

**Additional file 1. Accuracy summaries and sample size used to train and test for four machine learning models.** Models were tested across four different size epochs and with four and six behavioural categories. Statistics reported are: cross validation (training) accuracy and 95% confidence interval; out-of-sample (testing) accuracy and standard deviation (SD); the Kappa statistic and the proportion improvement made by the SL compared to other models.

Model	Epochs	Behavioural categories	n	Cross validation accuracy	Cross validation accuracy lower bound	Cross validation accuracy upper bound	Out-of-sample accuracy	Out-of-sample accuracy SD	Kappa	SL improvement
SL	75	4	1055	0.834	0.810	0.856	0.835	0.007	0.779	
RF				0.823	0.798	0.845	0.832	0.025	0.764	0.011
GBM				0.820	0.795	0.843	0.834	0.022	0.760	0.014
LR				0.770	0.743	0.795	0.769	0.009	0.693	0.064
SL	25	6	261	0.720	0.662	0.774	0.705	0.011	0.664	
RF				0.678	0.618	0.734	0.697	0.034	0.613	0.042
GBM				0.709	0.650	0.763	0.712	0.030	0.651	0.011
LR				0.632	0.571	0.691	0.651	0.017	0.558	0.088
SL	13	4	2982	0.834	0.820	0.847	0.836	0.004	0.778	
RF				0.826	0.812	0.839	0.833	0.013	0.767	0.008
GBM				0.834	0.820	0.847	0.834	0.013	0.779	0.000
LR				0.744	0.728	0.760	0.753	0.004	0.659	0.089
SL	13	6	896	0.730	0.700	0.759	0.721	0.014	0.676	
RF				0.723	0.693	0.752	0.699	0.044	0.668	0.007
GBM				0.720	0.689	0.749	0.712	0.039	0.664	0.010
LR				0.650	0.617	0.681	0.661	0.012	0.579	0.080
SL	13	4	5899	0.851	0.841	0.860	0.841	0.002	0.801	
RF				0.844	0.834	0.853	0.834	0.006	0.792	0.007
GBM				0.847	0.837	0.856	0.838	0.007	0.796	0.004
LR				0.751	0.740	0.762	0.750	0.003	0.668	0.100
SL	13	6	1783	0.736	0.715	0.757	0.741	0.009	0.684	
RF				0.727	0.706	0.747	0.735	0.028	0.672	0.010
GBM				0.734	0.712	0.754	0.740	0.031	0.680	0.003
LR				0.651	0.628	0.673	0.658	0.005	0.581	0.086

**Additional file 1. Cont'd**

Model	Epochs	Behavioural categories	n	Cross validation accuracy	Cross validation accuracy lower bound	Cross validation accuracy upper bound	Out-of-sample accuracy	Out-of-sample accuracy SD	Kappa	SL improvement
SL				0.842	0.835	0.849	0.847	0.002	0.790	
RF		4	10709	0.837	0.830	0.844	0.842	0.007	0.782	0.006
GBM				0.840	0.833	0.847	0.843	0.006	0.786	0.003
LR	7			0.741	0.733	0.750	0.750	0.002	0.655	0.101
SL				0.716	0.695	0.737	0.724	0.005	0.659	
RF		6	1800	0.705	0.683	0.726	0.718	0.017	0.646	0.011
GBM				0.717	0.696	0.738	0.719	0.016	0.661	-0.001
LR				0.645	0.622	0.667	0.650	0.005	0.574	0.071