

Supplementary Table 1: Performance metrics for four models on a dataset with four phases, using fixed window extraction technique and leave-one-subject-out splitting. Acc= accuracy, DTree= decision tree, LRegression= logistic regression, Prec= precision, Rec= recall, RForest= random forest, SVM= support vector machine.

Subject	DTree				RForest				LRegression				SVM			
	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1
S02	0.42	0.40	0.42	0.41	0.56	0.57	0.56	0.55	0.61	0.61	0.61	0.61	0.60	0.61	0.60	0.59
S03	0.67	0.75	0.67	0.67	0.50	0.58	0.50	0.45	0.67	0.79	0.67	0.66	0.58	0.62	0.58	0.57
S06	0.67	0.79	0.67	0.66	0.67	0.62	0.67	0.63	0.50	0.50	0.50	0.49	0.67	0.73	0.67	0.65
S07	0.83	0.90	0.83	0.84	0.75	0.78	0.75	0.74	0.75	0.78	0.75	0.74	0.75	0.78	0.75	0.74
S08	0.42	0.47	0.42	0.43	0.67	0.73	0.67	0.65	0.58	0.66	0.58	0.56	0.58	0.50	0.58	0.53
S09	0.62	0.77	0.62	0.60	0.69	0.69	0.69	0.67	0.62	0.55	0.62	0.56	0.56	0.54	0.56	0.52
S010	0.33	0.44	0.33	0.32	0.67	0.69	0.67	0.66	0.83	0.85	0.83	0.83	0.83	0.83	0.83	0.83
S011	0.75	0.79	0.75	0.74	0.75	0.79	0.75	0.74	0.50	0.44	0.50	0.46	0.50	0.56	0.50	0.50
S012	0.50	0.57	0.50	0.48	0.50	0.57	0.50	0.48	0.58	0.65	0.58	0.56	0.58	0.65	0.58	0.56
S013	0.50	0.52	0.50	0.49	0.58	0.56	0.58	0.56	0.83	0.85	0.83	0.83	0.75	0.81	0.75	0.73
S015	0.33	0.42	0.33	0.32	0.50	0.67	0.50	0.52	0.67	0.50	0.67	0.57	0.67	0.56	0.67	0.58
S017	0.44	0.47	0.44	0.43	0.38	0.35	0.38	0.36	0.44	0.48	0.44	0.39	0.31	0.43	0.31	0.31
S018	0.55	0.55	0.55	0.53	0.50	0.48	0.50	0.47	0.45	0.45	0.45	0.43	0.30	0.22	0.30	0.25
S019	0.50	0.54	0.50	0.49	0.60	0.46	0.60	0.51	0.70	0.77	0.70	0.66	0.65	0.74	0.65	0.62
S020	0.50	0.52	0.50	0.50	0.50	0.42	0.50	0.45	0.55	0.64	0.55	0.52	0.60	0.68	0.60	0.57
S021	0.50	0.48	0.50	0.48	0.80	0.81	0.80	0.80	0.80	0.86	0.80	0.78	0.75	0.76	0.75	0.75
S022	0.30	0.22	0.30	0.25	0.35	0.45	0.35	0.38	0.70	0.86	0.70	0.71	0.45	0.67	0.45	0.44
S023	0.25	0.25	0.25	0.24	0.67	0.73	0.67	0.65	0.50	0.38	0.50	0.43	0.58	0.62	0.58	0.59
Avg±sd	0.50±0.16	0.55±0.19	0.50±0.16	0.49±0.16	0.59±0.13	0.61±0.14	0.59±0.13	0.57±0.13	0.63±0.13	0.65±0.16	0.63±0.13	0.60±0.14	0.60±0.14	0.63±0.15	0.60±0.14	0.57±0.15

Supplementary Table 2: Performance metrics for four models on a dataset with three phases, using fixed window extraction technique and leave-one-subject-out splitting. Acc= accuracy, DTree= decision tree, LRegression= logistic regression, Prec= precision, Rec= recall, RForest= random forest, SVM= support vector machine.

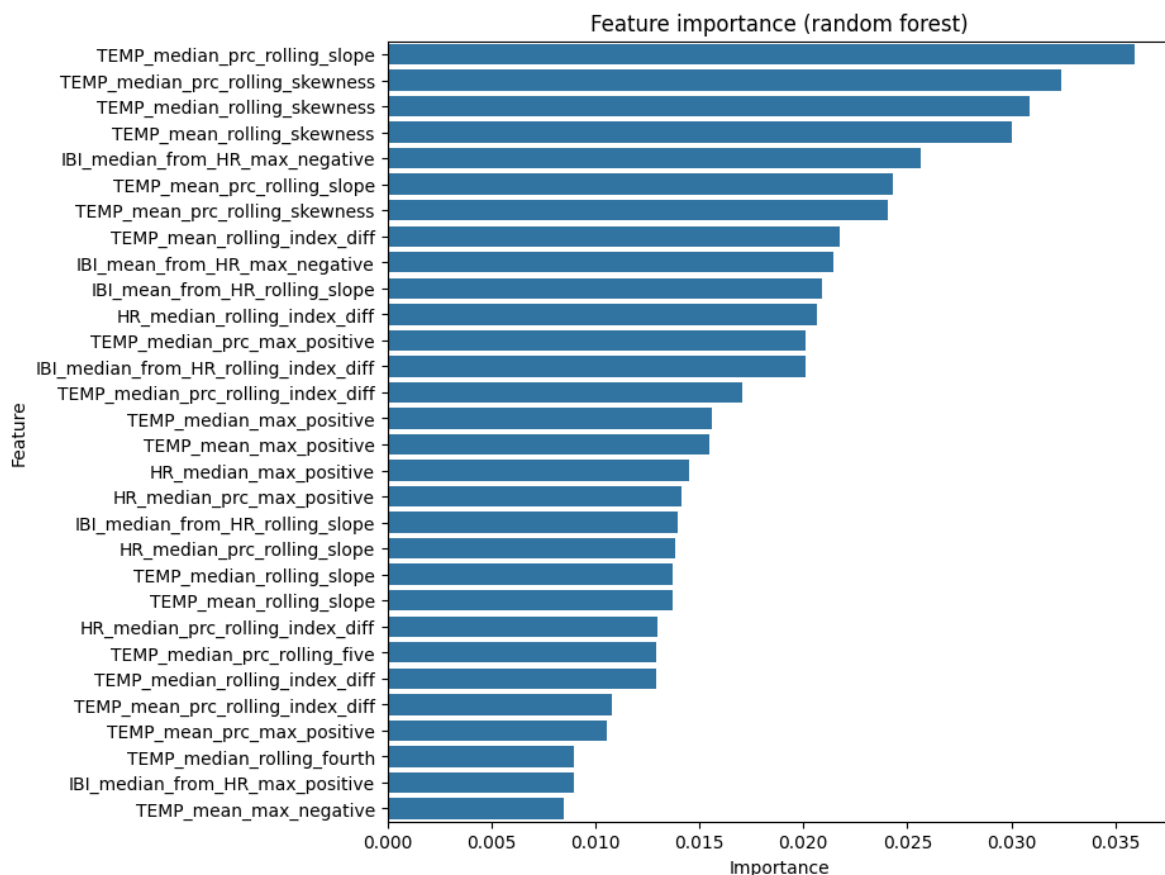
Subject	DTree				RForest				LRegression				SVM			
	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1
S02	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56
S03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S06	1.00	1.00	1.00	1.00	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56
S07	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S08	0.33	0.17	0.33	0.22	1.00	1.00	1.00	1.00	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56
S09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S010	0.67	0.50	0.67	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S011	1.00	1.00	1.00	1.00	0.67	0.50	0.67	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S012	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S013	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S015	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56
S017	0.00	0.00	0.00	0.00	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56
S018	0.33	0.11	0.33	0.17	0.33	0.33	0.33	0.33	0.33	0.11	0.33	0.17	0.33	0.11	0.33	0.17
S019	0.67	0.50	0.67	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S020	0.67	0.50	0.67	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S021	0.67	0.50	0.67	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S022	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.11	0.33	0.17	0.67	0.50	0.67	0.56
S023	0.33	0.33	0.33	0.33	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56	0.67	0.50	0.67	0.56
Avg±sd	0.70 ± 0.32	0.64±0.36	0.70±0.32	0.66±0.35	0.87±0.20	0.82±0.26	0.87±0.20	0.84±0.24	0.82±0.24	0.73±0.33	0.82±0.24	0.76±0.30	0.83±0.21	0.76±0.29	0.83±0.21	0.78±0.27

Supplementary Table 3: Performance metrics for four models on a dataset with four phases, using rolling window extraction technique and leave-one-subject-out splitting. Acc= accuracy, DTree= decision tree, LRegression= logistic regression, Prec= precision, Rec= recall, RForest= random forest, SVM= support vector machine.

Subject	DTree				RForest				LRegression				SVM				
	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	
S02	0.54	0.63	0.51	0.53	0.62	0.64	0.60	0.61	0.60	0.61	0.60	0.59	0.66	0.66	0.64	0.65	
S03	0.42	0.53	0.48	0.46	0.51	0.72	0.57	0.54	0.69	0.74	0.74	0.71	0.65	0.69	0.72	0.67	
S06	0.56	0.65	0.56	0.57	0.58	0.74	0.61	0.59	0.65	0.68	0.71	0.66	0.70	0.72	0.74	0.71	
S07	0.71	0.73	0.71	0.71	0.72	0.76	0.71	0.72	0.82	0.86	0.80	0.81	0.70	0.78	0.69	0.69	
S08	0.65	0.68	0.58	0.59	0.80	0.82	0.77	0.79	0.61	0.62	0.67	0.62	0.57	0.63	0.65	0.59	
S09	0.53	0.52	0.52	0.50	0.63	0.75	0.66	0.63	0.64	0.72	0.67	0.62	0.73	0.78	0.74	0.71	
S010	0.60	0.61	0.56	0.57	0.60	0.77	0.55	0.59	0.70	0.69	0.69	0.68	0.67	0.68	0.64	0.65	
S011	0.44	0.41	0.40	0.39	0.66	0.63	0.60	0.61	0.59	0.67	0.56	0.57	0.51	0.55	0.50	0.48	
S012	0.68	0.75	0.64	0.63	0.65	0.85	0.64	0.64	0.65	0.76	0.65	0.67	0.60	0.76	0.61	0.61	
S013	0.62	0.65	0.59	0.59	0.64	0.70	0.60	0.62	0.58	0.70	0.55	0.58	0.65	0.70	0.61	0.63	
S015	0.51	0.66	0.46	0.46	0.66	0.79	0.61	0.65	0.55	0.64	0.54	0.54	0.53	0.65	0.50	0.51	
S017	0.60	0.60	0.56	0.57	0.62	0.67	0.69	0.66	0.57	0.59	0.56	0.56	0.66	0.69	0.67	0.66	
S018	0.58	0.60	0.59	0.58	0.54	0.61	0.55	0.54	0.61	0.63	0.60	0.61	0.60	0.66	0.60	0.61	
S019	0.65	0.79	0.61	0.64	0.69	0.77	0.65	0.67	0.63	0.63	0.62	0.63	0.73	0.74	0.72	0.72	
S020	0.65	0.67	0.66	0.66	0.69	0.76	0.67	0.70	0.63	0.66	0.62	0.62	0.73	0.83	0.69	0.71	
S021	0.56	0.63	0.54	0.55	0.72	0.77	0.70	0.71	0.75	0.74	0.74	0.74	0.71	0.71	0.70	0.70	
S022	0.55	0.63	0.60	0.55	0.65	0.70	0.67	0.65	0.71	0.76	0.71	0.69	0.75	0.78	0.76	0.74	
S023	0.66	0.68	0.67	0.67	0.64	0.73	0.59	0.59	0.65	0.70	0.63	0.65	0.62	0.72	0.58	0.58	
Avg±sd	0.58±0.08	0.63±0.09	0.57±0.08	0.57±0.08	0.65±0.07	0.73±0.06	0.64±0.06	0.64±0.06	0.65±0.07	0.69±0.07	0.65±0.07	0.64±0.07	0.65±0.07	0.71±0.07	0.65±0.08	0.65±0.07	

Supplementary Table 4: Performance metrics for four models on a dataset with three phases, using rolling window technique and leave-one-subject-out dataset splitting. Acc= accuracy, DTree= decision tree, LRegression= logistic regression, Prec= precision, Rec= recall, RForest= random forest, SVM= support vector machine.

Subject	DTree				RForest				LRegression				SVM			
	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1	Acc	Prec	Rec	F1
S02	0.48	0.30	0.36	0.32	0.50	0.47	0.38	0.36	0.55	0.55	0.54	0.53	0.54	0.55	0.55	0.53
S03	0.58	0.39	0.53	0.45	0.42	0.49	0.50	0.39	0.64	0.69	0.65	0.66	0.60	0.67	0.62	0.63
S06	0.45	0.75	0.45	0.37	0.62	0.68	0.61	0.62	0.53	0.55	0.54	0.53	0.58	0.59	0.59	0.58
S07	0.66	0.70	0.59	0.59	0.82	0.85	0.77	0.78	0.76	0.76	0.78	0.76	0.72	0.71	0.73	0.71
S08	0.51	0.48	0.49	0.48	0.67	0.63	0.60	0.61	0.63	0.61	0.64	0.62	0.67	0.64	0.66	0.64
S09	0.39	0.13	0.33	0.19	0.70	0.76	0.69	0.70	0.67	0.67	0.68	0.67	0.69	0.69	0.71	0.69
S010	0.54	0.27	0.36	0.29	0.65	0.63	0.60	0.61	0.60	0.58	0.61	0.59	0.57	0.55	0.57	0.55
S011	0.28	0.32	0.33	0.27	0.44	0.36	0.39	0.36	0.43	0.51	0.44	0.40	0.36	0.39	0.35	0.32
S012	0.41	0.25	0.39	0.27	0.49	0.71	0.46	0.42	0.50	0.70	0.49	0.47	0.50	0.69	0.50	0.47
S013	0.38	0.39	0.37	0.37	0.48	0.39	0.39	0.34	0.56	0.53	0.49	0.48	0.52	0.49	0.44	0.40
S015	0.54	0.35	0.38	0.31	0.62	0.78	0.48	0.48	0.63	0.83	0.50	0.49	0.62	0.86	0.48	0.47
S017	0.51	0.46	0.50	0.47	0.70	0.68	0.56	0.59	0.62	0.73	0.45	0.42	0.61	0.54	0.44	0.41
S018	0.46	0.31	0.38	0.32	0.44	0.15	0.33	0.20	0.46	0.52	0.37	0.32	0.47	0.56	0.39	0.35
S019	0.49	0.46	0.49	0.42	0.54	0.57	0.61	0.55	0.68	0.66	0.65	0.66	0.66	0.64	0.63	0.63
S020	0.49	0.62	0.39	0.35	0.61	0.85	0.52	0.51	0.60	0.72	0.50	0.50	0.60	0.75	0.50	0.48
S021	0.52	0.38	0.38	0.32	0.58	0.61	0.51	0.53	0.68	0.65	0.64	0.65	0.70	0.67	0.67	0.67
S022	0.55	0.35	0.46	0.40	0.53	0.36	0.38	0.32	0.70	0.75	0.64	0.65	0.65	0.66	0.60	0.60
S023	0.49	0.66	0.41	0.34	0.57	0.83	0.50	0.49	0.68	0.71	0.65	0.66	0.70	0.75	0.67	0.68
Avg±sd	0.49±0.08	0.42±0.17	0.42±0.07	0.36±0.09	0.58±0.11	0.60±0.20	0.52±0.12	0.49±0.15	0.61±0.09	0.65±0.09	0.57±0.10	0.56±0.12	0.60±0.09	0.63±0.11	0.56±0.11	0.55±0.12



Supplementary Figure 1: Bar plot showcasing feature importance scores derived from the random forest model. The plot highlights the top 30 features, initially extracted from TEMP, HR, IBI, and EDA phasic components, ranked by their contribution to the model's classification performance. Features with higher scores indicate greater relevance to menstrual phase identification. It is important to note that this figure does not represent the features used to train the classifiers. Instead, Python's SelectKBest with the F-statistic function was employed to independently identify features most correlated with the target variable, ensuring a clear separation from the classifier evaluation process.