Supplementary Material

Accuracies reached using different machine learning methods

Young adults with good sleep quality vs older adults with bad sleep quality:

FineTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	63%	67%	73%	77%	78%
Max	83%	89%	86%	89%	92%

MediumTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	63%	67%	73%	77%	78%
Max	83%	89%	86%	89%	92%

CoarseTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	63%	67%	73%	77%	78%
Max	83%	89%	86%	89%	92%

LogisticRegression					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	62%	66%	72%	72%	75%
Max	81%	81%	89%	89%	97%

MediumGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	69%	69%	77%	79%	86%
Max	78%	83%	86%	89%	92%

CoarseGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	69%	69%	69%	69%	69%
Max	69%	69%	69%	69%	69%

FineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	55%	62%	69%	72%	80%
Max	69%	81%	86%	86%	92%

MediumKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	70%	72%	78%	82%	86%
Max	75%	83%	86%	89%	92%

LinearSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	67%	69%	76%	79%	85%
Max	78%	83%	83%	92%	89%

QuadraticSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	66%	75%	79%	84%
Max	75%	83%	86%	89%	94%

CubicSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	66%	70%	76%	81%
Max	75%	81%	83%	92%	94%

FineGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	69%	70%	70%	72%	70%
Max	78%	75%	78%	81%	75%

CoarseKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	69%	69%	69%	69%	69%
Max	69%	69%	69%	69%	69%

CosineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	70%	73%	80%	82%	85%
Max	75%	89%	89%	89%	92%

CubicKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	69%	72%	79%	81%	86%
Max	78%	86%	86%	89%	92%

WeightedKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	64%	68%	77%	81%	85%
Max	75%	83%	83%	92%	92%

Young bad vs old bad:

FineTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	62%	65%	69%	72%	76%
Max	84%	82%	87%	87%	92%

MediumTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	62%	65%	69%	72%	76%
Max	84%	82%	87%	87%	92%

CoarseTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	62%	65%	68%	73%	77%
Max	84%	82%	87%	87%	92%

LogisticRegression					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	63%	66%	68%	69%	74%
Max	79%	76%	84%	79%	84%

MediumGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	65%	66%	72%	72%	82%
Max	74%	76%	82%	84%	89%

CoarseGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	66%	66%	66%	66%	66%
Max	66%	68%	68%	66%	68%

FineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	53%	57%	67%	70%	78%
Max	74%	82%	82%	95%	87%

MediumKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	67%	71%	76%	77%	83%
Max	76%	79%	84%	87%	89%

LinearSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	67%	69%	74%	75%	82%
Max	76%	82%	84%	87%	89%

QuadraticSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	62%	68%	71%	81%
Max	84%	79%	89%	87%	92%

CubicSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	56%	58%	69%	73%	79%
Max	76%	79%	87%	87%	92%

FineGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	64%	66%	66%	66%	66%
Max	74%	71%	74%	74%	74%

CoarseKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	66%	66%	66%	66%	66%
Max	66%	66%	66%	66%	66%

CosineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	68%	72%	77%	78%	83%
Max	76%	87%	87%	89%	92%

CubicKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	67%	71%	76%	76%	82%
Max	79%	79%	87%	89%	87%

WeightedKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	61%	66%	72%	74%	82%
Max	79%	76%	84%	89%	89%

Young bad vs old good:

FineTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	53%	60%	73%	76%	72%
Max	91%	86%	95%	100%	95%

MediumTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	53%	60%	73%	76%	72%
Max	91%	86%	95%	100%	95%

CoarseTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	53%	60%	73%	76%	72%
Max	91%	86%	95%	100%	95%

LogisticRegression					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	63%	63%	64%	66%	70%
Max	86%	82%	100%	100%	100%

MediumGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	57%	58%	69%	78%	78%
Max	68%	77%	86%	95%	95%

CoarseGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	59%	59%	59%	59%
Max	59%	59%	59%	59%	59%

FineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	55%	57%	68%	68%	78%
Max	77%	82%	91%	95%	100%

MediumKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	60%	62%	75%	79%	80%
Max	82%	82%	91%	91%	91%

LinearSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	61%	69%	79%	78%
Max	86%	77%	86%	100%	95%

QuadraticSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	60%	66%	75%	79%
Max	77%	91%	86%	95%	100%

CubicSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	59%	67%	72%	78%
Max	82%	91%	86%	95%	100%

FineGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	58%	61%	61%	61%
Max	73%	68%	68%	77%	86%

CoarseKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	60%	62%	75%	79%	80%
Max	82%	82%	91%	91%	91%

CosineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	59%	77%	83%	78%
Max	77%	77%	86%	95%	91%

CubicKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	62%	75%	77%	80%
Max	77%	73%	91%	91%	95%

WeightedKNN					
Canais	Gamma	Beta	alpha	Theta	Delta
Mean	59%	62%	75%	77%	80%
Max	77%	73%	91%	91%	95%

Young good vs old good:

FineTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	57%	66%	67%	70%
Max	85%	85%	90%	90%	90%

MediumTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	57%	66%	67%	70%
Max	85%	85%	90%	90%	90%

CoarseTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	57%	66%	67%	70%
Max	85%	85%	90%	90%	90%

LogisticRegression					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	62%	61%	64%	65%
Max	90%	85%	85%	85%	95%

MediumGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	53%	68%	71%	76%
Max	80%	75%	80%	90%	95%

CoarseGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	55%	55%	55%	55%	55%
Max	55%	55%	55%	55%	55%

FineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	50%	56%	59%	63%	72%
Max	75%	85%	80%	95%	90%

MediumKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	57%	57%	72%	77%	80%
Max	75%	70%	85%	85%	90%

LinearSVM ★					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	56%	67%	70%	77%
Max	90%	70%	90%	90%	95%

QuadraticSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	62%	60%	63%	69%	75%
Max	90%	85%	85%	90%	95%

CubicSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	59%	60%	63%	70%	72%
Max	85%	85%	90%	85%	90%

FineGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	52%	50%	54%	55%	60%
Max	65%	65%	75%	75%	90%

CoarseKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	55%	55%	55%	55%	55%
Max	55%	55%	55%	55%	55%

CosineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	55%	56%	70%	77%	78%
Max	75%	75%	80%	85%	90%

CubicKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	56%	68%	73%	80%
Max	75%	80%	80%	90%	90%

WeightedKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	56%	52%	64%	73%	77%
Max	75%	75%	85%	85%	85%

Old good vs old bad:

FineTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	61%	61%	60%	63%	67%
Max	85%	79%	85%	85%	85%

MediumTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	61%	61%	60%	63%	67%
Max	85%	79%	85%	85%	85%

CoarseTree					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	61%	61%	60%	63%	68%
Max	85%	79%	85%	85%	85%

LogisticRegression					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	64%	63%	58%	61%	65%
Max	71%	71%	74%	71%	82%

MediumGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	74%	73%	73%	73%
Max	79%	79%	74%	74%	74%

CoarseGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	74%	74%	74%	74%
Max	74%	74%	74%	74%	74%

FineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	64%	63%	59%	59%	62%
Max	82%	82%	74%	76%	79%

MediumKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	73%	74%	73%	74%	74%
Max	76%	76%	76%	76%	79%

LinearSVM ★					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	72%	72%	72%	71%	71%
Max	85%	82%	74%	76%	79%

QuadraticSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	68%	67%	63%	65%	67%
Max	85%	85%	76%	79%	85%

CubicSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	64%	67%	60%	59%	65%
Max	85%	88%	74%	79%	79%

FineGuassianSVM					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	74%	73%	73%	73%
Max	79%	79%	74%	76%	74%

CoarseKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	74%	74%	74%	74%
Max	74%	74%	74%	74%	74%

CosineKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	73%	74%	74%	74%
Max	76%	74%	76%	76%	79%

CubicKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	74%	73%	73%	74%
Max	74%	74%	76%	74%	79%

WeightedKNN					
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	74%	74%	73%	73%	74%
Max	74%	74%	76%	74%	79%

Young good vs young bad:

	FineTree				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	47%	48%	49%	53%	49%
Max	71%	75%	71%	83%	79%

	MediumTree				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	47%	48%	49%	53%	49%
Max	71%	75%	71%	83%	79%

	CoarseTree				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	47%	48%	49%	53%	49%
Max	71%	75%	71%	83%	79%

	LogisticRegression				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	43%	50%	49%	47%	50%
Max	63%	75%	88%	71%	75%

	MediumGuassianSVM				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	50%	52%	47%	46%	48%
Max	63%	79%	63%	67%	58%

	CoarseGuassianSVM				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	54%	54%	54%	54%	54%
Max	54%	54%	54%	54%	54%

	FineKNN				
Canais	Gamma	Beta	alpha	Theta	Delta
Média	43%	48%	49%	47%	55%
Maximo	67%	88%	79%	71%	75%

	MediumKNN				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	57%	61%	56%	56%	59%
Max	75%	75%	75%	75%	71%

	LinearSVM				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	49%	53%	45%	44%	47%
Max	67%	75%	71%	75%	79%

	QuadraticSVM				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	43%	48%	49%	52%	56%
Max	71%	79%	75%	67%	75%

	CubicSVM				
Canais	Gamma	Beta	alpha	Theta	Delta
Média	46%	51%	49%	53%	55%
Maximo	67%	79%	71%	71%	71%

	FineGuassianSVM				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	48%	51%	51%	51%	51%
Max	71%	71%	75%	71%	67%

	CoarseKNN				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	54%	54%	54%	54%	54%
Max	54%	54%	54%	54%	54%

	CosineKNN				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	60%	58%	56%	54%	54%
Max	83%	79%	71%	71%	79%

	CubicKNN				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	58%	61%	56%	56%	61%
Max	75%	75%	75%	71%	75%

	WeightedKNN				
Channel	Gamma	Beta	alpha	Theta	Delta
Mean	47%	47%	46%	47%	51%
Max	67%	75%	63%	71%	67%

Regions that presented higher differences

EEG brain configuration changes in theta and delta subbands in young vs older adults				
Subband	**YG vs OB**	**YB vs OG**	**YB vs OB**	**YG vs OG**
Theta	D4	C4	B26	D19
	B2	**B16**	**A30**	
	A30	A19		
Delta	**B16**	C7	**B16**	D26
	A23	**A23**		
		A19		
		A15		

Note. Table 2 displays the channels that presented higher differences between the study groups in the theta and delta subbands. YG = Young Adults with Good Sleep Quality; OB = Older Adults with Bad sleep Quality; YB = Young Adults Bad Sleep Quality; OG = Older Adults Good sleep Quality; Highlighted *in blue* the most representative channels indicating bad sleep in ageing; Channels in *in green* indicate age related changes; *In orange* the channel related to bad sleep independently of age. Only the theta and delta subbands are displayed as they are the ones that showed greater accuracy levels. (See below a biosemi plot with the biosemi EEG channels' locations). In *black* changes due to age and / or sleep (difficult to disentangle).

Regions most affected when comparing the older groups	
Subband	**OG vs OB**
Gamma	A23
Beta	A23
Alpha	Several
Theta	A1
Delta	C29
	C7

Note. Table 3 displays the channels that presented higher differences between the study groups. OG = Older with Good Sleep Quality and the OB =Older with Bad Sleep Quality. In this table, all the subbands are displayed as accuracy levels are homogeneous across them.