In the Name of God

General Test Conditions:

No. of Channels:	1 to 5	No. of Subjects:	109
–	–	Baseline Channel:	T10 (In case of use)
Task:	REO	No. of Epochs:	25(Ch1), 30(Ch2,Ch3)
Orthogonal:	Yes (In case of use)	Tries:	3(Ch1), 10(Ch2), 11 (Ch3)
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	50(Ch1), 80(Ch2,Ch3)	Test Data Percentage:	25(Ch1), 20(ch2,Ch3)

Overall Test Results:

Channels No.	Number of Tries	Previously Selected Channel(s)	Baseline	Orthog.	Best Channel	Train Data		Test Data	
						Loss	Acc.	Loss	Acc.
1	3	-	-	×	Oz (2 out of 3) (+)	0.4655	0.8514	0.5059	0.8352
					Oz (2 out of 3) (+)	0.4724	0.8487	0.5079	0.8338
2	10	Oz	-	✓	F4 (1 out of 10)(+)	0.0200	0.9944 ± 0.0034	0.0286	0.9911 ± 0.0041
					F4 (0 out of 10)(+)	0.0200	0.9944 ± 0.0034	0.0286	0.9911 ± 0.0041
	10	Oz	-	×	Fz (1 out of 10)(+)	0.0614	0.9829 ± 0.0048	0.0806	0.9755 ± 0.0063
					F8 (0 out of 10)(+)	0.0627	0.9810 ± 0.0081	0.0767	0.9751 ± 0.0086
3	11	Oz, F4	-	✓	O2 (0 out of 11)(+)	0.0057	0.9984 ± 0.0012	0.0085	0.9975 ± 0.0017
					Fp1(2 out of 11)(+)	0.0052	0.9984 ± 0.0016	0.0072	0.9976 ± 0.0020
	10	Oz, Fz	-	×	O2 (2 out of 10)(+)	0.0214	0.9940 ± 0.0035	0.0298	0.9906 ± 0.0041
					O2 (0 out of 10)(+)	0.0214	0.9940 ± 0.0035	0.0298	0.9906 ± 0.0041

Description:

Blue color: Best Channel according to the train accuracy.

Red color: Best Channel according to the test accuracy.

+: Link to the figures and tables in detail.

(BACK TO RESULT TABLE)

Test Conditions of Case 1: One Channel, Without Orthogonalization

No. of Channels:	1	No. of Subjects:	109
Previous Selected Channels:	–	Baseline Channel:	–
Task:	REO	No. of Epochs:	25
Orthogonal:	No.	Tries:	3
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	50%	Test Data Percentage:	25%

Table 1: Avg. Results for Searching first best channel with 109 subjects, no baseline is removed. Channels are sorted due to the test data accuracy.

Channel	Train Data		Validation Data		Test Data	
	Loss	Acc.	Loss	Acc.	Loss	Acc.
P4,52	1.0402	0.6749	1.0848	0.6619	1.0916	0.6598
P3,48	0.9958	0.6864	1.0424	0.6734	1.0434	0.6708
Pz,50	0.9156	0.7207	0.9726	0.7029	0.9715	0.7021
F7,29	0.9033	0.7149	0.9488	0.7034	0.9472	0.7039
P8,54	0.9010	0.7197	0.9443	0.7059	0.9484	0.7056
Fp1,21	0.8695	0.7283	0.9234	0.7103	0.9251	0.7117
Cz,10	0.8564	0.7309	0.9083	0.7171	0.9093	0.7150
C3,8	0.8013	0.7504	0.8514	0.7357	0.8491	0.7352
Fp2,23	0.7990	0.7551	0.8465	0.7393	0.8429	0.7402
Fz,33	0.7587	0.7573	0.8083	0.7431	0.8037	0.7438
T8,41	0.7296	0.7615	0.7619	0.7513	0.7653	0.7493
P7,46	0.7243	0.7653	0.7658	0.7512	0.7685	0.7509
F3,31	0.7160	0.7695	0.7643	0.7542	0.7626	0.7540
F4,35	0.7146	0.7707	0.7539	0.7588	0.7578	0.7573
C4,12	0.7111	0.7783	0.7627	0.7608	0.7712	0.7586
T7,40	0.6517	0.7892	0.6894	0.7793	0.6893	0.7757
F8,36	0.6471	0.7958	0.6889	0.7832	0.6925	0.7802
O2,62	0.5575	0.8189	0.5895	0.8055	0.5958	0.8050
O1,60	0.5302	0.8252	0.5660	0.8137	0.5692	0.8105
Oz,61	0.4655	0.8514	0.5062	0.8362	0.5059	0.8352

Table 2: Best channels, in order, in each try.

		Try 1	Try 2	Try 3
B.C.	Train	***Oz***>O2>O1	***Oz***>O2>T7	O1>***Oz***>O2
	Test	***Oz***>O2>T7	***Oz***>O2>T7	O1>***Oz***>O2

Test Conditions of Case 1: (*continued*)

No. of Channels:	1	No. of Subjects:	109
Previous Selected Channels:	–	Baseline Channel:	–
Task:	REO	No. of Epochs:	25
Orthogonal:	No.	Tries:	3
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	50%	Test Data Percentage:	25%

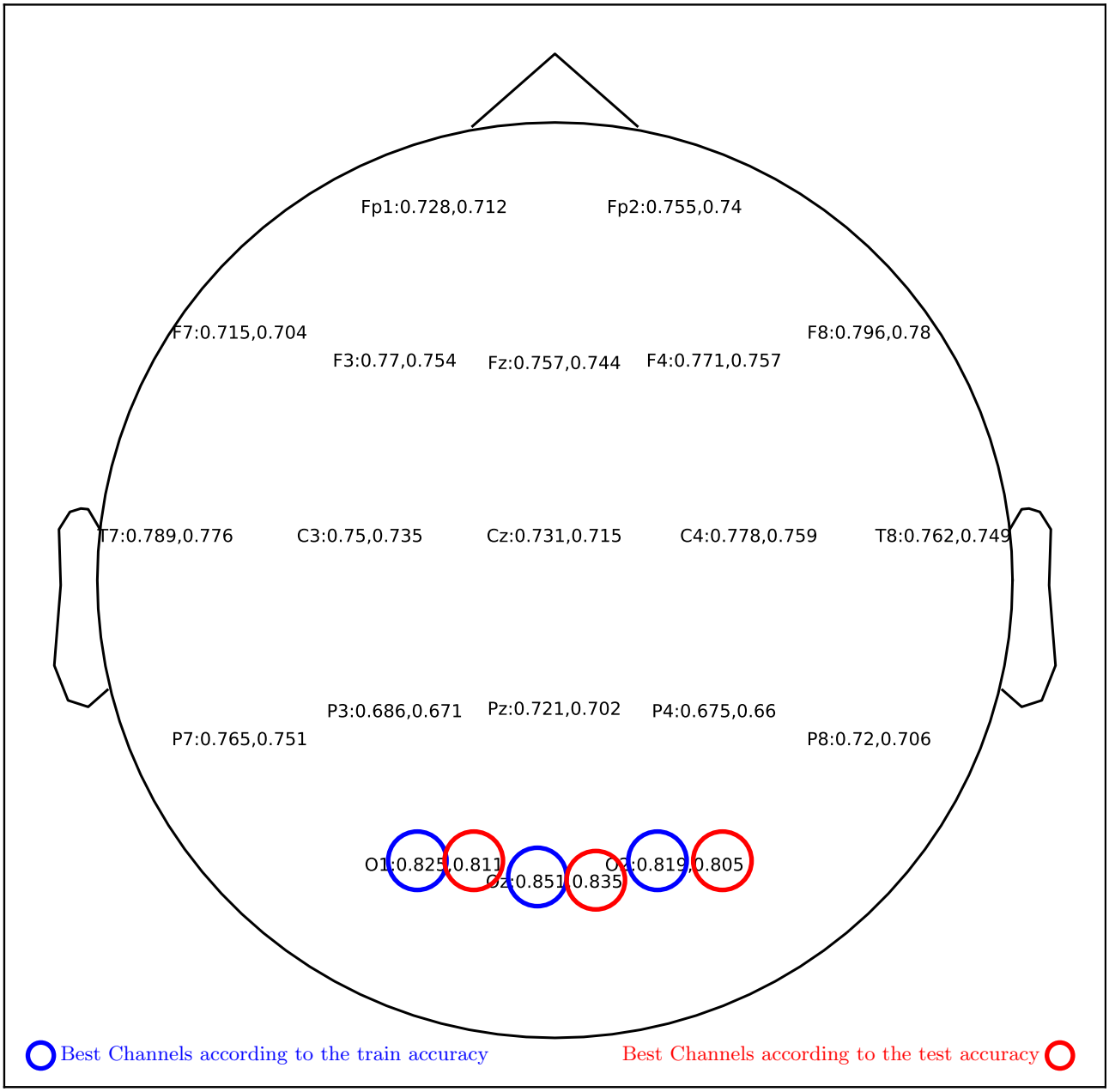

Figure 1: Avg. Results for Searching first best channel with 109 subjects, no baseline is removed.

(BACK TO RESULT TABLE)

Test Conditions of Case 2: Two Channels, With Orthogonalization

No. of Channels:	2	No. of Subjects:	109
Previous Selected Channels:	Oz	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	Yes	Tries:	10
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

Table 3: Avg. Results for Searching the second best channel with 109 subjects with orthogonalization. No baseline is removed. Channels are sorted due to the test data accuracy.

Channel	Train Data		Test Data	
	Loss	Acc.	Loss	Acc.
Oz	0.1000	0.0000 ± 0.0000	0.0000	0.0000 ± 0.0000
C3	0.0434	0.9859 ± 0.0054	0.0566	0.9806 ± 0.0060
O1	0.0511	0.9845 ± 0.0239	0.0604	0.9813 ± 0.0248
Cz	0.0396	0.9872 ± 0.0083	0.0508	0.9828 ± 0.0089
Fp2	0.0350	0.9889 ± 0.0131	0.0475	0.9845 ± 0.0147
O2	0.0372	0.9881 ± 0.0103	0.0475	0.9845 ± 0.0115
Pz	0.0352	0.9889 ± 0.0111	0.0466	0.9847 ± 0.0119
F7	0.0342	0.9892 ± 0.0098	0.0442	0.9852 ± 0.0115
T7	0.0314	0.9902 ± 0.0056	0.0423	0.9862 ± 0.0060
F8	0.0309	0.9903 ± 0.0100	0.0411	0.9866 ± 0.0123
C4	0.0307	0.9906 ± 0.0073	0.0411	0.9867 ± 0.0085
T8	0.0309	0.9904 ± 0.0047	0.0412	0.9869 ± 0.0053
P8	0.0293	0.9909 ± 0.0035	0.0393	0.9869 ± 0.0041
P3	0.0318	0.9903 ± 0.0090	0.0408	0.9871 ± 0.0107
Fp1	0.0287	0.9906 ± 0.0115	0.0371	0.9874 ± 0.0119
F3	0.0295	0.9912 ± 0.0077	0.0389	0.9874 ± 0.0083
Fz	0.0299	0.9907 ± 0.0070	0.0390	0.9874 ± 0.0081
P7	0.0270	0.9918 ± 0.0056	0.0377	0.9878 ± 0.0068
P4	0.0245	0.9926 ± 0.0038	0.0344	0.9888 ± 0.0042
F4	0.0200	0.9944 ± 0.0034	0.0286	0.9911 ± 0.0041

Table 4: Best channels, in order, in each try.

Try 1		Try 2		Try 3		Try 4		Try 5		Try 6		Try 7		Try 8		Try 9		Try 10	
Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te
P7	P7	T8	O1	P7	Fp1	Fz	Fz	Fp1	Fp1	*F4*	P3	Fz	Fz	Fp1	F8	F8	F8	F3	F3
T7	T7	P4	P4	Fp1	P7	Fp1	Fp1	P7	P7	P3	Fz	C4	P4	F8	Fp1	F3	P3	O1	O1
F7	F7	O1	T8	*F4*	*F4*	Cz	Cz	*F4*	Fz	Fp2	Fp1	P4	C4	C4	C4	P3	Fp2	*F4*	*F4*
P4	Fp1	O2	O2	Cz	Cz	F7	F7	Fz	O2	Fz	*F4*	O1	O1	*F4*	*F4*	Fp2	*F4*	Cz	Pz
F4	Fp1	Cz	P3	F7	Pz	Fp2	Fp2	C4	*F4*	Pz	F3	P8	P7	P8	P8	O1	F3	Pz	F7

Test Conditions of Case 2: (*continued*)

No. of Channels:	2	No. of Subjects:	109
Previous Selected Channels:	Oz	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	Yes	Tries:	10
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

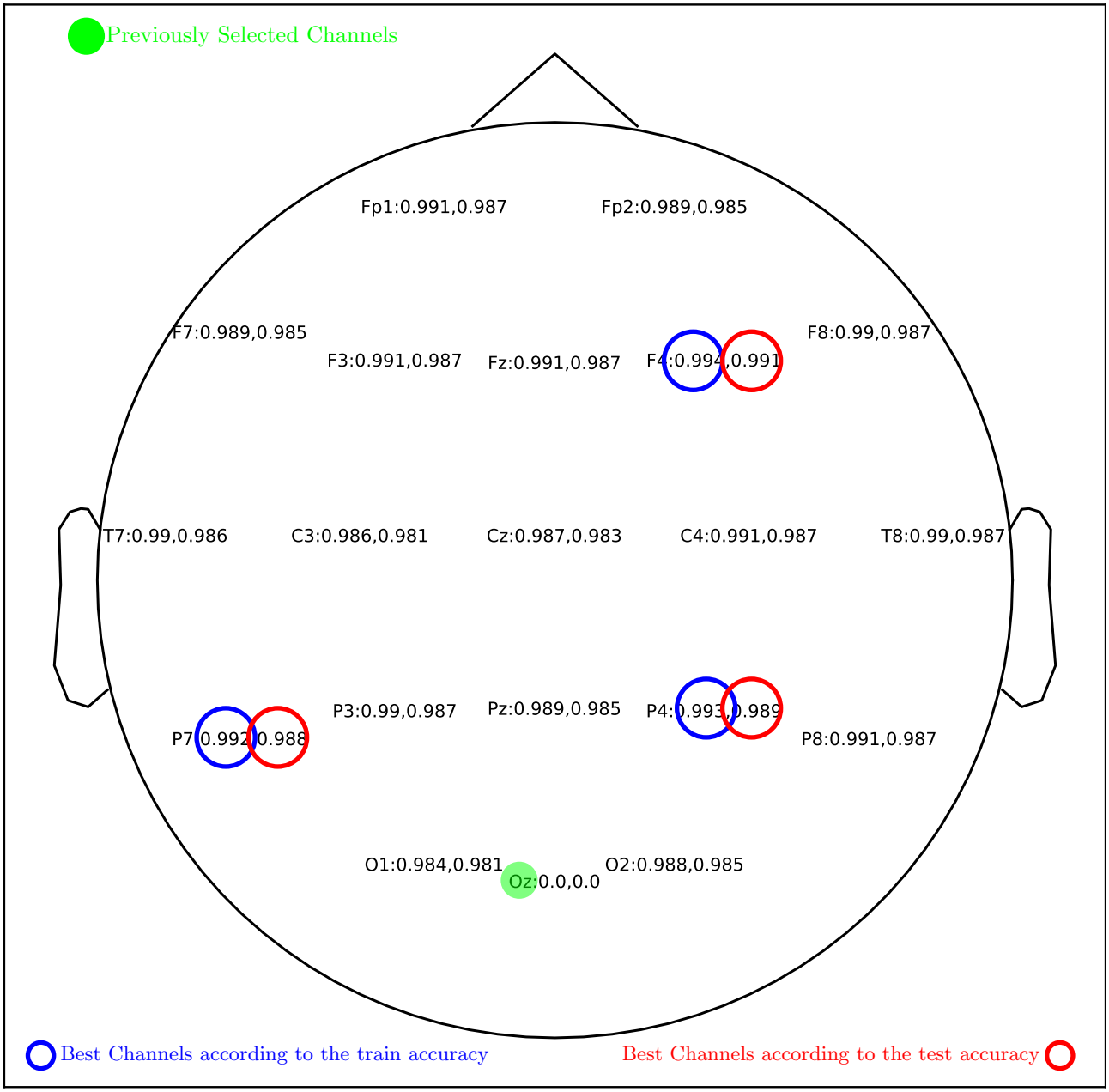

Figure 2: Avg. Results for Searching the second best channel with 109 subjects with orthogonalization. No baseline is removed.

(BACK TO RESULT TABLE)

Test Conditions of Case 3: Two Channels, Without Orthogonalization

No. of Channels:	2	No. of Subjects:	109
Previous Selected Channels:	Oz	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	No	Tries:	10
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

Table 5: Avg. Results for Searching the second best channel with 109 subjects Without orthogonalization. No baseline is removed. Channels are sorted due to the test data accuracy.

Channel	Train Data		Test Data	
	Loss	Acc.	Loss	Acc.
Oz	0.1000	0.0000 ± 0.0000	0.0000	0.0000 ± 0.0000
P8	0.1373	0.9557 ± 0.0368	0.1613	0.9476 ± 0.0379
P4	0.1221	0.9618 ± 0.0374	0.1451	0.9536 ± 0.0389
P3	0.1003	0.9681 ± 0.0203	0.1235	0.9595 ± 0.0208
O1	0.0980	0.9672 ± 0.0159	0.1181	0.9598 ± 0.0164
Fp2	0.0963	0.9705 ± 0.0158	0.1227	0.9608 ± 0.0187
Cz	0.0982	0.9694 ± 0.0184	0.1184	0.9617 ± 0.0195
T7	0.0995	0.9681 ± 0.0303	0.1175	0.9618 ± 0.0298
C3	0.0936	0.9713 ± 0.0166	0.1151	0.9633 ± 0.0176
O2	0.0872	0.9713 ± 0.0136	0.1072	0.9640 ± 0.0148
T8	0.0913	0.9715 ± 0.0192	0.1091	0.9649 ± 0.0211
F3	0.0844	0.9732 ± 0.0176	0.1025	0.9658 ± 0.0196
Fp1	0.0852	0.9744 ± 0.0189	0.1085	0.9659 ± 0.0199
P7	0.0810	0.9744 ± 0.0122	0.1030	0.9661 ± 0.0129
C4	0.0886	0.9728 ± 0.0194	0.1073	0.9664 ± 0.0206
Pz	0.0828	0.9748 ± 0.0104	0.1027	0.9667 ± 0.0118
F7	0.0753	0.9778 ± 0.0071	0.0960	0.9694 ± 0.0086
F4	0.0674	0.9784 ± 0.0172	0.0848	0.9717 ± 0.0194
Fz	0.0615	0.9814 ± 0.0078	0.0781	0.9751 ± 0.0086
F8	0.0627	0.9810 ± 0.0081	0.0767	0.9751 ± 0.0086

Table 6: Best channels, in order, in each try.

Try 1		Try 2		Try 3		Try 4		Try 5		Try 6		Try 7		Try 8		Try 9		Try 10	
Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te
O2	O2	Fz	F4	F4	F4	T8	T8	Fp1	Fp1	F4	F4	P4	P4	T7	T7	T7	T7	T8	F3
Fp1	Fp1	F4	Fz	***F8***	***F8***	Cz	Cz	T7	T8	C4	P3	C3	Fp1	F4	P8	C4	C4	F3	T8
F4	F4	F3	F3	C3	Fz	O2	O2	T8	T7	***F8***	F4	Fz	***F8***	Fz	F4	P7	P7	F7	***F8***
O1	O1	P4	P4	Fz	C3	O1	Fz	***F8***	Fz	Fp2	Cz	Fp1	C3	P8	O2	C3	***F8***	***F8***	F7
P4	C4	***F8***	***F8***	Cz	F7	Fz	O1	C4	***F8***	Pz	Fp1	***F8***	T8	P3	Fz	***F8***	C3	Pz	Cz

Test Conditions of Case 3: (*continued*)

No. of Channels:	2	No. of Subjects:	109
Previous Selected Channels:	Oz	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	No	Tries:	10
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

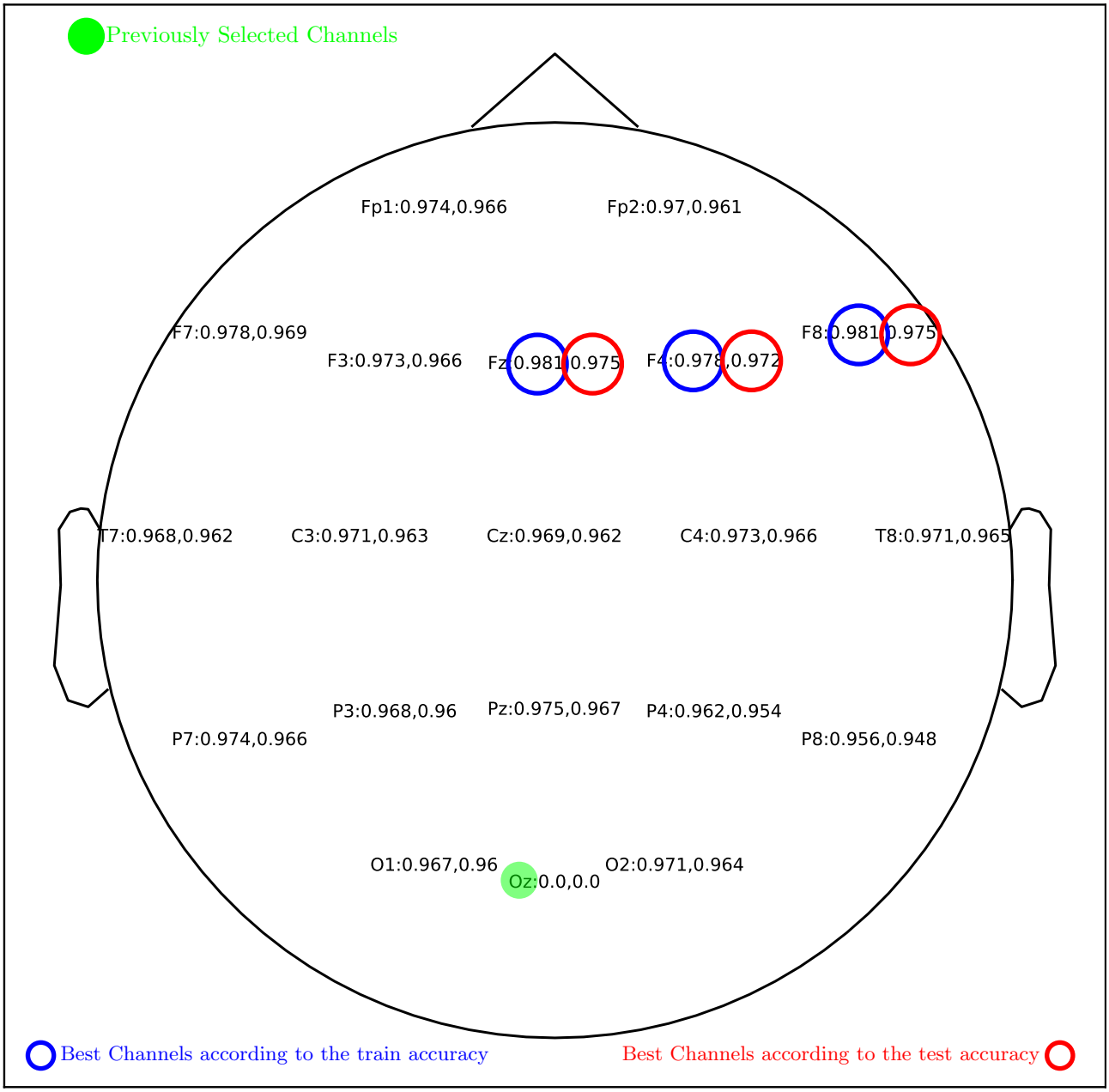

Figure 3: Avg. Results for Searching the second best channel with 109 subjects without orthogonalization. No baseline is removed.

(BACK TO RESULT TABLE)

Test Conditions of Case 4: Three Channels, With Orthogonalization

No. of Channels:	3	No. of Subjects:	109
Previous Selected Channels:	Oz, F4	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	Yes	Tries:	11
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

Table 7: Avg. Results for Searching the third best channel with 109 subjects with orthogonalization. No baseline is removed. Channels are sorted due to the test data accuracy.

Channel	Train Data		Test Data	
	Loss	Acc.	Loss	Acc.
F4	0.1000	0.0000 ± 0.0000	0.0000	0.0000 ± 0.0000
Oz	0.1000	0.0000 ± 0.0000	0.0000	0.0000 ± 0.0000
P8	0.0119	0.9964 ± 0.0052	0.0165	0.9949 ± 0.0062
F8	0.0105	0.9967 ± 0.0050	0.0135	0.9957 ± 0.0058
O1	0.0087	0.9973 ± 0.0040	0.0125	0.9960 ± 0.0021
P3	0.0089	0.9972 ± 0.0030	0.0126	0.9960 ± 0.0039
Fp2	0.0083	0.9974 ± 0.0023	0.0116	0.9962 ± 0.0030
Cz	0.0089	0.9972 ± 0.0035	0.0121	0.9962 ± 0.0045
T8	0.0085	0.9974 ± 0.0033	0.0110	0.9966 ± 0.0029
Pz	0.0072	0.9978 ± 0.0022	0.0104	0.9967 ± 0.0028
F7	0.0066	0.9981 ± 0.0012	0.0101	0.9969 ± 0.0017
T7	0.0076	0.9978 ± 0.0021	0.0104	0.9969 ± 0.0026
F3	0.0063	0.9982 ± 0.0011	0.0094	0.9970 ± 0.0016
C3	0.0073	0.9979 ± 0.0030	0.0097	0.9971 ± 0.0038
P7	0.0064	0.9981 ± 0.0016	0.0092	0.9971 ± 0.0015
Fz	0.0057	0.9982 ± 0.0012	0.0082	0.9973 ± 0.0015
C4	0.0060	0.9982 ± 0.0014	0.0083	0.9974 ± 0.0014
O2	0.0057	0.9984 ± 0.0012	0.0085	0.9975 ± 0.0017
P4	0.0059	0.9984 ± 0.0016	0.0083	0.9975 ± 0.0018
Fp1	0.0052	0.9984 ± 0.0016	0.0072	0.9976 ± 0.0020

Table 8: Best channels, in order, in each try.

Try 1		Try 2		Try 3		Try 4		Try 5		Try 6		Try 7		Try 8		Try 9		Try 10		Try 11	
Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te
C4	C4	C3	O2	P7	P7	T8	T8	***Fp1***	***Fp1***	O1	T7	***Fp1***	***Fp1***	T7	T7	Fz	Fz	F8	F8	Cz	Cz
F8	Fp2	O2	C3	P4	Pz	Fz	Fz	P8	P8	Cz	F8	C4	C4	P3	Pz	F8	Fz	P7	T8	O2	F7
Fp2	F8	Cz	Cz	O1	P4	F3	C3	C3	C3	T7	F7	P8	C3	Pz	P3	O2	F7	T8	P7	F7	O2
T8	T8	C4	T7	Pz	Cz	T7	C3	Pz	Pz	T8	C4	T7	Fz	C3	C3	O1	O1	F3	Fp2	***Fp1***	***Fp1***
P4	T8	C4	T8	Cz	O2	Pz	Pz	T7	Pz	C3	T7	Fp2	Fz	F7	P4	F7	***Fp1***	Fp2	F3	Fp2	***Fp1***

Test Conditions of Case 4: (*continued*)

No. of Channels:	3	No. of Subjects:	109
Previous Selected Channels:	Oz, F4	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	Yes	Tries:	11
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

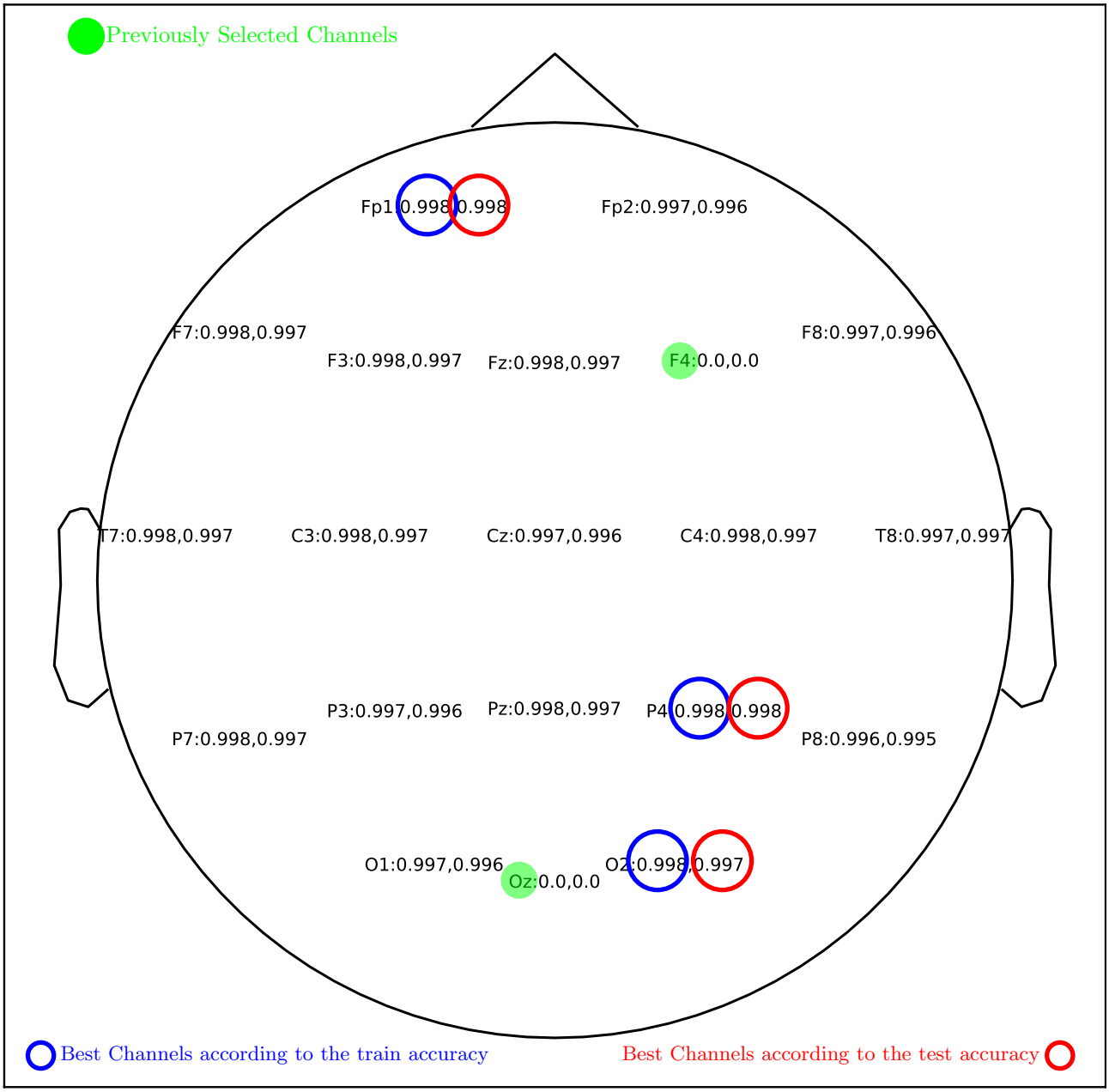

Figure 4: Avg. Results for Searching the third best channel with 109 subjects with orthogonalization. No baseline is removed.

(BACK TO RESULT TABLE)

Test Conditions of Case 5: Three Channels, Without Orthogonalization

No. of Channels:	3	No. of Subjects:	109
Previous Selected Channels:	Oz, Fz	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	No	Tries:	10
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

Table 9: Avg. Results for Searching the third best channel with 109 subjects without orthogonalization. No baseline is removed. Channels are sorted due to the test data accuracy.

Channel	Train Data		Test Data	
	Loss	Acc.	Loss	Acc.
Fz	0.1000	0.0000 ± 0.0000	0.0000	0.0000 ± 0.0000
Oz	0.1000	0.0000 ± 0.0000	0.0000	0.0000 ± 0.0000
C4	0.0622	0.9794 ± 0.0152	0.0764	0.9742 ± 0.0169
F7	0.0623	0.9800 ± 0.0175	0.0767	0.9750 ± 0.0201
Pz	0.0590	0.9809 ± 0.0156	0.0729	0.9760 ± 0.0172
Fp2	0.0516	0.9841 ± 0.0165	0.0643	0.9793 ± 0.0177
P4	0.0463	0.9854 ± 0.0111	0.0593	0.9804 ± 0.0125
Fp1	0.0482	0.9855 ± 0.0081	0.0617	0.9806 ± 0.0088
C3	0.0450	0.9858 ± 0.0097	0.0587	0.9808 ± 0.0109
P7	0.0448	0.9860 ± 0.0084	0.0576	0.9811 ± 0.0091
O1	0.0459	0.9856 ± 0.0108	0.0586	0.9811 ± 0.0114
Cz	0.0413	0.9878 ± 0.0097	0.0535	0.9830 ± 0.0110
F8	0.0417	0.9871 ± 0.0174	0.0515	0.9832 ± 0.0193
T7	0.0430	0.9871 ± 0.0156	0.0540	0.9832 ± 0.0176
P3	0.0408	0.9879 ± 0.0147	0.0527	0.9832 ± 0.0168
T8	0.0425	0.9868 ± 0.0191	0.0531	0.9833 ± 0.0216
F3	0.0375	0.9891 ± 0.0082	0.0483	0.9849 ± 0.0089
P8	0.0350	0.9900 ± 0.0067	0.0457	0.9861 ± 0.0079
F4	0.0353	0.9908 ± 0.0061	0.0459	0.9869 ± 0.0070
O2	0.0214	0.9940 ± 0.0035	0.0298	0.9906 ± 0.0041

Table 10: Best channels, in order, in each try.

Try 1		Try 2		Try 3		Try 4		Try 5		Try 6		Try 7		Try 8		Try 9		Try 10	
Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te	Tr	Te
T7	T7	F3	T8	T8	T8	F8	F8	C3	T8	***O2***	F8	F8	F8	C4	C4	T8	T8	***O2***	T8
O1	***O2***	T7	F4	P3	P4	T8	***O2***	T8	C3	F8	Oz	C3	C3	P8	P8	***O2***	***O2***	T8	***O2***
O2	O1	F4	T7	P4	P3	***O2***	T8	F7	P8	Fp2	Fp1	P3	P3	P7	F4	P3	P3	P3	P3
Cz	Cz	T8	F3	Fp2	T7	F4	Fp2	T7	T7	F7	Fp2	Fp1	Fp1	F4	P7	Fp2	Fp2	F3	F7
Pz	F8	P3	P3	Cz	Fp2	Fp2	F4	P8	F7	P7	T8	P8	P8	***O2***	***O2***	C4	C4	P4	P4

Test Conditions of Case 5: (*continued*)

No. of Channels:	3	No. of Subjects:	109
Previous Selected Channels:	Oz, Fz	Baseline Channel:	–
Task:	REO	No. of Epochs:	30
Orthogonal:	No	Tries:	10
Inner Shift:	4	Outer Shift:	8
Train Data Percentage:	80%	Test Data Percentage:	20%

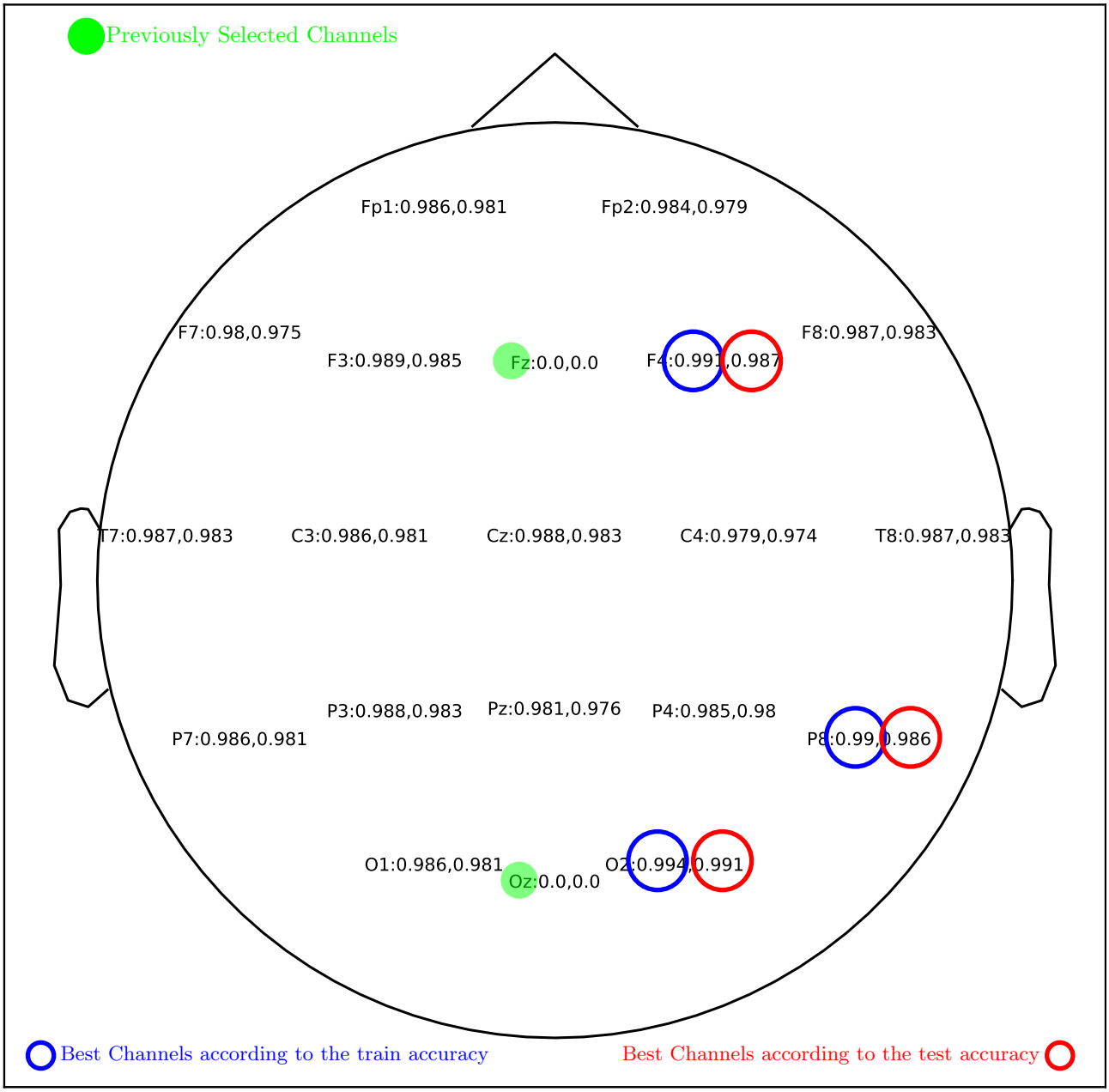

Figure 5: Avg. Results for Searching the third best channel with 109 subjects without orthogonalization. No baseline is removed.