

Supplementary Table S1-S6 shows the results of Adam optimizer-based optimization of the learning rate of the six-transfer learning models for 50 epochs performed on 75% training and 15% validation data.

**Supplementary Table S1:** Adam optimizer-based optimization of learning rate of DenseNet121 model

Number of Epoch	Training Loss	Training accuracy	Validation loss	Validation Accuracy	Learning rate
1	0.096978	0.960133	0.192027	0.960938	0.001
2	0.008872	0.999169	2.503934	0.5625	0.001
3	0.005898	0.999169	1.89457	0.726563	0.001
4	0.005082	0.999169	2.583766	0.726563	0.0005
5	0.00539	0.999169	2.631716	0.734375	0.0005
6	0.005252	0.999169	2.902014	0.695313	0.00025
7	0.004748	0.999169	2.74256	0.71875	0.00025
8	<b>0.005991</b>	<b>0.999169</b>	<b>2.17531</b>	<b>0.742188</b>	<b>0.000125</b>

The optimized learning rate of DenseNet121 model is **0.000125**

**Supplementary Table S2:** Adam optimizer-based optimization of learning rate of InceptionResNetv2 model

Number of Epoch	Training Loss	Training accuracy	Validation loss	Validation Accuracy	Learning rate
1	0.131244	0.942691	0.149143	0.953125	0.001
2	0.027651	0.990864	50.97754	0.546875	0.001
3	0.00705	0.999169	0.159667	0.9375	0.001
4	0.00657	0.999169	0.039842	0.984375	0.0005
5	0.001165	1	0.035429	0.992188	0.0005
6	0.005949	0.998339	0.075267	0.96875	0.0005
7	0.004269	0.999169	0.044188	0.992188	0.0005
8	0.005152	0.999169	0.056347	0.992188	0.00025
9	0.005617	0.999169	0.074104	0.921875	0.00025
10	0.004915	0.999169	0.092519	0.921875	0.000125
11	0.003462	0.999169	0.11532	0.914063	0.000125
12	<b>0.004081</b>	<b>0.999169</b>	<b>0.139653</b>	<b>0.914063</b>	<b>0.0000625</b>

The optimized learning rate of InceptionResNetv2 model is **0.0000625**

**Supplementary Table S3:** Adam optimizer-based optimization of learning rate of ResNet50v2 model

Number of Epoch	Training Loss	Training accuracy	Validation loss	Validation Accuracy	Learning rate
1	0.131541	0.950166	229.5494	0.453125	0.001
2	0.027849	0.989203	3435.949	0.453125	0.001
3	0.027853	0.995017	309.3971	0.453125	0.001
4	0.011107	0.999169	32.38318	0.710938	0.0005
5	0.006463	0.999169	14.4573	0.875	0.0005
6	0.006302	0.999169	3.929239	0.90625	0.0005
7	0.004987	0.999169	0.982665	0.984375	0.0005
8	0.004974	0.999169	0.0299776	0.984375	0.0005
9	0.006605	0.999169	0.0236274	0.992188	0.0005
10	0.005552	0.999169	0.0134194	0.992188	0.0005
11	0.006594	0.999169	0.0067419	0.992188	0.0005
12	0.004956	0.999169	0.0068975	0.992188	0.0005
13	0.005129	0.999169	0.0058987	0.992188	0.0005
14	0.004522	0.999169	0.0040701	0.992188	0.0005
15	0.005327	0.999169	0.004242	0.992188	0.0005
16	0.004975	0.999169	0.0030118	0.992188	0.0005
17	0.005684	0.999169	0.0028614	0.992188	0.0005
18	0.004369	0.999169	0.0029249	0.992188	0.0005
19	0.006416	0.999169	0.0027669	0.992188	0.0005
20	0.005205	0.999169	0.0028357	0.992188	0.0005
21	0.004374	0.999169	0.0027854	0.992188	0.0005
22	0.006138	0.999178	0.0027806	0.992188	0.00025
23	0.005115	0.999169	0.028081	0.992188	0.00025
24	0.006047	0.999169	0.0068339	0.992188	0.000125
25	0.004947	0.999169	0.0067906	0.992188	0.000125
26	<b>0.004283</b>	<b>0.999169</b>	<b>0.0068291</b>	<b>0.992188</b>	<b>0.0000625</b>

The optimized learning rate of ResNet50v2 model is **0.0000625**

**Supplementary Table S4:** Adam optimizer-based optimization of learning rate of Inceptionv3 model

Number of Epoch	Training Loss	Training accuracy	Validation loss	Validation Accuracy	Learning rate
1	0.169212	0.933555	6.632735	0.453125	0.001
2	0.03088	0.999169	7.638783	0.453125	0.001
3	0.005334	0.999169	4.844649	0.453125	0.001
4	0.007747	0.999169	1.711046	0.640625	0.001
5	0.017656	0.996678	0.065251	0.976563	0.001
6	0.070755	0.980066	4.196708	0.664063	0.001
7	0.029651	0.994186	7.662934	0.484375	0.001
8	0.010275	0.998339	9.678524	0.414063	0.0005
9	0.007393	0.999169	5.429296	0.570313	0.0005
10	0.005824	0.999169	0.741854	0.882813	0.00025
11	0.006434	0.998339	0.586732	0.914063	0.00025
12	<b>0.006391</b>	<b>0.998339</b>	<b>0.651289</b>	<b>0.898438</b>	<b>0.000125</b>

The optimized learning rate of Inceptionv3 model is **0.0000625**

**Supplementary Table S5:** Adam optimizer-based optimization of learning rate of VGG19 model

Number of Epoch	Training Loss	Training accuracy	Validation loss	Validation Accuracy	Learning rate
1	1.88069	0.500831	0.641957	0.546875	0.001
2	0.421913	0.797342	0.266766	0.914063	0.001
3	0.429674	0.868771	0.372994	0.851563	0.001
4	0.71833	0.520764	0.730633	0.453125	0.001
5	0.702145	0.504153	0.701526	0.453125	0.0005
6	0.694811	0.490864	0.690554	0.765625	0.0005
7	0.689957	0.528239	0.695962	0.453125	0.00025
8	0.684258	0.536545	0.669463	0.445313	0.00025
9	<b>0.669144</b>	<b>0.554817</b>	<b>0.639826</b>	<b>0.796875</b>	<b>0.000125</b>

The optimized learning rate of VGG19 model is **0.000125**

**Supplementary Table S6:** Adam optimizer-based optimization of learning rate of Xception model

Number of Epoch	Training Loss	Training accuracy	Validation loss	Validation Accuracy	Learning rate
1	0.179083	0.932724	52.41513	0.453125	0.001
2	0.004911	0.999169	39.07822	0.453125	0.001
3	0.011271	0.997508	2.751696	0.867188	0.001
4	0.006999	0.999169	0.198542	0.976563	0.001
5	0.000972	1	0.567571	0.914063	0.001
6	0.006233	0.999169	0.84649	0.914063	0.001
7	0.000523	1	1.176231	0.914063	0.0005
8	0.006828	0.999169	1.183162	0.90625	0.0005
9	0.006104	0.999169	1.212053	0.890625	0.00025
10	0.006452	0.999169	1.211309	0.875	0.00025
11	<b>0.005251</b>	<b>0.999169</b>	<b>1.205872</b>	<b>0.875</b>	<b>0.000125</b>

The optimized learning rate of Xception model is **0.000125**