Deep Learning-Based In Vitro Detection Method for Cellular Impurities in Human Cell-Processed Therapeutic Products

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Table S1. loss(Val) and Acc(Val) in total dataset with BS and LR.

Dataset	Batch size	Solver type	Learning Rate	Loss in Val	Accuracy in Val (%)
TOTAL	5	SGD	0.001	0.716209	63.8799
TOTAL	6	SGD	0.001	0.729963	49.5813
TOTAL	7	SGD	0.001	0.679698	64.3143
TOTAL	8	SGD	0.001	0.667179	62.2656
TOTAL	9	SGD	0.001	0.667321	63.9189
TOTAL	10	SGD	0.001	0.651073	64.2577
TOTAL	20	SGD	0.001	0.668454	64.2719
TOTAL	25	SGD	0.001	0.663097	64.0234
TOTAL	26	SGD	0.001	0.662662	63.9997
TOTAL	27	SGD	0.001	0.675377	62.1254
TOTAL	28	SGD	0.001	0.746488	42.2777
TOTAL	29	SGD	0.001	0.685206	60.5355
TOTAL	30	SGD	0.001	0.649303	63.7282
TOTAL	31	SGD	0.001	0.834088	35.3439
TOTAL	32	SGD	0.001	0.871342	35.1674
TOTAL	33	SGD	0.001	0.784572	36.6983
TOTAL	34	SGD	0.001	0.733778	45.6408
TOTAL	35	SGD	0.001	0.710029	49.0085
TOTAL	40	SGD	0.001	0.692763	60.4008
TOTAL	50	SGD	0.001	0.922739	35.3583
TOTAL	100	SGD	0.001	0.698669	63.6995
TOTAL	150	SGD	0.001	0.741419	35.0783
TOTAL	200	SGD	0.001	0.719355	35.9355
TOTAL	250	SGD	0.001	0.7040263	55.32169
TOTAL	300	SGD	0.001	0.693429	56.2068
TOTAL	350	SGD	0.001	0.691089	63.6292
TOTAL	30	SGD	0.01	0.648621	63.9496
TOTAL	30	SGD	0.0001	0.744884	35.3462
TOTAL	30	SGD	0.00001	0.74544	36.1648
TOTAL	30	SGD	0.000001	0.717533	35.8696
TOTAL	30	SGD	0.0000001	0.688918	63.9761
TOTAL	30	SGD	0.0000001	0.685352	64.1304
TOTAL	30	SGD	0.005	0.651688	63.8017
TOTAL	30	SGD	0.006	0.813605	62.7013
TOTAL	30	SGD	0.007	0.726818	60.2791
TOTAL	30	SGD	0.008	0.657053	63.8486

TOTAL	30	SGD	0.009	0.652019	64.3921
TOTAL	30	SGD	0.004	0.671485	61.4063
TOTAL	30	SGD	0.003	0.649076	63.8352
TOTAL	30	SGD	0.002	0.709421	62.98979
TOTAL	30	SGD	0.02	0.6483	64.2512
TOTAL	30	SGD	0.03	0.65205	64.2513
TOTAL	30	SGD	0.04	0.660121	63.8486

Table S2. loss(Val) and Acc(Val) in early_stage dataset with BS and LR.

Dataset	Batch size	LR	Solver type	Loss in Val	Accuracy in Val
Early-stage	5	0.001	SGD	13.630600	40.0000
Early-stage	10	0.001	SGD	9.251720	39.7184
Early-stage	50	0.001	SGD	3.703010	37.7097
Early-stage	100	0.001	SGD	1.599410	26.9851
Early-stage	110	0.001	SGD	1.422980	33.6651
Early-stage	120	0.001	SGD	1.433140	34.6429
Early-stage	130	0.001	SGD	1.482000	35.4129
Early-stage	140	0.001	SGD	1.436970	36.2500
Early-stage	150	0.001	SGD	1.269980	33.8596
Early-stage	160	0.001	SGD	1.180660	36.1310
Early-stage	170	0.001	SGD	1.131290	34.2278
Early-stage	180	0.001	SGD	0.986152	34.0541
Early-stage	190	0.001	SGD	1.008300	35.2976
Early-stage	200	0.001	SGD	0.995135	36.1176
Early-stage	180	0.000000001	SGD	0.681962	65.3454
Early-stage	180	0.00000001	SGD	0.683054	65.3454
Early-stage	180	0.0000001	SGD	0.682977	65.9460
Early-stage	180	0.000001	SGD	0.687506	60.3604
Early-stage	180	0.00001	SGD	0.742560	34.0540
Early-stage	180	0.0001	SGD	1.166300	34.7748
Early-stage	180	0.01	SGD	3.051330	35.7357
Early-stage	180	0.000000001	NAG	0.681962	65.3454
Early-stage	180	0.000000001	AdaGrad	0.681963	65.3454
Early-stage	180	0.000000001	Adadelta	0.681963	65.3454
Early-stage	180	0.000000001	Adam	0.681957	65.3454
Early-stage	180	0.000000001	RMSprop	0.682227	65.3454
Early-stage	180	0.000000001	Adadelta	0.677844	65.9460
Early-stage	180	0.000000001	Adadelta	0.681797	65.3454

Table S3. loss(Val) and Acc(Val) in late_stage dataset with BS and LR

Dataset	Batch size	LR	Solver type	Loss in Val	Accuracy in Val
Late-stage	5	0.001	SGD	0.926394	55.0000
Late-stage	10	0.001	SGD	0.803285	60.1998
Late-stage	18	0.001	SGD	0.639602	67.0517
Late-stage	50	0.001	SGD	0.680862	65.3543
Late-stage	100	0.001	SGD	0.647945	66.8125
Late-stage	110	0.001	SGD	0.648136	66.6872
Late-stage	120	0.001	SGD	0.628050	69.3082
Late-stage	130	0.001	SGD	0.642267	68.0891
Late-stage	140	0.001	SGD	0.652087	62.5466
Late-stage	150	0.001	SGD	0.631931	61.4443
Late-stage	160	0.001	SGD	0.644490	69.0625
Late-stage	170	0.001	SGD	0.639611	68.3599
Late-stage	180	0.001	SGD	0.634885	68.8272

Late-stage	185	0.001	SGD	0.639513	67.0517
Late-stage	187	0.001	SGD	0.637846	67.3342
Late-stage	188	0.001	SGD	0.637706	67.3342
Late-stage	189	0.001	SGD	0.622472	70.2206
Late-stage	190	0.001	SGD	0.622550	70.2206
Late-stage	191	0.001	SGD	0.622493	70.2206
Late-stage	192	0.001	SGD	0.637146	70.2020
Late-stage	193	0.001	SGD	0.649381	66.7903
Late-stage	194	0.001	SGD	0.649060	66.7903
Late-stage	195	0.001	SGD	0.649105	66.7903
Late-stage	200	0.001	SGD	0.651472	59.4375
Late-stage	189	0.00001	SGD	0.663130	70.5882
Late-stage	189	0.0001	SGD	0.654229	70.0980
Late-stage	189	0.0005	SGD	0.641791	62.1936
Late-stage	189	0.0006	SGD	0.633585	62.8064
Late-stage	189	0.0007	SGD	0.631465	62.4387
Late-stage	189	0.0008	SGD	0.635555	60.6005
Late-stage	189	0.0009	SGD	0.628382	70.2206
Late-stage	189	0.002	SGD	0.617128	70.2206
Late-stage	189	0.003	SGD	0.616459	70.2206
Late-stage	189	0.004	SGD	0.650177	61.3358
Late-stage	189	0.005	SGD	0.694065	59.9877
Late-stage	189	0.01	SGD	0.651069	58.2690
Late-stage	189	0.0025	SGD	0.615829	70.2206
Late-stage	189	0.0026	SGD	0.611521	70.2206
Late-stage	189	0.0027	SGD	0.617085	70.2206
Late-stage	189	0.0028	SGD	0.620904	70.2206
Late-stage	189	0.0029	SGD	0.618962	70.2206
Late-stage	189	0.0035	SGD	0.643136	66.6667
Late-stage	189	0.0034	SGD	0.629763	70.2206
Late-stage	189	0.0033	SGD	0.627800	70.2206
Late-stage	189	0.0032	SGD	0.622631	70.2206
Late-stage	189	0.0031	SGD	0.619301	70.2206
Late-stage	189	0.0026	step down	0.611615	70.2206
Late-stage	189	0.0026	exponential Decay	0.613017	70.2206
Late-stage	189	0.0026	Inverse Decay	0.613466	70.2206
Late-stage	189	0.0026	Polynomial Decay	0.611353	70.2206
Late-stage	189	0.0026	Sigmoid Decay	0.610587	70.2206