




Supplementary Materials: Brain tumour Detection Using Magnetic Resonance Imaging and Convolutional Neural Networks

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1. Appendix I: Results obtained in the Grid Search for the training and validation subsets

Table S1. Results obtained in the Grid Search for the training and validation subsets.

BS	LR	nCL	nDL	Loss		Accuracy	
				Train	Test	Train	Test
10	0.001	2	1	4.89E-05	0.14433	1	0.96986
10	0.001	2	2	3.30E-05	0.18886	1	0.96986
10	0.001	2	3	1.68E-05	0.14478	1	0.97656
10	0.001	3	1	3.29E-05	0.07849	1	0.98549
10	0.001	3	2	5.84E-05	0.06205	1	0.98883
10	0.001	3	3	8.68E-06	0.12430	1	0.98660
10	0.001	4	1	2.99E-05	0.08012	1	0.98549
10	0.001	4	2	9.77E-05	0.10440	1	0.98437
10	0.001	4	3	8.78E-05	0.20614	1	0.97767
10	0.0001	2	1	0.01602	0.12446	0.99808	0.96428
10	0.0001	2	2	0.00305	0.09107	1	0.97433
10	0.0001	2	3	0.00097	0.12992	1	0.97544
10	0.0001	3	1	0.00509	0.09706	1	0.97656
10	0.0001	3	2	0.00705	0.09700	0.99968	0.97767
10	0.0001	3	3	0.00075	0.08243	1	0.98102
10	0.0001	4	1	0.01178	0.11591	0.99904	0.97209
10	0.0001	4	2	0.01823	0.08538	0.99489	0.97433
10	0.0001	4	3	0.00388	0.10156	0.99968	0.97433
10	0.00001	2	1	0.12884	0.17021	0.97799	0.94531
10	0.00001	2	2	0.11527	0.15631	0.97831	0.95200
10	0.00001	2	3	0.08096	0.13136	0.98660	0.95982
10	0.00001	3	1	0.23001	0.24752	0.92091	0.91852
10	0.00001	3	2	0.19894	0.23472	0.93622	0.92075
10	0.00001	3	3	0.20945	0.23378	0.92633	0.91517
10	0.00001	4	1	0.26640	0.27723	0.89285	0.89174
10	0.00001	4	2	0.27896	0.30249	0.87882	0.86607
10	0.00001	4	3	0.28977	0.29607	0.87627	0.87723
20	0.001	2	1	0.00010	0.16136	1	0.96763
20	0.001	2	2	2.09E-05	0.21122	1	0.96763
20	0.001	2	3	3.01E-05	0.23761	1	0.97209
20	0.001	3	1	0.00050	0.08538	0.99968	0.98214
20	0.001	3	2	0.00581	0.07157	0.99872	0.98660
20	0.001	3	3	3.98E-05	0.11459	1	0.98325
20	0.001	4	1	2.31E-05	0.10214	1	0.97879
20	0.001	4	2	2.58E-05	0.12046	1	0.98214
20	0.001	4	3	0.03085	0.05653	0.99011	0.97991
20	0.0001	2	1	0.00497	0.08557	1	0.97098
20	0.0001	2	2	0.00186	0.09227	1	0.97321

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20	0.0001	2	3	0.00049	0.13634	1	0.96540
20	0.0001	3	1	0.00288	0.09437	1	0.97879
20	0.0001	3	2	0.01859	0.10044	0.99521	0.97879
20	0.0001	3	3	0.00150	0.19286	0.99968	0.95312
20	0.0001	4	1	0.00711	0.09879	0.99936	0.97544
20	0.0001	4	2	0.01680	0.07517	0.99744	0.98102
20	0.0001	4	3	0.00078	0.09500	1	0.98102
20	0.00001	2	1	0.17804	0.20781	0.95758	0.92968
20	0.00001	2	2	0.12541	0.16811	0.97927	0.94754
20	0.00001	2	3	0.07244	0.13716	0.98756	0.95200
20	0.00001	3	1	0.23971	0.25860	0.92442	0.91517
20	0.00001	3	2	0.17370	0.20559	0.94834	0.92633
20	0.00001	3	3	0.16207	0.19311	0.95057	0.94084
20	0.00001	4	1	0.27665	0.29677	0.88903	0.88727
20	0.00001	4	2	0.24693	0.26609	0.90306	0.90848
20	0.00001	4	3	0.24577	0.26774	0.90242	0.88950
30	0.001	2	1	4.74E-05	0.16229	1	0.97098
30	0.001	2	2	2.32E-05	0.16970	1	0.97098
30	0.001	2	3	2.01E-05	0.21653	1	0.96986
30	0.001	3	1	0.00047	0.06235	1	0.98772
30	0.001	3	2	3.32E-05	0.08023	1	0.98660
30	0.001	3	3	9.93E-06	0.06209	1	0.98660
30	0.001	4	1	3.08E-05	0.10439	1	0.98437
30	0.001	4	2	0.00149	0.07470	1	0.98549
30	0.001	4	3	0.02644	0.16276	0.99107	0.97656
30	0.0001	2	1	0.03589	0.09428	0.99553	0.96986
30	0.0001	2	2	0.00160	0.08877	1	0.97544
30	0.0001	2	3	0.00077	0.13209	1	0.97321
30	0.0001	3	1	0.00789	0.07330	0.99968	0.98102
30	0.0001	3	2	0.00244	0.12308	1	0.97433
30	0.0001	3	3	0.00050	0.11152	1	0.97321
30	0.0001	4	1	0.00286	0.07784	1	0.97879
30	0.0001	4	2	0.00684	0.12778	0.99872	0.97098
30	0.0001	4	3	0.00484	0.13476	0.99936	0.97656
30	0.00001	2	1	0.14611	0.18376	0.97002	0.93861
30	0.00001	2	2	0.09723	0.15362	0.98246	0.94866
30	0.00001	2	3	0.07287	0.13599	0.98852	0.95758
30	0.00001	3	1	0.21026	0.22397	0.93144	0.91852
30	0.00001	3	2	0.18334	0.23297	0.94451	0.90513
30	0.00001	3	3	0.18566	0.20394	0.93750	0.93303
30	0.00001	4	1	0.24189	0.23700	0.90625	0.90736
30	0.00001	4	2	0.25936	0.28414	0.90082	0.88058
30	0.00001	4	3	0.25398	0.26808	0.89668	0.89285
<i>BS: batch size</i>				<i>LR: learning rate</i>			
<i>nCL: number of Convolutional Layers</i>				<i>nDL: number of Dense Layers</i>			

Table S2. Detailed results obtained after the Grid Search for the testing subset.

BS	LR	nCL	nDL	precision	recall	accuracy
10	0.001	2	1	0.97154	0.97551	0.97098
10	0.001	2	2	0.96680	0.97899	0.97098
10	0.001	2	3	0.97983	0.98380	0.97991

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10	0.001	3	1	0.96747	0.97540	0.96875
10	0.001	3	2	0.97540	0.97942	0.97544
10	0.001	3	3	0.98804	0.96875	0.97544
10	0.001	4	1	0.96761	0.97551	0.96875
10	0.001	4	2	0.97200	0.98380	0.97544
10	0.001	4	3	0.95703	0.98790	0.96875
10	0.0001	2	1	0.96311	0.98739	0.97321
10	0.0001	2	2	0.95528	0.98326	0.96651
10	0.0001	2	3	0.97983	0.97983	0.97767
10	0.0001	3	1	0.98000	0.97222	0.97321
10	0.0001	3	2	0.96525	0.97276	0.96428
10	0.0001	3	3	0.97916	0.96707	0.97098
10	0.0001	4	1	0.97071	0.96265	0.96428
10	0.0001	4	2	0.95454	0.97058	0.95982
10	0.0001	4	3	0.95510	0.97500	0.96205
10	0.00001	2	1	0.95967	0.95967	0.95535
10	0.00001	2	2	0.96311	0.93625	0.94419
10	0.00001	2	3	0.93548	0.95867	0.94196
10	0.00001	3	1	0.87364	0.94901	0.89285
10	0.00001	3	2	0.89312	0.94354	0.90625
10	0.00001	3	3	0.92340	0.87500	0.89062
10	0.00001	4	1	0.84444	0.93827	0.87276
10	0.00001	4	2	0.89600	0.89243	0.88169
10	0.00001	4	3	0.89519	0.85416	0.86830
20	0.001	2	1	0.95652	0.97580	0.96205
20	0.001	2	2	0.96551	0.98823	0.97321
20	0.001	2	3	0.96356	0.98347	0.97098
20	0.001	3	1	0.96707	0.97107	0.96651
20	0.001	3	2	0.97580	0.98373	0.97767
20	0.001	3	3	0.96911	0.98431	0.97321
20	0.001	4	1	0.98412	0.97637	0.97767
20	0.001	4	2	0.96400	0.97967	0.96875
20	0.001	4	3	0.97925	0.97520	0.97544
20	0.0001	2	1	0.98031	0.98031	0.97767
20	0.0001	2	2	0.97071	0.98305	0.97544
20	0.0001	2	3	0.96774	0.97560	0.96875
20	0.0001	3	1	0.97925	0.97119	0.97321
20	0.0001	3	2	0.97154	0.97551	0.97098
20	0.0001	3	3	0.92217	0.98750	0.94866
20	0.0001	4	1	0.95762	0.96581	0.95982
20	0.0001	4	2	0.95884	0.95884	0.95535
20	0.0001	4	3	0.94820	0.97540	0.95758
20	0.00001	2	1	0.92276	0.93032	0.91964
20	0.00001	2	2	0.94736	0.95510	0.94642
20	0.00001	2	3	0.96234	0.94650	0.95089
20	0.00001	3	1	0.86206	0.93360	0.88392
20	0.00001	3	2	0.91358	0.90983	0.90401
20	0.00001	3	3	0.94871	0.90983	0.92410
20	0.00001	4	1	0.89743	0.85714	0.86830
20	0.00001	4	2	0.86397	0.95528	0.89285
20	0.00001	4	3	0.83458	0.94468	0.87276
30	0.001	2	1	0.96265	0.97071	0.96428
30	0.001	2	2	0.97046	0.98290	0.97544

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30	0.001	2	3	0.98393	0.98000	0.97991
30	0.001	3	1	0.97510	0.99156	0.98214
30	0.001	3	2	0.97637	0.97637	0.97321
30	0.001	3	3	0.97991	0.97600	0.97544
30	0.001	4	1	0.96047	0.97983	0.96651
30	0.001	4	2	0.97244	0.98015	0.97321
30	0.001	4	3	0.97165	0.96774	0.96651
30	0.0001	2	1	0.97916	0.95918	0.96651
30	0.0001	2	2	0.97510	0.97510	0.97321
30	0.0001	2	3	0.95652	0.97580	0.96205
30	0.0001	3	1	0.98770	0.96787	0.97544
30	0.0001	3	2	0.96341	0.98340	0.97098
30	0.0001	3	3	0.96551	0.98437	0.97098
30	0.0001	4	1	0.96456	0.97222	0.96428
30	0.0001	4	2	0.96638	0.95041	0.95535
30	0.0001	4	3	0.98007	0.96470	0.96875
30	0.00001	2	1	0.93832	0.89495	0.91294
30	0.00001	2	2	0.93560	0.97244	0.94642
30	0.00001	2	3	0.93975	0.97095	0.95089
30	0.00001	3	1	0.86220	0.93191	0.88616
30	0.00001	3	2	0.84912	0.97975	0.89285
30	0.00001	3	3	0.93693	0.88135	0.90625
30	0.00001	4	1	0.85714	0.93670	0.88392
30	0.00001	4	2	0.91341	0.85425	0.87500
30	0.00001	4	3	0.85393	0.91935	0.86830
<i>BS: batch size</i>				<i>LR: learning rate</i>		
<i>nCL: number of Convolutional Layers</i>				<i>nDL: number of Dense Layers</i>		