonet over ResNet18

We trained for different video sizes

FLOPs: $1{,}8 \times 10^{9}$

# Trainable Params: 66,350,018

ResNet18	28x28 (e)	56X56 (a)	112X112 (b)	28x28 (f) (Weighted)	56X56 (c) (Weighted)	112X112 (d) (Weighted)
Train Acc	0.97	0.93	0.92	0.94	0.92	0.94
Val Acc	0.87	0.87	0.88	0.83	0.86	0.88
Test Acc	0.85	0.87	0.87	0.81	0.85	0.86
Test AUROC	0.87	0.90	0.90	0.85	0.90	0.88
Test AUPRC	0.83	0.87	0.88	0.80	0.86	0.86

Epochs	5	5	7	5	5	9
Batch size	16	16	16	16	16	16

FLOPs: $11{,}3 \times 10^{9}$

# Trainable Params: 236,190,658

ResNet152	28x28 (g)	56X56 (h)	112X112 (i)
Train Acc	0.87	0.92	0.98
Val Acc	0.86	0.87	0.86
Test Acc	0.88	0.86	0.85
Test AUROC	0.88	0.89	0.84
Test AUPRC	0.72	0.75	0.68

Epochs	2	3	2
Batch size	8	8	8

Source: ResNet18 (a, b, c, d, e, f), ResNet152(g; g_test, h; h_test, i; i_test), FLOPs

Date: 09/19/2024

Training Echonet over ResNet18

We trained for different video sizes

FLOPs: $1{,}8 \times 10^9$
# Trainable Params: 66,350,018

ResNet18	28x28 (e)	56X56 (a)	112X112 (b)	28x28 (f) (Weighted)	56X56 (c) (Weighted)	112X112 (d) (Weighted)
Test ACC	**0.85**	**0.87**	**0.87**	**0.81**	**0.85**	**0.86**
ACC class 0	0.90	0.95	0.97	0.84	0.88	0.96
ACC class 1	0.65	0.59	0.52	0.70	0.74	0.50

We chose model (c) for transfer learning for out private dataset.

Source: ResNet18 (a, b, c, d, e, f), FLOPs

Date: 09/19/2024

Transfer learning with ResNet18

			Average of accuracy		Average of roc_auc		Average of pr_auc	
k fold	Model type	fcc dropout/ l1reg/ cnn dropout	test	train	test	train	test	train
7	(b)	0.8/0.1/0.8	0.700	0.790	0.690	0.895	0.530	0.719
5	**(b)**	**0.9/0.1/0.9**	**0.733**	**0.816**	**0.760**	**0.884**	**0.758**	**0.720**
3	(b)	0.8/0.095/0.8	0.629	0.599	0.698	0.798	0.422	0.617
2	(b)	0.8/0.3/0.8	0.794	0.829	0.548	0.690	0.442	0.455

			std accuracy		std roc_auc		std pr_auc	
k fold	Model type	fcc dropout/ l1reg/ cnn dropout	test	train	test	train	test	train
7	(b)	0.8/0.1/0.8	0.173	0.124	0.329	0.059	0.441	0.086
5	**(b)**	**0.9/0.1/0.9**	**0.160**	**0.123**	**0.434**	**0.153**	**0.398**	**0.243**
3	(b)	0.8/0.095/0.8	0.328	0.384	0.233	0.054	0.320	0.053
2	(b)	0.8/0.3/0.8	0.042	0.040	0.068	0.118	0.002	0.267

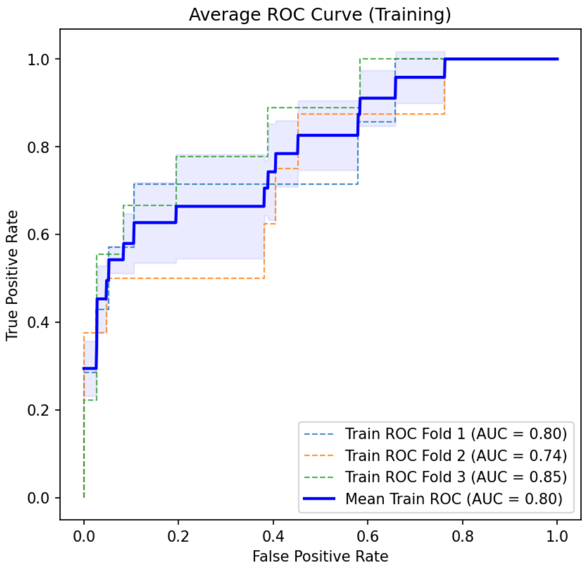
Source: Excel Results

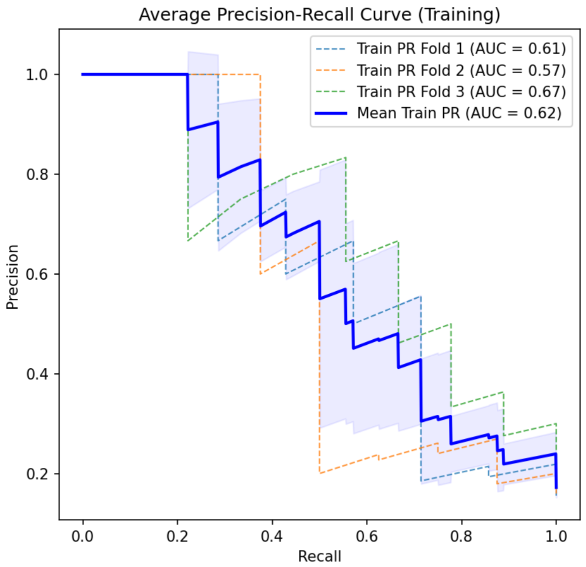
Transfer learning with ResNet18

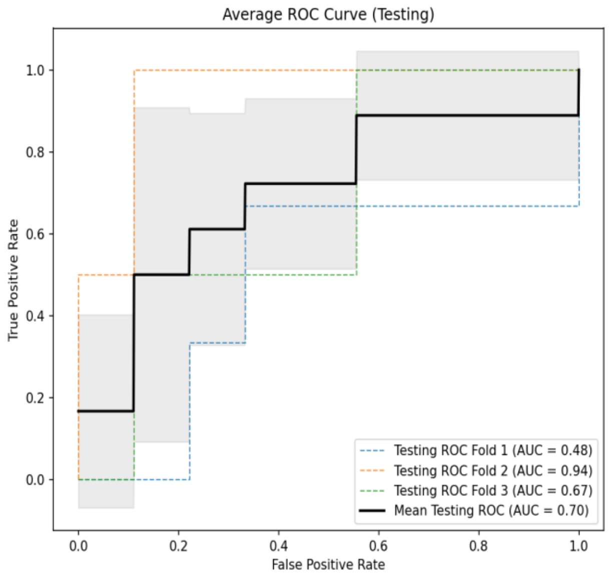
5 fold experiment			Average of accuracy		Average of roc_auc		Average of pr_auc	
l1 reg	Model type	fcc dropout/ cnn dropout	test	train	test	train	test	train
0.1	(b)	0.1/0	0.790	0.872	0.653	0.954	0.453	0.844
0.1	(b)	0.2/0	0.733	0.857	0.693	0.948	0.392	0.820
0.1	**(b)**	**0.3/0**	**0.819**	**0.820**	**0.787**	**0.875**	**0.542**	**0.632**
0.1	(b)	0.4/0	0.762	0.853	0.613	0.947	0.450	0.818
0.1	(b)	0.9/0	0.671	0.993	0.573	1.000	0.366	1.000
0.1	(b)	0.9/0.9	0.733	0.816	0.760	0.884	0.758	0.720

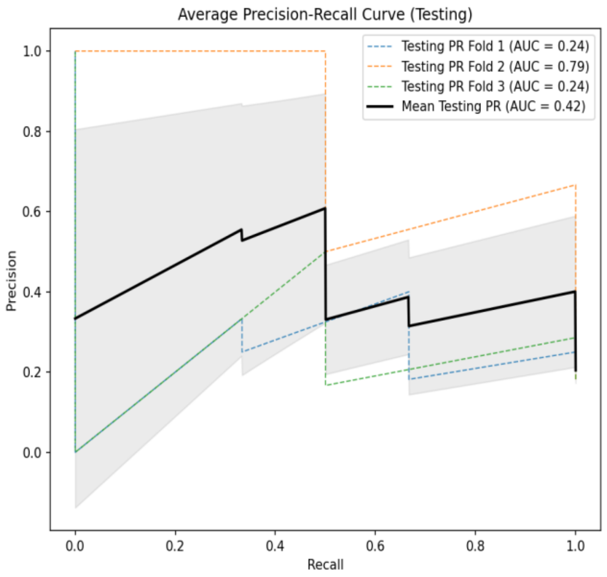
Source: Excel Results

Transfer learning with ResNet18 for 3 fold


Average ROC Curve (Training)

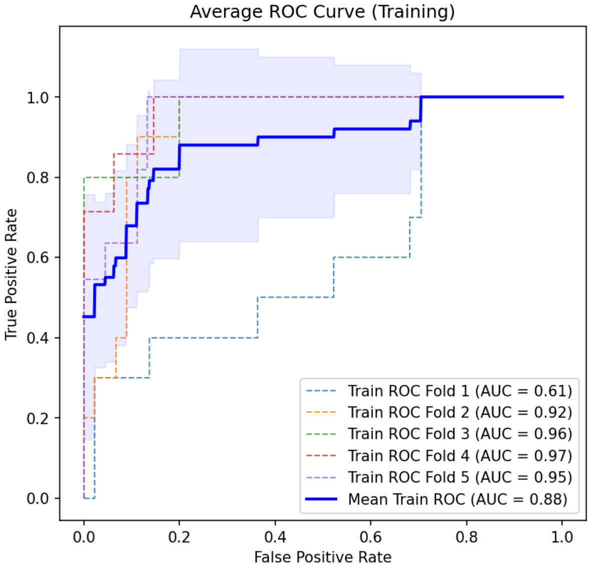

Average Precision-Recall Curve (Training)

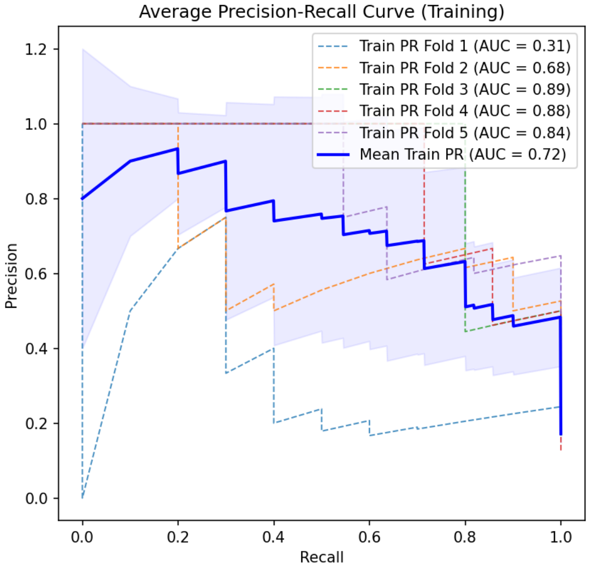

Average ROC Curve (Testing)

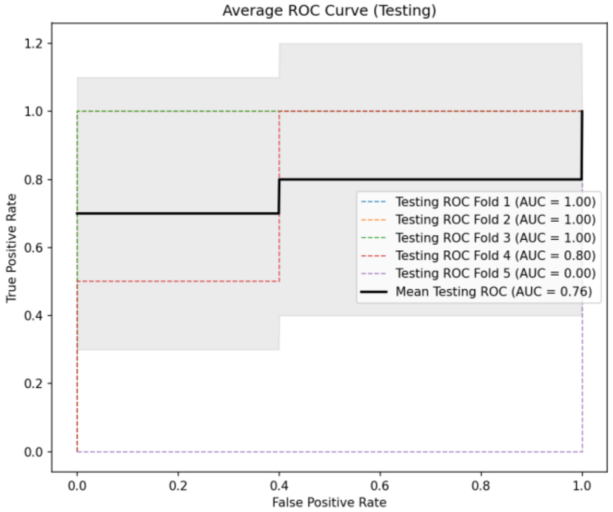

Average Precision-Recall Curve (Testing)

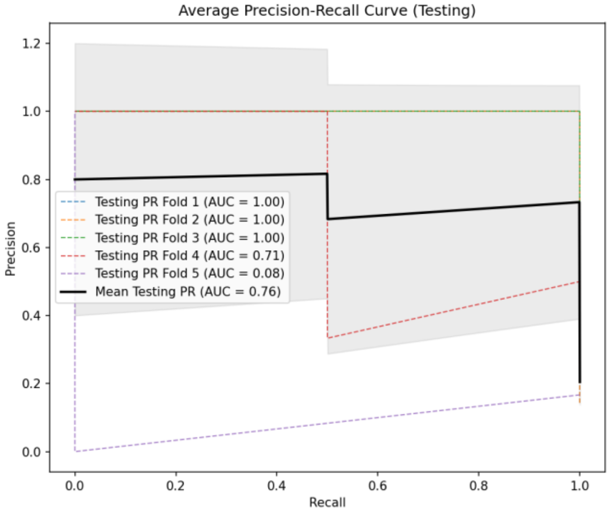
Source: https://www.kaggle.com/code/dannlin/05112024-best-model-metrics/notebook

Transfer learning with ResNet18 for 5 fold









Source: https://www.kaggle.com/code/dannlin/05112024-best-model-metrics/notebook