

1 Supplementary Material

1.1 Additional Model Results

This section contains some additional results for the regression and classification models separately, as opposed to the combined results presented in the main paper. These results contain the values of Mean Squared Error (MSE), F1 Score, and Balanced Accuracy (along with other metrics) that were used in the optimisation process as reported in the main paper.

1.1.1 Regression Results

Table 1 presents the metrics for the best regression models for each participant. It also includes some metrics that were not reported in the main paper. It includes the Mean Squared Error (MSE) and its standard deviation (MSE-STD). We did not include the whole table in the main paper as MSE is not presented in the Shah et al. paper from where we obtained the dataset. Also, these metrics are not computed in the classification models, so we did not include them in the combined results in the main paper. These metrics are presented here for a more complete picture of the regression results.

Table 1 Table containing the metrics for the best regression models for each participant (MAE: Mean Absolute Error Mean, MAE-STD: Mean Absolute Error Standard Deviation, MAPE: Mean Absolute Percentage Error Mean in %, MAPE-STD: Mean Absolute Percentage Error Standard Deviation in %, MSE: Mean Squared Error, MSE-STD: Mean Squared Error Standard Deviation, Part.: Participant)

Metric	Part. 1	Part. 10	Part. 12	Part. 14	Part. 15	Part. 18	Part. 19
MAE	0.406	0.734	0.582	0.829	0.494	0.721	1.005
MSE	0.44	0.943	0.615	1.822	0.383	1.057	1.925
MAPE	9.636	20.17	22.26	36.152	13.114	18.71	48.148
MAE-STD	0.086	0.101	0.063	0.327	0.05	0.112	0.176
MSE-STD	0.126	0.3	0.044	1.413	0.059	0.177	0.332
MAPE-STD	1.70	6.159	3.107	17.918	1.583	4.429	13.254
Metric	Part. 20	Part. 21	Part. 23	Part. 24	Part. 26	Part. 28	Part. 29
MAE	0.578	1.103	0.97	0.313	1.012	0.648	1.065
MSE	0.616	2.293	1.505	0.353	1.65	0.893	1.785
MAPE	19.93	53.113	39.072	22.165	33.395	21.071	59.116
MAE-STD	0.144	0.216	0.304	0.074	0.272	0.12	0.19
MSE-STD	0.344	1.102	0.854	0.146	0.817	0.373	0.574
MAPE-STD	5.131	11.71	8.326	3.903	10.714	5.032	16.031

1.1.2 Classification Results

Table 2 presents the metrics for the best classification models for each participant. It also includes some metrics that were not reported in the main paper. We did not include the whole table in the main paper as these metrics are not common to the regression models and we cannot use them to compare models and find the best models between the regression and classification models. These metrics are presented here for a more complete picture of the classification results.

Table 2 Table containing the metrics for the best classification models for each participant (MAE: Mean Absolute Error Mean, MAE-STD: Mean Absolute Error Standard Deviation, MAPE: Mean Absolute Percentage Error Mean in %, MAPE-STD: Mean Absolute Percentage Error Standard Deviation in %, ACCURACY: Mean Accuracy, ACCURACY-STD: Mean Accuracy Standard Deviation, BALANCED-ACCURACY: Mean Balanced Accuracy, BALANCED-ACCURACY-STD: Mean Balanced Accuracy Standard Deviation, F1: Mean F1 Score, F1-STD: Mean F1 Score Standard Deviation, RECALL: Mean Recall, RECALL-STD: Mean Recall Standard Deviation, SPECIFICITY: Mean Specificity, SPECIFICITY-STD: Mean Specificity Standard Deviation, Part.: Participant)

Metric	Part. 1	Part. 10	Part. 12	Part. 14	Part. 15	Part. 18	Part. 19
ACCURACY	0.754	0.463	0.65	0.514	0.5	0.533	0.434
BALANCED-ACCURACY	0.593	0.455	0.44	0.522	0.514	0.534	0.45
MAE	0.295	0.715	0.532	0.933	0.522	0.638	0.989
MAPE	6.155	19.839	26.569	40.624	14.259	18.857	53.204
RECALL	0.593	0.455	0.44	0.522	0.514	0.534	0.45
F1	0.57	0.443	0.426	0.423	0.477	0.482	0.382
SPECIFICITY	0.887	0.889	0.874	0.868	0.708	0.851	0.848
ACCURACY-STD	0.101	0.091	0.1	0.155	0.142	0.227	0.125
BALANCED-ACCURACY-STD	0.154	0.131	0.072	0.12	0.145	0.279	0.157
MAE-STD	0.151	0.089	0.071	0.306	0.155	0.472	0.096
MAPE-STD	2.729	4.426	4.386	28.323	3.418	18.541	12.124
RECALL-STD	0.154	0.131	0.072	0.12	0.145	0.279	0.157
F1-STD	0.157	0.132	0.056	0.149	0.163	0.254	0.117
SPECIFICITY-STD	0.061	0.022	0.037	0.046	0.061	0.069	0.031
Metric	Part. 20	Part. 21	Part. 23	Part. 24	Part. 26	Part. 28	Part. 29
ACCURACY	0.636	0.421	0.392	0.933	0.393	0.581	0.405
BALANCED-ACCURACY	0.647	0.289	0.325	0.623	0.363	0.419	0.398
MAE	0.455	1.201	0.914	0.125	1.053	0.562	1.03
MAPE	13.515	50.35	35.756	5.347	31.769	17.565	47.369
RECALL	0.647	0.289	0.325	0.623	0.363	0.419	0.398
F1	0.603	0.301	0.272	0.633	0.315	0.402	0.326
ACCURACY-STD	0.17	0.111	0.103	0.048	0.07	0.132	0.084
BALANCED-ACCURACY-STD	0.186	0.106	0.089	0.217	0.103	0.198	0.091
MAE-STD	0.249	0.272	0.298	0.088	0.349	0.163	0.253
MAPE-STD	6.165	10.689	6.494	4.933	9.414	6.398	18.945
RECALL-STD	0.186	0.106	0.089	0.217	0.103	0.198	0.091
F1-STD	0.216	0.115	0.09	0.215	0.107	0.204	0.067
SPECIFICITY-STD	0.042	0.016	0.049	0.184	0.049	0.034	0.024

1.2 Explainability Results

The following two figures show the SHAP and ALE plots for the top-5 features in the overall best models (from both regression and classification models) for all participants. The SHAP plots are shown in Figure 1, and the ALE plots are shown in Figure 2.

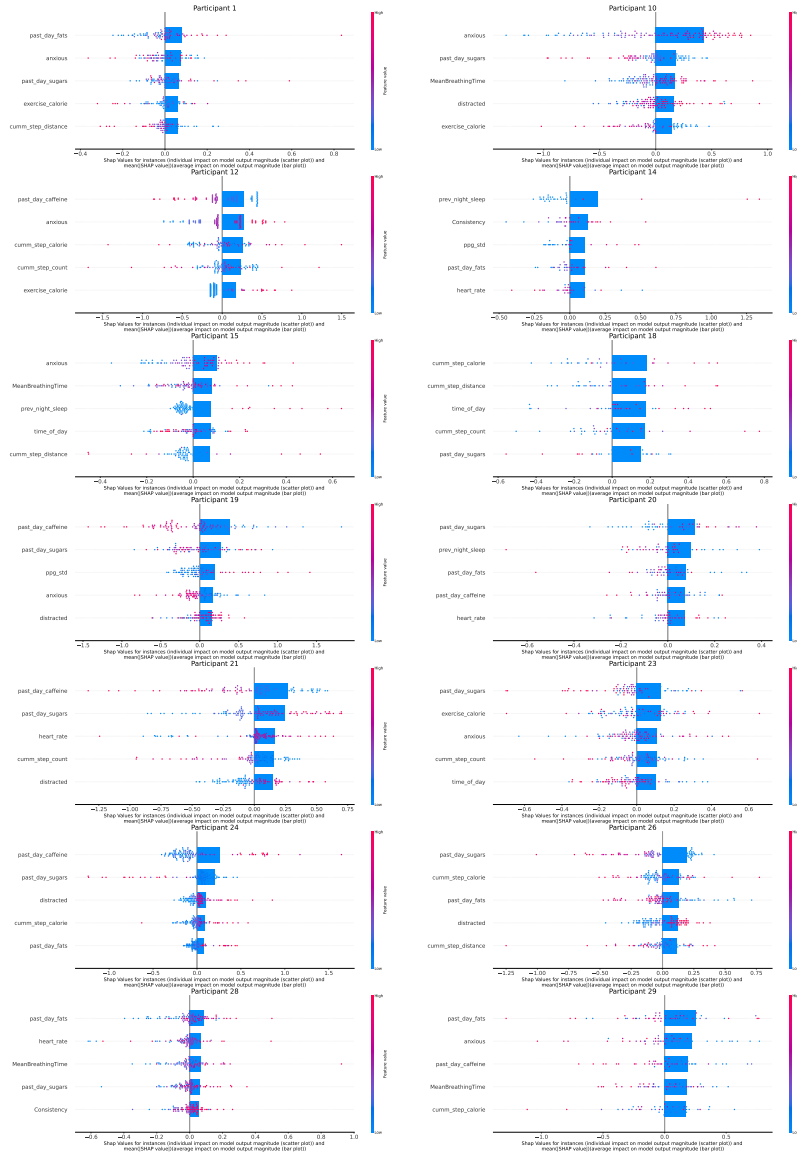
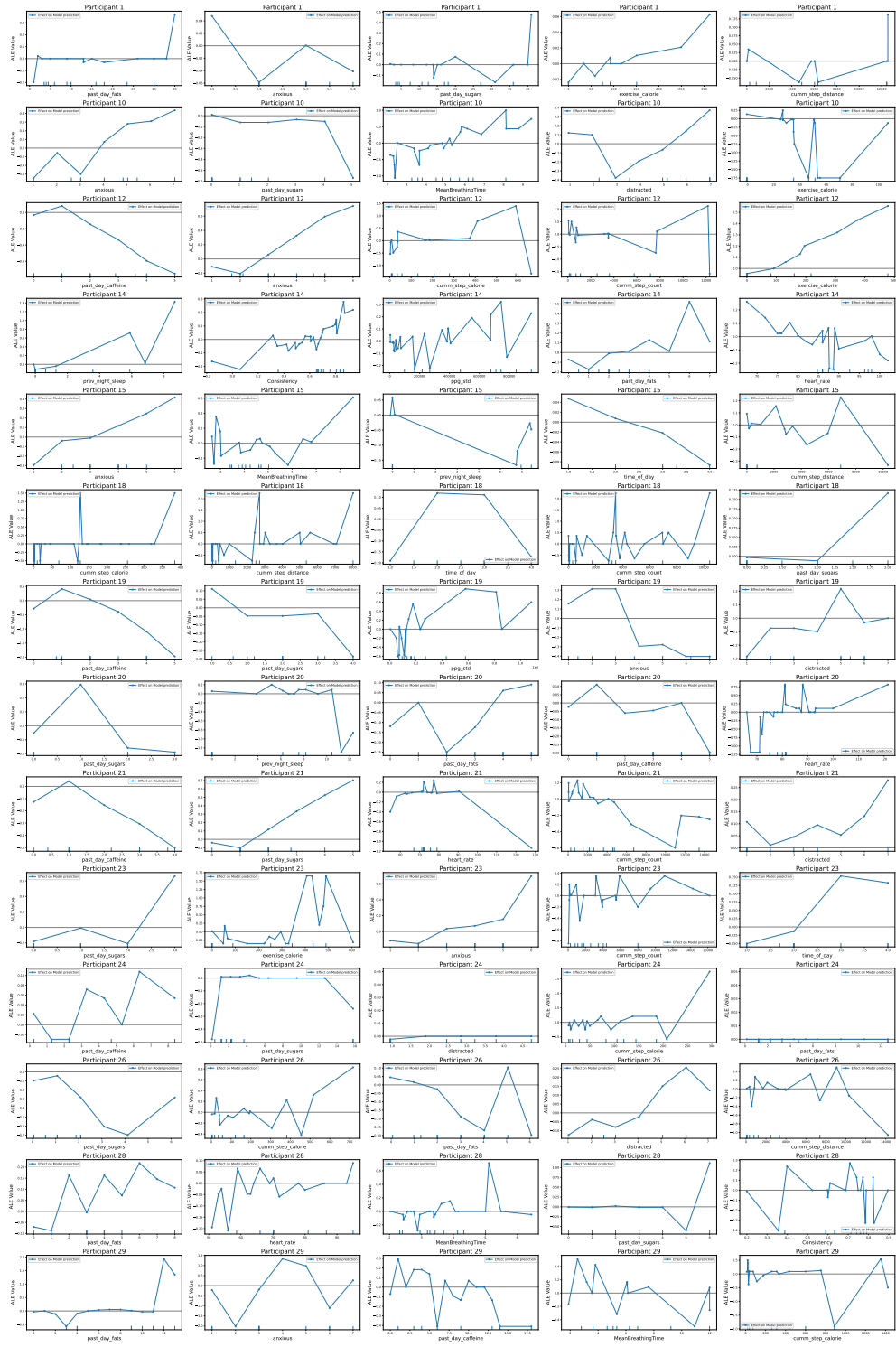


Fig. 1 The figure shows the SHAP value effects for the top-5 features in the overall best models for all participants. The scatter plots depict the SHAP values for individual samples, with the colour of the points denoting their magnitude. The bar plots superimposed on top shows the mean of the absolute value of the SHAP values over all data points. The features are arranged based on the magnitude of the average SHAP values.



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Fig. 2 The figure shows the Accumulated Local Effects (ALE) plots for the top-5 features in the overall best models for all participants. The x-axis contains the feature values, and the y-axis contains the ALE values. The ALE values denote the magnitude of the average effect of a feature value on the model output, i.e., the mood score.