SUPPLEMENTARY MATERIAL

Table I delineates the detailed structural parameters of our THFT-GCNet method when applied to the PhysioNet dataset. Specifically, the input EEG data dimensions for the PhysioNet dataset are $32 \times 64 \times 200$, where 32 represents the batch size, 64 denotes the number of EEG channels, and 200 corresponds to the number of time samples. In contrast, for the LLM-BCImotion dataset, the input data dimensions are set to $32 \times 32 \times 400$. The architecture of THFT-GCNet is comprehensively detailed, employing the PyTorch framework.

TABLE I: THFT-GCN ARCHITECTURE AND NUMBER OF PARAMETERS.

Modual	Layer	Layer type	# filters	Size	Groups	Others	# params
EFTM	Learnable weight	linear	1	(7, 1)	-	-	7
EFTM	GCN_1	gcn	1	(200, 150)	-	-	30000
EFTM	GCN_2	gcn	1	(150, 100)	-	-	15000
HSTM	GCN_1	gcn	1	(200, 150)	-	-	30000
HSTM	GCN_2	gcn	1	(150, 100)	-	-	15000
STCM	Temporal	convolution	24	(1, 1)	1	-	24
STCM	Temporal	batchnorm	24	-	-	-	-
STCM	Temporal	convolution	24	(1, 16)	8	-	1152
STCM	Temporal	batchnorm	24	-	-	-	-
STCM	Temporal	gelu	-	-	-	-	-
STCM	Temporal	dropout	-	p=0.3	-	-	-
STCM	Depth	pooling	-	(1, 485)	-	-	-
STCM	Depth	transpose	-	-	-	-	-
STCM	Depth	convolution	1	(7, 1)	-	padding=3, bias=True	8
STCM	Depth	softmax	-	-	-	-	-
STCM	Depth	transpose	-	-	-	-	-
STCM	Spatial	convolution	8	(1, 1)	1	-	8
STCM	Spatial	batchnorm	8	-	-	-	-
STCM	Spatial	convolution	8	(64, 1)	8	-	512
STCM	Spatial	batchnorm	8	-	-	-	-
STCM	Spatial	gelu	-	-	-	-	-
STCM	Spatial	dropout	-	p=0.3	-	-	-
-	Classifier	linear	1	(5480, 4)	-	-	21924
-	Classifier	softmax	-	-	-	-	-

Tables II and III present detailed within-subject performance for all evaluated methods on the PhysioNet and LLM-BCImotion datasets, respectively. The results demonstrate that THFT-GCNet consistently achieved the highest classification accuracy across nearly all subjects. This consistent superiority across different subjects signifies THFT-GCNet's robustness and adaptability in discerning and classifying MI-related EEG patterns.

TABLE II: THE DETAIL WITHIN-SUBJECT PERFORMANCE OF ALL METHODS ON THE PHYSIONET DATASET.

Subject	FBCSP+SVM	FBCSP+KNN	ShallowNet	EEGNet	LMDA-Net	T3SFNet	THFT-GCNet
S1	62.00%	57.89%	67.67%	53.71%	72.67%	74.33%	81.33%
S2	52.43%	56.15%	66.33%	62.00%	65.33%	71.33%	93.67%
S3	50.14%	62.06%	76.00%	63.14%	79.67%	64.67%	94.67%
S4	50.57%	64.83%	64.67%	55.00%	75.00%	71.33%	96.67%
S5	43.86%	56.15%	73.33%	55.14%	73.33%	66.33%	83.67%
S6	50.57%	51.64%	65.00%	60.14%	66.67%	70.67%	86.33%
S7	50.43%	66.57%	66.33%	70.71%	80.33%	65.00%	93.67%
S8	58.14%	65.18%	58.33%	45.00%	76.00%	65.33%	92.67%
S9	54.57%	48.17%	69.33%	64.86%	75.00%	78.67%	90.00%
S10	53.00%	58.58%	58.67%	58.43%	48.00%	70.33%	83.33%
S11	53.86%	58.93%	53.00%	50.00%	72.67%	55.00%	92.00%
S12	40.86%	57.89%	64.00%	59.00%	74.00%	75.00%	87.00%
S13	51.14%	44.00%	61.33%	57.71%	62.33%	67.67%	92.67%
S14	52.00%	49.56%	60.00%	61.43%	66.00%	72.67%	86.33%

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Subject	FBCSP+SVM	FBCSP+KNN	ShallowNet	EEGNet	LMDA-Net	T3SFNet	THFT-GCNet
S15	52.71%	50.60%	62.33%	77.29%	71.33%	72.67%	90.33%
S16	46.14%	48.51%	66.33%	45.29%	67.33%	65.33%	86.00%
S17	45.86%	54.76%	66.67%	50.71%	63.00%	62.67%	83.00%
S18	55.00%	47.82%	67.00%	59.71%	65.33%	71.00%	79.67%
S19	45.43%	48.51%	54.00%	61.29%	51.67%	56.00%	83.67%
S20	46.43%	39.14%	65.67%	52.57%	66.33%	76.33%	90.00%
S21	48.14%	54.42%	58.33%	68.14%	64.67%	72.00%	94.33%
S22	43.43%	41.22%	67.00%	70.14%	55.33%	70.00%	87.00%
S23	47.71%	41.22%	63.67%	55.71%	42.67%	66.67%	83.67%
S24	55.57%	62.06%	70.67%	64.57%	60.00%	65.00%	79.67%
S25	47.00%	47.82%	56.00%	50.57%	69.00%	51.00%	93.67%
S26	64.71%	67.26%	77.00%	51.00%	75.00%	68.67%	96.67%
S27	54.57%	53.38%	61.33%	53.43%	64.67%	66.33%	90.00%
S28	52.43%	50.25%	67.00%	49.00%	56.00%	67.00%	78.00%
S29	63.29%	73.51%	64.00%	60.29%	92.00%	76.33%	96.67%
S30	51.14%	49.56%	69.00%	63.29%	53.33%	59.33%	76.33%
S31	48.71%	59.28%	66.00%	60.00%	68.33%	58.67%	85.00%
S32	59.57%	55.11%	78.00%	62.00%	68.00%	69.67%	87.67%
S33	61.14%	65.88%	75.67%	62.29%	81.67%	77.33%	99.67%
S34	52.57%	61.71%	72.33%	56.86%	76.00%	75.00%	93.33%
S35	72.57%	59.63%	63.33%	84.86%	77.33%	71.00%	86.33%
S36	45.29%	53.03%	63.67%	71.29%	51.00%	56.33%	83.00%
S37	51.71%	46.43%	57.00%	51.29%	58.33%	66.67%	87.00%
S38	44.86%	55.81%	60.00%	53.00%	66.67%	69.67%	88.00%
S39	48.29%	36.01%	55.00%	43.86%	53.33%	58.33%	84.67%
S40	48.29%	53.03%	61.67%	51.71%	61.33%	67.33%	97.33%
S41	59.00%	60.67%	72.33%	50.57%	79.00%	66.67%	78.33%
S42	65.57%	60.67%	70.67%	59.00%	64.33%	66.67%	96.33%
S43	50.43%	50.25%	50.00%	61.00%	55.67%	63.67%	87.67%
S44	62.14%	51.99%	66.67%	58.86%	73.67%	71.33%	88.67%
S45	54.71%	72.47%	72.67%	72.14%	68.00%	65.00%	83.00%
S46	57.43%	48.51%	71.33%	54.14%	68.00%	76.33%	79.67%
S47	46.00%	55.46%	65.00%	55.57%	83.33%	61.33%	85.00%
S48	55.71%	60.67%	52.00%	66.00%	64.67%	57.00%	90.67%
S49	53.86%	61.01%	75.33%	67.29%	76.67%	67.67%	98.33%
S50	54.71%	54.42%	76.33%	56.00%	73.67%	73.33%	92.00%
S51	47.14%	55.81%	56.33%	56.14%	50.33%	70.33%	82.33%
S52	44.00%	52.33%	56.33%	45.00%	58.00%	61.00%	95.00%
S53	59.00%	55.11%	81.33%	70.43%	77.00%	68.33%	98.00%
S54	56.29%	58.93%	71.33%	74.00%	68.67%	78.33%	92.33%
S55	48.86%	59.97%	77.33%	66.00%	70.00%	64.00%	90.33%
S56	62.57%	60.32%	62.33%	75.43%	85.33%	75.00%	97.67%
S57	54.00%	50.94%	64.33%	59.71%	52.67%	64.33%	85.33%
S58	62.00%	50.25%	67.67%	67.43%	60.33%	68.00%	96.67%
S59	44.57%	41.92%	51.33%	42.14%	42.67%	78.33%	73.33%
S60	52.71%	53.38%	74.67%	43.86%	74.00%	62.33%	97.33%
S61	57.29%	57.19%	61.67%	57.00%	63.67%	53.00%	90.00%
S62	60.86%	61.01%	60.33%	53.71%	70.33%	73.33%	91.67%
S63	54.14%	57.19%	76.67%	55.57%	69.67%	73.67%	89.67%
S64	42.57%	59.28%	66.33%	62.00%	60.33%	75.00%	80.00%
S65	52.29%	44.00%	59.00%	60.00%	69.33%	68.33%	96.00%
S66	47.86%	49.90%	60.33%	66.86%	57.67%	48.33%	83.00%
S67	48.57%	62.40%	65.67%	64.43%	74.33%	72.67%	89.67%
S68	54.14%	65.53%	68.00%	43.57%	67.67%	73.67%	89.00%
S69	48.14%	53.72%	58.33%	59.43%	50.00%	43.67%	88.00%

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Subject	FBCSP+SVM	FBCSP+KNN	ShallowNet	EEGNet	LMDA-Net	T3SFNet	THFT-GCNet
S70	53.86%	70.39%	65.67%	69.29%	68.33%	64.33%	84.33%
S71	49.71%	60.67%	60.67%	50.71%	56.67%	64.00%	88.33%
S72	72.71%	74.56%	73.67%	48.43%	76.00%	73.67%	91.67%
S73	51.57%	53.38%	61.33%	54.43%	44.33%	73.33%	90.67%
S74	52.29%	50.25%	63.33%	55.14%	53.67%	64.00%	75.33%
S75	45.29%	47.13%	56.33%	56.14%	65.00%	63.67%	79.00%
S76	43.29%	59.97%	49.67%	55.71%	58.33%	55.67%	79.00%
S77	48.00%	44.00%	57.67%	56.00%	59.00%	59.67%	89.00%
S78	53.14%	54.42%	69.00%	51.43%	68.33%	59.33%	83.00%
S79	55.00%	51.29%	70.00%	50.57%	55.67%	65.33%	89.00%
S80	58.29%	48.17%	64.00%	60.00%	73.00%	69.67%	89.00%
S81	45.86%	48.86%	58.33%	66.14%	60.33%	79.00%	86.00%
S82	51.29%	59.97%	57.00%	50.57%	58.67%	74.33%	96.33%
S83	55.29%	47.47%	63.00%	51.43%	53.33%	54.67%	73.00%
S84	57.14%	50.94%	57.33%	41.29%	58.33%	80.67%	87.33%
S85	60.71%	56.85%	62.67%	53.43%	66.00%	60.33%	94.33%
S86	59.29%	49.21%	68.67%	60.43%	76.00%	60.33%	94.00%
S87	47.86%	51.99%	61.33%	49.57%	65.00%	68.00%	96.00%
S88	58.00%	48.86%	68.67%	68.86%	71.33%	62.67%	86.00%
S89	61.14%	61.36%	65.33%	77.00%	75.00%	78.67%	95.33%
S90	58.29%	59.97%	67.00%	56.00%	61.33%	61.00%	88.00%
S91	52.57%	50.60%	65.00%	60.86%	63.00%	57.67%	92.00%
S92	60.00%	63.10%	70.33%	53.86%	61.67%	65.00%	86.67%
S93	47.86%	42.26%	48.67%	70.29%	67.00%	65.67%	88.00%
S94	50.29%	49.21%	67.33%	66.71%	56.33%	65.67%	90.67%
S95	58.00%	70.04%	64.00%	60.57%	72.00%	68.67%	93.67%
S96	46.43%	59.28%	58.33%	60.71%	59.67%	79.33%	85.00%
S97	58.14%	59.28%	64.67%	70.29%	74.00%	60.67%	87.67%
S98	51.14%	51.99%	54.67%	60.14%	65.00%	71.00%	90.67%
S99	52.71%	48.51%	72.00%	43.00%	69.33%	60.33%	92.00%
S100	49.00%	42.26%	54.33%	65.29%	56.00%	65.00%	84.33%
S101	45.29%	41.22%	55.67%	47.29%	64.67%	66.33%	92.00%
S102	46.14%	41.22%	51.00%	42.71%	50.00%	70.00%	82.33%
S103	60.00%	42.96%	51.67%	48.29%	51.67%	69.67%	81.67%
S104	54.43%	51.99%	54.00%	66.71%	53.33%	63.33%	94.00%
ACC	**52.91%**	**54.45%**	**64.01%**	**58.36%**	**65.22%**	**66.98%**	**88.41%**
STD	**0.0623**	**0.0784**	**0.0717**	**0.0872**	**0.0962**	**0.0712**	**0.0594**

TABLE III: THE DETAIL WITHIN-SUBJECT PERFORMANCE OF ALL METHODS ON THE LLM-BCIMOTION DATASET.

Subject	FBCSP+SVM	FBCSP+KNN	ShallowNet	EEGNet	LMDA-Net	T3SFTNet	THFT-GCNet
S1	51.85%	55.56%	62.96%	50.00%	71.30%	77.78%	**87.96%**
S2	62.50%	61.11%	58.80%	66.67%	56.48%	83.33%	**78.70%**
S3	70.83%	63.89%	57.87%	72.22%	60.19%	77.77%	**75.00%**
S4	45.37%	48.61%	56.02%	61.11%	67.59%	77.78%	**82.41%**
S5	49.07%	47.69%	54.17%	61.11%	54.63%	66.67%	**82.87%**
S6	54.17%	56.48%	75.93%	77.78%	67.13%	77.78%	**89.81%**
S7	64.35%	61.11%	59.72%	83.33%	60.65%	83.33%	**79.63%**
S8	55.56%	61.11%	61.57%	66.67%	45.83%	77.78%	**84.72%**
S9	55.09%	50.46%	50.46%	72.22%	64.81%	72.22%	**85.65%**
S10	57.41%	53.24%	56.02%	61.11%	70.37%	66.67%	**81.48%**
ACC	**56.62%**	**55.93%**	**59.35%**	**67.22%**	**61.90%**	**76.11%**	**82.82%**
STD	**0.0683**	**0.0525**	**0.0620**	**0.0869**	**0.0722**	**0.0532**	**0.0401**