

1 Tabelas de resultados

1.1 Resultados com a base ocluída

Antes de apresentar a acurácia de reconhecimento das técnicas baseadas em subespaço e subespaço para a tarefa de reconstrução é interessante apresentar-se a acurácia de reconhecimento do classificador após aplicação da imagem pura com oclusão. Mediante isso os resultados abaixo apresentam o comportamento da taxa de reconhecimento das bases mediante avaliação com os classificadores KNN, ELM e SVM.

Sumário

1	Tabelas de resultados	1
<i>1.1</i>	<i>Resultados com a base ocluída</i>	<i>1</i>
1.1.1	ELM nível 3	3
1.1.2	ELM nível 2	5
1.1.3	ELM nível 1	6
1.1.4	KNN nível 3	6
1.1.5	KNN nível 2	8
1.1.6	KNN nível 1	8
1.1.7	SVM nível 3	9
1.1.8	SVM nível 2	10
<i>1.2</i>	<i>Resultados de reconstrução com técnicas baseadas em subespaço</i>	<i>11</i>
1.2.1	ELM nível 3	11
1.2.2	ELM nível 2	19
1.2.3	ELM nível 1	27
1.2.4	KNN nível 3	35
1.2.5	KNN nível 2	39
1.2.6	KNN nível 1 falta	44
1.2.7	SVM nível 3 falta	44
1.2.8	SVM nível 2 falta	44
<i>1.3</i>	<i>Resultados de reconstrução com técnicas baseadas em modelo</i>	<i>44</i>
1.3.1	ELM nível 3	44
1.3.2	ELM nível 2	48

1.3.3	ELM nível 1 falta	52
1.3.4	KNN nível 3	52
1.3.5	KNN nível 2	53
1.3.6	KNN nível 1	54

1.1.1 ELM nível 3

Tabela 1 – Taxa de reconhecimento com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	40.99±2.02	39.53±2.98	37.55±1.53	37.68±1.74	40.00±3.34
	500	44.74±2.74	46.85±2.02	42.94±3.24	45.89±1.82	45.05±1.66
	1000	25.10±1.65	28.61±1.74	26.87±1.92	28.20±1.37	26.65±1.61
	2000	25.17±2.10	29.88±2.15	28.56±2.10	29.13±1.59	29.46±1.92
	4000	41.33±1.81	45.90±2.17	44.20±1.32	44.70±1.64	43.38±2.27

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	50.52±2.41	47.00±2.42	46.4±1.37	45.30±2.83	49.12±3.96
	500	53.62±3.58	55.02±2.49	52.12±4.75	55.2±1.67	54.85±3.29
	1000	30.97±2.72	34.32±3.00	32.52±2.34	34.375±1.96	32.22±2.84
	2000	30.22±3.39	34.82±3.23	33.62±3.09	35.075±2.05	35.22±2.28
	4000	46.67±2.65	50.45±2.95	49.75±2.19	50.75±2.02	48.47±2.55

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	39.83±2.30	38.81±4.20	32.08±3.85	34.13±2.99	39.20±5.01
	500	46.10±3.30	51.51±2.68	44.91±3.99	46.76±3.20	48.53±1.90
	1000	31.85±2.46	37.58±3.29	35.80±3.48	38.18±2.63	35.86±2.59
	2000	32.18±4.75	39.75±3.51	39.35±4.27	41.90±2.33	42.31±2.81
	4000	50.63±3.58	57.10±2.89	56.60±1.62	59.70±3.46	58.03±3.26

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	41.25±3.38	39.36±3.42	42.48±2.45	40.65±3.18	39.70±3.81
	500	42.43±4.09	41.38±3.60	40.75±3.85	44.21±1.44	40.15±2.88
	1000	17.66±2.45	18.96±1.71	18.65±2.68	17.93±2.89	16.93±1.52
	2000	17.33±2.09	19.38±1.82	18.00±2.71	16.31±2.44	16.31±1.78
	4000	30.73±2.10	33.16±2.87	31.66±3.27	29.65±2.12	28.63±2.74

Fonte: Jonas Mendonça Targino, 2018

Tabela 2 – Taxa de reconhecimento com ELM na base de dados Yale com oclusões

		Yale#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	77.33±14.12	70.66±12.64	63.33±13.78	67.33±14.55	68.00±10.32
	500	96.00±4.66	90.66±7.16	79.33±11.52	89.33±7.16	93.33±6.28
	1000	96.66±3.51	94.00±3.78	80.66±4.91	93.33±7.02	96.00±3.44
	2000	98.66±2.81	94.66±2.81	84.00±6.44	98.00±3.22	98.00±3.22
	4000	100.00±0.00	94.66±2.81	83.33±5.66	100.00±0.00	98.00±3.22

		Yale#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	57.33±10.03	47.33±14.21	58.00±14.41	44.00±9.53	52.66±15.53
	500	78.00±7.06	79.33±6.62	75.33±6.32	70.00±6.47	74.00±6.62
	1000	79.33±5.83	83.33±3.51	81.33±2.81	76.66±5.66	80.66±6.62
	2000	80.66±3.78	87.33±5.83	84.00±3.44	79.33±6.62	81.33±4.21
	4000	81.33±4.21	85.33±4.21	86.00±2.10	78.66±6.12	82.66±4.66

Fonte: Jonas Mendonça Targino, 2018

1.1.2 ELM nível 2

Tabela 3 – Taxa de reconhecimento da base ocluída com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	35.80±1.37	39.31±3.26	36.60±4.25	36.62±3.34	35.78±3.02
	500	45.23±1.42	47.04±2.66	47.05±2.29	44.78±2.87	45.71±1.86
	1000	34.23±1.95	34.86±1.84	34.08±1.75	33.77±2.39	33.47±2.01
	2000	37.20±1.35	40.60±1.43	39.15±1.74	37.60±2.30	40.25±1.57
	4000	56.51±1.80	59.80±2.29	59.02±1.20	57.78±2.20	58.33±1.59

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	43.07±1.28	46.02±3.53	43.82±4.44	43.60±2.94	43.02±3.03
	500	54.17±2.72	55.62±3.32	57.47±2.48	52.97±3.32	53.97±2.05
	1000	41.30±2.96	41.22±2.65	42.15±3.37	41.05±3.22	39.50±3.63
	2000	43.92±2.40	48.52±2.33	46.70±2.04	44.37±2.91	47.10±2.03
	4000	64.37±2.15	65.97±2.45	66.70±1.47	64.72±2.84	65.42±2.22

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	35.51±3.01	39.03±3.06	35.71±5.24	36.76±5.18	35.48±4.05
	500	42.85±3.19	43.71±2.96	42.78±3.34	43.20±4.84	44.85±3.80
	1000	33.36±2.83	36.18±1.75	33.18±2.33	36.23±2.64	36.33±2.97
	2000	38.78±1.16	42.91±1.94	41.31±2.41	42.56±3.32	44.01±2.29
	4000	58.93±3.18	63.65±2.58	60.06±1.47	62.68±3.06	63.70±1.89

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	36.10±1.99	39.60±4.52	37.48±7.32	36.48±2.73	36.08±3.40
	500	47.61±2.44	50.36±4.57	51.31±3.19	46.36±2.20	46.58±2.45
	1000	35.10±3.45	33.55±3.16	34.98±3.47	31.31±4.25	30.61±3.24
	2000	35.63±2.90	38.30±1.99	37.00±3.13	32.65±2.89	36.50±2.91
	4000	54.10±2.64	55.96±3.28	57.98±1.69	52.88±2.75	52.96±2.89

1.1.3 ELM nível 1

Tabela 4 – Taxa de reconhecimento da base ocluída com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	29.81±3.20	27.80±2.95	28.53±0.97	27.68±2.30	30.47±2.68
	500	37.60±2.07	35.40±2.08	36.20±2.83	36.17±4.28	37.45±2.28
	1000	28.16±1.27	27.00±1.94	27.65±2.01	28.38±1.27	27.50±1.84
	2000	35.20±3.36	35.50±1.71	35.28±3.09	34.78±3.73	35.29±2.04
	4000	54.79±1.90	53.39±2.66	55.46±3.43	54.80±2.34	54.16±2.52

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	35.52±4.22	33.20±3.55	34.27±1.98	33.27±2.85	36.32±2.36
	500	45.30±3.56	41.42±3.17	43.72±4.54	43.42±5.42	44.55±3.45
	1000	33.92±2.70	32.15±3.25	33.30±2.40	33.62±2.85	33.15±2.35
	2000	40.45±4.67	40.67±2.20	40.12±2.70	39.45±4.59	41.22±3.81
	4000	59.85±2.97	59.47±3.60	61.92±3.92	62.00±2.56	59.72±4.35

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	31.28±3.38	29.05±4.19	30.13±4.12	29.71±4.00	33.50±4.63
	500	36.95±1.56	34.30±2.93	37.28±3.23	37.60±3.69	37.88±2.23
	1000	27.78±2.17	27.05±3.37	28.08±3.73	28.55±2.81	29.58±2.77
	2000	35.65±3.72	37.68±2.42	36.68±4.69	37.03±4.85	37.25±2.37
	4000	56.21±2.45	54.68±3.89	57.58±4.62	56.38±2.75	57.45±3.44

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	28.35±4.14	26.56±4.14	26.93±3.90	25.65±5.27	27.45±4.34
	500	38.26±3.05	36.51±4.14	35.11±4.70	34.75±6.06	37.01±5.02
	1000	28.55±1.97	26.95±2.19	27.21±3.53	28.21±3.36	25.41±2.01
	2000	34.76±3.98	33.33±2.20	33.88±2.85	32.53±4.63	33.33±3.22
	4000	53.36±3.74	52.10±3.60	53.35±2.99	53.21±4.74	50.88±3.22

1.1.4 KNN nível 3

Tomando por base outra estratégia de classificação utilizou-se o KNN para analisar os resultados de taxa de identificação das imagens de faces parcialmente ocluídas.

Tabela 5 – Taxa de reconhecimento com KNN na base de dados AR com oclusões

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	42.83	44.25	42.50	39.50	40.25	43.25	43.75	42.00	41.25	42.50
	2	42.83	44.25	42.50	39.50	40.25	43.25	43.75	42.00	41.25	42.50
	4	41.58	43.00	41.92	38.00	38.67	43.25	43.75	42.00	41.25	42.50
	6	39.67	41.75	41.33	37.42	37.83	40.50	42.50	43.75	38.00	37.75
	8	39.33	40.83	40.67	35.92	37.25	41.25	42.50	41.75	35.50	37.75
	10	38.33	40.42	39.17	35.75	36.58	40.25	41.00	41.00	36.00	37.25

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	72.67	75.83	73.33	69.00	70.83	12.67	12.67	12.17	9.83	10.17
	2	72.67	75.83	73.33	69.00	70.83	12.67	12.67	12.17	9.83	10.17
	4	71.00	72.83	70.50	67.17	68.17	11.67	12.83	12.67	9.33	9.50
	6	68.17	70.83	70.33	65.67	66.17	11.00	12.83	12.83	9.17	9.83
	8	66.33	68.33	68.67	62.50	64.67	11.83	12.67	12.00	8.67	9.67
	10	65.17	68.50	67.33	62.33	63.17	11.67	12.67	11.83	9.00	9.33

Fonte: Jonas Mendonça Targino, 2018

Tabela 6 – Taxa de reconhecimento com KNN na base de dados Yale com oclusões

		Yale#1				
		db2	db4	sym3	sym4	sym5
K-vizinhos	1	100.00	100.00	100.00	93.33	100.00
	2	100.00	100.00	100.00	93.33	100.00
	4	100.00	93.33	100.00	100.00	100.00
	6	100.00	100.00	100.00	100.00	100.00
	8	93.33	93.33	100.00	100.00	100.00
	10	100.00	93.33	100.00	100.00	100.00

		Yale#2				
		db2	db4	sym3	sym4	sym5
K-vizinhos	1	46.67	53.33	46.67	26.67	26.67
	2	46.67	53.33	46.67	26.67	26.67
	4	46.67	40.00	46.67	33.33	33.33
	6	46.67	53.33	46.67	26.67	26.67
	8	53.33	53.33	53.33	26.67	26.67
	10	53.33	46.67	60.00	26.67	26.67

Fonte: Jonas Mendonça Targino, 2018

1.1.5 KNN nível 2

Tabela 7 – Taxa de reconhecimento da base ocluída com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	42.08	44.83	43.83	42.50	42.42	41.75	43.75	43.00	43.75	43.75
	2	42.08	44.83	43.83	42.50	42.42	41.75	43.75	43.00	43.75	43.75
	4	40.42	43.50	42.33	41.50	40.75	41.50	44.75	43.00	42.50	41.75
	6	39.83	42.42	42.17	40.25	40.08	40.75	43.25	43.00	41.50	41.00
	8	39.33	42.00	41.75	39.42	39.25	41.25	43.25	42.50	40.50	40.50
	10	38.67	41.00	40.75	38.92	39.00	41.00	42.00	41.50	40.50	39.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	72.17	76.17	73.00	74.17	74.00	12.00	13.50	14.67	10.83	10.83
	2	72.17	76.17	73.00	74.17	74.00	12.00	13.50	14.67	10.83	10.83
	4	69.83	74.67	71.33	72.83	71.33	11.00	12.33	13.33	10.17	10.17
	6	69.00	71.83	70.83	70.17	70.00	10.67	13.00	13.50	10.33	10.17
	8	67.83	71.33	69.00	68.00	67.50	10.83	12.67	14.50	10.83	11.00
	10	65.17	69.00	67.67	66.83	66.17	12.17	13.00	13.83	11.00	11.83

1.1.6 KNN nível 1

Tabela 8 – Taxa de reconhecimento da base ocluída com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	41.08	42.42	41.75	42.08	42.75	41.50	42.25	41.25	42.00	42.50
	2	41.08	42.42	41.75	42.08	42.75	41.50	42.25	41.25	42.00	42.50
	4	38.92	40.50	39.58	39.75	40.42	40.50	41.75	40.50	40.75	40.75
	6	37.92	39.58	39.25	38.83	39.58	39.25	41.75	40.50	41.00	41.25
	8	37.58	39.00	38.17	38.25	38.42	38.75	40.50	39.50	39.75	39.75
	10	36.92	38.83	38.00	37.58	38.17	38.25	40.75	39.00	39.25	39.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	70.33	71.17	70.67	71.67	73.00	11.83	13.67	12.83	12.50	12.50
	2	70.33	71.17	70.67	71.67	73.00	11.83	13.67	12.83	12.50	12.50
	4	67.17	69.17	67.83	68.33	69.83	10.67	11.83	11.33	11.17	11.00
	6	65.33	67.67	67.33	66.50	68.50	10.50	11.50	11.17	11.17	10.67
	8	63.67	65.83	64.33	65.00	65.17	11.50	12.17	12.00	11.50	11.67
	10	62.50	65.17	63.50	63.67	64.50	11.33	12.50	12.50	11.50	11.83

1.1.7 SVM nível 3

Tabela 9 – Taxa de reconhecimento da base ocluída com classificador SVM

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
Sigma	2E-03	58.67	60.50	59.50	54.08	54.25	65.25	64.00	65.75	55.50	56.00
	2E-04	58.83	59.17	58.50	54.25	53.67	66.25	66.75	65.25	59.00	58.50
	2E-05	58.25	58.92	57.50	53.17	51.67	66.50	65.00	64.75	59.00	57.75
	2E-06	57.25	61.08	58.83	54.42	54.25	66.00	69.50	66.75	63.00	63.25
	2E-07	54.00	56.75	55.67	52.08	51.50	62.75	65.25	62.50	58.00	57.00
	2E-08	54.58	56.33	55.67	51.58	51.67	63.25	64.75	62.50	58.00	57.00
	2E-09	50.25	52.83	52.50	49.25	49.25	60.00	62.00	60.75	56.25	56.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
Sigma	2E-03	89.17	92.00	91.50	92.17	92.83	71.50	64.33	67.67	48.50	48.83
	2E-04	86.33	89.50	87.50	87.83	88.00	67.17	63.83	65.67	52.83	52.17
	2E-05	85.67	86.83	86.50	84.83	85.00	63.83	60.33	61.50	53.00	51.67
	2E-06	85.00	88.17	86.33	85.83	86.67	69.17	61.00	63.67	51.67	49.83
	2E-07	82.83	84.50	83.17	83.17	84.67	69.00	60.00	62.50	49.50	47.67
	2E-08	82.33	84.67	83.50	82.83	84.33	68.67	59.33	63.00	49.17	47.50
	2E-09	79.33	83.83	79.00	81.33	80.00	59.67	55.33	54.83	46.83	42.67

1.1.8 SVM nível 2

Tabela 10 – Taxa de reconhecimento da base ocluída com classificador SVM

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
Sigma	2E-03	54.75	58.33	57.25	54.42	54.00	57.25	62.25	59.75	53.50	52.75
	2E-04	63.17	66.50	66.25	61.25	61.33	69.25	72.50	72.25	67.25	67.00
	2E-05	63.50	65.42	65.67	62.42	61.67	71.50	72.50	73.00	70.75	68.75
	2E-06	62.83	65.17	65.08	61.83	61.42	70.00	72.50	72.00	69.00	68.50
	2E-07	57.92	62.17	60.75	58.58	58.17	65.50	68.50	69.00	64.00	64.75
	2E-08	57.75	61.25	60.17	58.50	57.92	65.50	67.75	69.00	63.25	65.00
	2E-09	57.08	60.75	59.33	58.50	58.17	65.00	67.00	67.25	63.25	64.75

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
Sigma	2E-03	92.67	93.50	93.50	92.67	93.17	71.33	67.50	71.83	57.67	55.17
	2E-04	91.67	93.00	92.50	92.33	92.67	77.33	77.33	78.67	69.67	68.50
	2E-05	89.17	91.33	91.67	89.83	90.00	75.50	74.67	76.33	68.17	67.33
	2E-06	88.67	90.50	91.00	89.33	89.67	75.83	74.83	76.83	68.17	66.33
	2E-07	87.67	89.00	88.83	88.00	87.50	77.33	75.00	77.33	68.50	65.67
	2E-08	87.17	88.67	88.50	87.33	87.00	77.17	74.67	77.17	68.00	65.83
	2E-09	87.00	89.00	88.33	87.17	88.00	76.00	73.83	76.83	69.83	67.33

1.2 Resultados de reconstrução com técnicas baseadas em subespaço

1.2.1 ELM nível 3

Tabela 11 – Taxa de reconhecimento da técnica Asymmetrical PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	35.41±2.20	34.22±2.70	32.02±1.26	32.24±1.92	34.47±3.36
	500	39.11±3.04	41.70±2.05	37.35±3.37	40.87±2.28	39.70±2.38
	1000	21.85±1.55	24.20±1.63	23.04±1.77	25.17±1.00	23.60±1.48
	2000	21.26±2.32	25.16±2.24	25.20±2.00	25.56±1.54	26.25±1.86
	4000	35.68±1.55	40.91±2.17	39.45±1.16	40.45±1.88	39.10±2.02

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	43.57±2.88	41.62±3.26	39.42±1.66	39.10±3.46	42.70±3.82
	500	48.07±3.87	50.80±3.49	46.17±4.71	50.97±2.44	48.50±3.47
	1000	27.32±2.72	29.57±2.22	28.72±2.11	31.55±1.92	29.60±1.78
	2000	25.67±2.97	31.00±3.17	30.07±2.86	31.60±1.78	32.15±2.59
	4000	40.45±2.37	45.97±2.51	45.00±1.81	46.37±2.42	44.10±2.63

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	36.76±2.228	36.38±4.00	29.18±3.43	30.96±2.65	36.03±5.14
	500	43.08±4.2392	49.01±2.02	40.41±4.24	43.36±3.44	45.35±1.97
	1000	29.40±2.1662	34.00±3.55	31.66±2.86	35.76±2.54	33.83±1.92
	2000	29.06±4.576	35.78±2.78	35.73±3.69	38.30±2.57	39.66±3.26
	4000	46.21±3.373	53.36±2.95	53.08±2.05	55.75±3.30	54.45±2.08

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	34.06±2.93	32.06±3.34	34.86±2.99	33.51±3.36	32.91±3.31
	500	35.15±4.16	34.38±3.88	34.28±4.34	38.38±2.20	34.06±4.07
	1000	14.31±2.46	14.40±1.18	14.41±1.25	14.58±2.69	13.36±1.76
	2000	13.46±1.19	14.55±2.54	14.66±2.68	12.83±2.72	12.83±1.35
	4000	25.15±1.78	28.46±2.98	25.83±3.01	25.16±2.46	23.76±2.87

Tabela 12 – Taxa de reconhecimento da técnica Fast Recursive PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	70.80±0.96	69.55±1.19	69.47±1.19	68.26±1.11	68.25±1.32
	500	71.56±1.34	70.95±1.68	71.37±0.78	70.91±1.19	69.18±0.99
	1000	51.15±0.98	50.94±1.70	50.36±1.27	50.65±1.06	48.65±1.42
	2000	54.15±1.14	53.30±1.56	53.61±1.45	50.81±1.07	50.10±1.77
	4000	68.16±0.80	69.06±1.26	69.07±0.93	65.34±1.29	64.90±1.20

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	87.97±0.74	86.00±0.84	86.42±1.37	84.75±0.98	83.50±1.29
	500	85.52±0.74	83.90±1.79	85.72±0.98	83.27±0.75	82.07±0.87
	1000	64.82±1.38	63.87±1.55	63.62±1.74	63.97±1.48	61.57±1.14
	2000	68.22±2.57	66.70±1.53	65.85±1.06	63.37±1.53	62.25±2.33
	4000	79.70±1.34	79.15±1.40	80.10±1.29	76.15±0.93	76.00±0.95

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	78.28±1.15	77.66±1.38	77.38±1.90	76.28±1.76	76.35±1.82
	500	83.46±2.11	82.33±1.05	83.66±1.43	82.35±1.22	81.88±1.35
	1000	66.68±1.47	66.60±1.89	65.91±1.88	67.00±1.79	64.96±1.62
	2000	70.50±2.10	70.28±1.97	70.15±2.25	68.81±1.76	67.46±2.30
	4000	82.40±1.03	83.46±1.32	83.18±0.56	81.06±1.68	80.50±1.49

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	63.33±1.09	61.43±3.13	61.56±1.65	60.25±1.63	60.15±2.12
	500	59.66±1.34	59.56±3.18	59.08±1.36	59.48±1.48	56.48±1.59
	1000	35.61±1.03	35.28±1.72	34.81±1.91	34.31±1.88	32.35±1.73
	2000	37.80±1.77	36.33±1.71	37.08±1.75	32.81±1.46	32.73±2.04
	4000	53.93±1.46	54.66±1.49	54.96±1.56	49.61±1.33	49.31±1.55

Tabela 13 – Taxa de reconhecimento da técnica Fisherfaces com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	18.46±1.29	18.24±1.02	18.12±0.88	17.56±1.18	18.37±0.95
	500	14.37±0.87	14.69±1.40	15.50±1.10	15.63±0.94	14.61±1.12
	1000	7.23±0.87	7.60±1.02	7.37±0.48	8.40±1.10	7.103±1.06
	2000	6.67±1.46	7.11±0.81	7.25±0.70	7.00±1.03	6.80±0.89
	4000	9.93±1.40	10.70±1.34	11.57±1.26	11.15±1.23	10.73±0.79

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	24.10±2.49	23.70±1.52	22.52±1.74	22.55±1.63	24.25±1.69
	500	19.47±1.17	18.57±2.27	19.65±1.08	20.37±1.38	19.10±2.39
	1000	9.75±1.50	9.52±1.89	9.50±0.82	11.47±1.89	9.97±1.75
	2000	9.57±3.03	9.62±1.70	9.20±1.24	9.47±1.77	9.55±1.91
	4000	13.10±2.35	14.40±2.03	15.02±1.99	15.35±1.89	14.90±1.78

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	12.15±1.68	12.31±1.61	12.01±1.42	12.40±1.73	12.71±1.31
	500	9.06±1.29	10.13±1.90	9.66±1.40	10.28±1.17	9.96±0.92
	1000	5.10±1.33	5.70±1.26	5.65±0.73	6.53±0.75	5.13±0.94
	2000	4.30±1.46	4.81±0.79	5.00±0.90	5.86±1.17	5.25±0.60
	4000	4.96±0.94	6.80±1.42	5.85±1.16	6.91±1.21	6.30±1.26

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	24.78±1.23	24.16±1.41	24.23±1.55	22.73±1.44	24.03±1.55
	500	19.68±1.19	19.25±1.45	21.33±1.12	20.98±1.36	19.26±2.00
	1000	9.36±1.13	9.51±1.72	9.10±1.16	10.26±1.98	9.08±1.38
	2000	9.05±2.09	9.41±1.39	9.50±1.14	8.13±1.46	8.35±1.59
	4000	14.90±2.63	14.61±1.78	17.30±2.16	15.40±2.23	15.16±1.86

Tabela 14 – Taxa de reconhecimento da técnica Fast Robust PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	22.30±1.66	23.04±1.99	22.55±1.13	22.30±1.13	22.02±1.18
	500	19.96±2.14	20.61±1.66	21.05±1.93	21.15±2.18	21.43±1.67
	1000	12.20±1.47	14.10±1.68	14.28±1.87	14.50±0.90	14.68±1.21
	2000	13.95±1.41	14.91±1.48	14.97±1.83	15.22±1.22	15.81±1.36
	4000	20.40±1.80	20.94±1.55	21.24±1.23	21.79±1.68	22.30±1.31

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	25.10±2.40	25.85±3.48	24.75±2.23	24.65±1.55	24.02±2.28
	500	23.07±3.13	22.92±2.44	24.32±2.51	24.10±3.31	24.50±1.95
	1000	13.05±2.21	15.20±2.86	16.27±2.49	17.10±2.80	16.95±2.20
	2000	15.55±2.62	15.62±1.89	16.97±2.38	18.30±1.64	18.15±1.87
	4000	20.42±2.65	20.25±2.23	22.30±2.33	23.90±1.96	24.22±2.52

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	23.26±1.54	24.63±2.39	24.06±1.82	24.05±1.94	24.81±1.86
	500	22.63±1.61	22.65±1.95	23.48±2.18	24.40±2.91	25.35±2.77
	1000	15.76±2.62	18.16±2.40	18.63±3.29	19.66±1.28	20.41±1.84
	2000	17.20±1.80	19.41±2.25	19.65±2.70	20.30±2.77	21.56±2.68
	4000	22.55±3.29	24.21±2.56	24.26±1.45	26.31±2.15	28.16±2.50

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	21.35±2.43	21.45±2.22	21.05±1.88	20.55±2.15	19.23±1.48
	500	17.30±3.14	18.58±2.29	18.63±2.71	17.90±2.69	17.51±1.84
	1000	8.65±1.51	10.05±1.82	9.93±1.80	9.35±1.44	8.95±1.79
	2000	10.70±1.85	10.41±1.48	10.30±1.48	10.15±1.28	10.06±0.89
	4000	18.25±1.96	17.66±1.86	18.21±1.78	17.26±1.95	16.43±1.02

Tabela 15 – Taxa de reconhecimento da técnica Gappy PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	62.19±1.38	61.35±1.20	61.13±0.72	61.65±0.79	60.34±0.76
	500	58.94±1.18	58.75±1.31	59.81±0.86	59.08±1.26	56.54±1.40
	1000	42.43±0.91	41.43±1.45	41.77±1.07	40.87±0.69	38.90±1.15
	2000	45.66±0.99	44.67±1.72	45.01±1.13	42.40±1.25	41.47±0.97
	4000	59.60±1.30	59.21±1.56	59.18±1.21	56.47±1.17	55.73±1.35

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	80.40±0.92	77.67±1.72	78.22±1.69	77.35±1.19	75.82±1.22
	500	73.62±1.04	70.65±0.80	72.62±1.85	70.27±1.39	67.85±1.65
	1000	54.92±2.17	51.92±1.92	52.32±1.59	51.32±0.45	50.00±1.49
	2000	57.80±1.15	55.52±2.04	55.90±1.11	53.90±1.18	52.27±1.41
	4000	71.72±1.59	68.30±1.59	69.77±1.61	67.12±1.20	66.35±1.41

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	67.00±2.12	67.05±1.05	66.51±1.04	67.13±1.25	65.78±0.91
	500	67.63±1.87	67.11±1.33	68.53±1.53	67.03±1.33	65.70±1.71
	1000	53.70±1.65	53.85±1.83	53.98±1.51	53.96±1.90	51.73±1.55
	2000	58.98±0.81	58.25±2.14	58.58±1.96	56.86±1.54	55.53±1.53
	4000	71.05±1.60	71.31±1.70	70.50±1.63	69.03±1.54	68.46±1.48

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	57.38±1.45	55.66±2.43	55.75±1.89	56.18±1.88	54.90±1.17
	500	50.25±1.54	50.40±2.31	51.10±1.39	51.13±1.52	47.38±1.91
	1000	31.16±1.10	29.01±2.66	29.56±1.67	27.78±1.18	26.06±1.31
	2000	32.35±1.64	31.10±1.64	31.45±1.14	27.95±2.04	27.41±1.35
	4000	48.15±2.03	47.11±1.92	47.86±1.68	43.91±1.36	43.00±1.88

Tabela 16 – Taxa de reconhecimento da técnica PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	19.58±1.78	19.70±1.97	19.49±0.62	19.95±1.08	20.55±1.80
	500	16.81±1.54	18.23±1.75	17.84±1.59	19.25±1.29	17.47±2.15
	1000	9.35±1.19	9.40±0.68	9.39±1.27	10.14±1.09	9.15±0.72
	2000	9.43±0.97	10.50±1.77	10.28±1.13	9.85±1.69	9.34±1.38
	4000	14.78±1.79	15.79±0.99	15.24±1.26	13.84±1.47	14.03±0.70

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	23.15±3.10	22.97±2.77	22.97±1.56	23.72±2.13	25.27±2.74
	500	20.67±2.70	22.62±2.11	21.45±2.80	24.22±2.16	22.00±2.99
	1000	11.15±1.58	11.17±1.66	11.47±1.66	12.27±1.58	11.72±1.15
	2000	10.95±2.17	12.75±2.48	12.62±1.75	11.80±2.39	11.77±2.37
	4000	17.07±2.54	18.37±1.79	18.55±1.81	16.07±2.42	16.60±1.32

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	14.61±2.09	15.73±2.01	15.16±1.89	16.13±1.45	16.45±3.13
	500	13.53±2.15	14.23±1.62	14.91±1.77	14.93±1.60	14.73±3.20
	1000	8.81±1.13	9.11±1.67	9.05±1.79	10.40±0.84	9.86±1.05
	2000	9.03±1.61	10.08±1.90	10.48±0.91	10.81±2.32	10.15±2.00
	4000	13.93±2.06	14.65±1.30	14.15±1.58	14.55±1.99	14.51±1.15

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	24.55±2.37	23.66±2.87	23.81±2.37	23.78±2.05	24.66±2.58
	500	20.10±3.01	22.23±2.72	20.76±2.29	23.56±1.59	20.21±2.40
	1000	9.88±1.67	9.68±0.70	9.73±1.52	9.88±1.74	8.43±1.18
	2000	9.83±1.62	10.91±2.07	10.08±2.18	8.88±1.42	8.53±1.44
	4000	15.63±2.17	16.93±1.48	16.33±2.43	13.13±1.69	13.55±1.53

Tabela 17 – Taxa de reconhecimento da técnica Recursive PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	70.81±0.96	69.56±1.18	69.45±1.19	68.31±1.10	68.27±1.30
	500	71.61±1.36	71.00±1.72	71.39±0.79	70.95±1.11	69.17±0.96
	1000	51.20±1.03	50.95±1.66	50.40±1.28	50.70±1.02	48.70±1.41
	2000	54.20±1.12	53.32±1.51	53.65±1.47	50.88±1.06	50.18±1.73
	4000	68.14±0.78	69.10±1.25	69.10±0.97	65.45±1.37	64.95±1.24

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	87.97±0.74	86.05±0.80	86.42±1.35	84.85±0.93	83.50±1.30
	500	85.65±0.77	83.97±1.83	85.77±1.03	83.35±0.74	82.10±0.89
	1000	64.92±1.43	63.97±1.56	63.80±1.65	64.00±1.36	61.75±1.16
	2000	68.37±2.56	66.72±1.55	66.00±1.07	63.50±1.47	62.62±2.27
	4000	79.62±1.28	79.27±1.48	80.17±1.45	76.35±1.11	76.15±0.97

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	78.31±1.14	77.68±1.39	77.36±1.92	76.36±1.79	76.43±1.77
	500	83.50±2.08	82.43±0.93	83.70±1.42	82.41±1.12	81.91±1.31
	1000	66.75±1.44	66.61±1.94	65.96±1.91	67.08±1.77	64.98±1.58
	2000	70.58±2.06	70.31±1.92	70.25±2.29	68.90±1.73	67.56±2.28
	4000	82.43±1.10	83.51±1.30	83.23±0.58	81.21±1.76	80.58±1.50

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	63.31±1.12	61.45±3.12	61.55±1.65	60.26±1.67	60.11±2.13
	500	59.73±1.28	59.58±3.26	59.08±1.36	59.50±1.41	56.43±1.51
	1000	35.65±1.12	35.28±1.64	34.85±1.96	34.31±1.76	32.43±1.79
	2000	37.81±1.85	36.33±1.63	37.06±1.85	32.86±1.41	32.80±2.10
	4000	53.85±1.46	54.70±1.49	54.96±1.60	49.68±1.42	49.31±1.51

Tabela 18 – Taxa de reconhecimento da Representação Esparsa com Fast Recursive PCA na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	87.55±0.47	87.45±0.48	87.10±0.35	87.01±0.20	87.40±0.49
	500	87.86±0.46	88.05±0.20	87.62±0.27	87.71±0.23	87.96±0.38
	1000	85.33±0.39	85.86±0.49	85.40±0.32	85.00±0.73	85.41±0.70
	2000	86.28±0.41	86.44±0.33	86.20±0.59	85.71±0.47	86.40±0.44
	4000	88.74±0.41	88.73±0.40	89.02±0.21	88.30±0.33	88.42±0.22

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	93.70±0.51	93.32±0.50	93.62±0.39	93.50±0.39	93.35±0.41
	500	93.77±0.24	93.60±0.33	93.45±0.40	93.42±0.40	93.57±0.40
	1000	93.40±0.55	93.22±0.44	93.25±0.37	93.15±0.48	93.12±0.47
	2000	93.92±0.33	93.50±0.56	93.50±0.48	93.27±0.41	93.60±0.45
	4000	94.27±0.38	93.52±0.44	94.20±0.40	93.70±0.32	94.02±0.34

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.45±0.20	95.43±0.28	95.71±0.13	95.6±0.195	95.45±0.17
	500	95.38±0.15	95.43±0.25	95.43±0.16	95.55±0.23	95.40±0.31
	1000	95.33±0.27	95.31±0.29	95.40±0.29	95.31±0.22	95.23±0.36
	2000	95.48±0.30	95.31±0.40	95.53±0.21	95.53±0.46	95.55±0.33
	4000	95.93±0.21	95.45±0.23	96.05±0.24	95.90±0.27	95.61±0.20

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
	200	79.66±1.00	79.48±0.95	78.50±0.68	78.43±0.43	79.36±0.97
	500	80.35±0.90	80.66±0.42	79.81±0.52	79.88±0.52	80.53±0.61
	1000	75.33±0.81	76.41±0.85	75.40±0.56	74.68±1.45	75.60±1.31
	2000	77.08±0.90	77.56±0.66	76.88±1.10	75.90±0.89	77.26±0.82
	4000	81.55±0.76	82.01±0.66	82.00±0.39	80.70±0.58	81.23±0.52

Fonte: Jonas Mendonça Targino, 2018

1.2.2 ELM nível 2

Tabela 19 – Taxa de reconhecimento da técnica Asymmetrical PCA com ELM nos quatro grupos da base AR

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	30.51±1.36	34.45±3.34	31.22±4.30	31.80±2.94	30.69±3.28
	500	40.15±1.56	40.88±2.66	40.48±2.59	39.94±3.07	40.72±2.38
	1000	31.73±2.49	32.34±1.67	32.12±1.38	31.06±2.91	31.42±1.61
	2000	34.99±2.03	37.00±2.09	36.52±1.47	35.39±2.05	37.30±1.37
	4000	49.96±2.35	53.68±2.46	52.05±1.79	51.71±2.78	53.08±2.02

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	36.55±1.21	40.75±4.12	37.87±5.20	38.12±2.86	37.22±3.64
	500	48.37±2.15	49.02±3.06	50.80±3.97	48.87±3.06	49.77±2.37
	1000	38.42±4.16	38.22±2.49	38.92±3.62	38.22±3.76	38.45±2.83
	2000	41.97±2.84	44.10±2.93	44.37±2.36	42.15±3.32	44.30±1.67
	4000	57.25±3.17	60.42±3.02	59.82±1.88	59.17±3.32	60.62±2.63

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	32.96±2.98	37.45±3.19	33.31±4.64	34.41±5.36	33.05±4.03
	500	41.36±3.59	41.41±3.52	40.06±2.18	41.45±4.92	42.70±3.61
	1000	33.78±3.40	36.36±1.67	34.10±3.03	35.43±2.75	35.86±2.28
	2000	38.36±1.71	41.71±1.78	40.81±2.72	41.31±3.30	42.61±2.60
	4000	55.58±2.58	60.30±3.43	57.08±2.06	58.48±3.20	59.26±2.91

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	28.06±1.87	31.46±4.79	29.13±6.66	29.20±2.49	28.33±4.02
	500	38.93±2.88	40.35±5.07	40.90±4.95	38.43±2.77	38.75±3.56
	1000	29.68±5.13	28.31±3.01	30.15±3.51	26.70±4.16	26.98±3.29
	2000	31.61±4.17	32.30±3.28	32.23±3.10	29.46±3.16	32.00±2.73
	4000	44.35±3.36	47.06±2.61	47.01±2.32	44.95±3.66	46.90±2.84

Tabela 20 – Taxa de reconhecimento da técnica PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	17.60±1.96	20.78±2.75	19.78±3.15	20.80±2.28	19.40±1.52
	500	18.86±1.06	20.00±1.94	20.13±2.99	19.78±1.61	18.99±1.71
	1000	15.40±1.40	14.20±1.71	14.60±1.94	14.07±1.52	13.76±1.56
	2000	14.68±2.11	16.10±1.59	15.98±0.94	15.25±1.47	15.28±1.58
	4000	18.80±1.48	20.58±1.22	20.55±1.18	19.96±1.55	19.85±1.19

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	20.15±3.16	25.17±4.56	24.05±4.36	25.57±3.44	23.22±2.87
	500	22.55±1.79	24.37±2.71	24.75±4.63	23.55±2.50	23.85±3.50
	1000	19.27±2.82	16.75±1.98	17.75±3.27	17.50±2.60	17.05±2.55
	2000	17.42±2.65	19.42±2.31	18.87±1.11	18.90±1.65	18.72±2.30
	4000	20.70±2.22	23.52±2.10	23.80±2.15	23.12±1.83	22.75±1.80

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	14.43±2.78	18.63±3.42	15.96±1.85	19.10±2.80	17.36±2.42
	500	15.46±2.27	15.73±2.51	15.13±2.20	16.28±1.15	15.46±2.28
	1000	14.36±2.13	12.95±3.01	12.28±2.57	13.10±2.25	12.23±1.65
	2000	12.80±3.10	13.85±2.76	13.68±1.99	14.73±2.73	13.08±1.67
	4000	15.88±2.19	17.51±2.35	15.98±1.44	17.45±1.86	16.30±1.36

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	20.76±2.49	22.93±3.40	23.60±5.03	22.50±2.49	21.43±1.93
	500	22.26±2.43	24.26±2.74	25.13±4.54	23.28±2.82	22.51±2.77
	1000	16.43±2.25	15.46±2.52	16.91±2.18	15.05±2.08	15.30±2.45
	2000	16.56±3.02	18.36±2.14	18.28±2.33	15.76±2.46	17.48±2.74
	4000	21.73±2.35	23.65±2.33	25.11±2.12	22.48±2.74	23.40±1.74

Tabela 21 – Taxa de reconhecimento da técnica Fisherfaces com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	17.02±1.67	18.43±1.19	18.36±1.83	18.51±1.99	16.95±1.37
	500	18.10±1.06	18.18±1.22	17.89±0.82	17.68±1.06	16.67±0.79
	1000	12.88±0.93	12.35±1.30	12.20±1.43	12.40±0.92	11.05±1.56
	2000	11.58±1.68	12.90±0.84	12.30±1.44	12.12±1.24	11.67±1.13
	4000	16.52±0.65	17.08±0.64	17.19±1.30	17.19±1.12	16.01±0.78

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	21.57±2.78	24.37±2.81	24.17±2.59	23.60±2.84	22.22±2.51
	500	23.50±1.97	22.97±1.32	23.10±1.48	22.90±1.50	21.45±1.19
	1000	16.17±1.59	16.70±2.00	16.82±2.66	16.42±1.92	14.35±2.26
	2000	14.65±2.05	17.07±1.50	16.80±2.21	16.32±1.60	15.12±2.54
	4000	21.65±1.19	22.40±1.07	22.77±1.63	23.32±1.61	21.22±1.67

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	9.85±2.09	12.03±1.51	11.41±2.12	13.20±1.51	10.95±1.90
	500	11.36±1.87	11.65±1.67	10.78±1.76	11.13±1.37	11.05±1.28
	1000	8.8±0.80	8.43±1.56	8.20±1.38	9.65±1.88	7.45±1.53
	2000	6.96±1.73	7.85±1.78	7.33±1.15	7.45±1.89	7.41±1.81
	4000	8.00±1.27	8.58±0.86	8.30±0.97	9.13±1.49	8.13±0.61

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	24.20±1.99	24.83±1.61	25.31±2.46	23.83±2.95	22.96±2.86
	500	24.85±1.28	24.71±1.96	25.00±1.89	24.23±2.05	22.30±1.74
	1000	16.96±1.43	16.28±1.33	16.21±1.76	15.16±2.14	14.65±3.06
	2000	16.20±2.44	17.96±0.94	17.28±2.66	16.80±2.10	15.93±1.79
	4000	25.05±1.18	25.58±0.75	26.08±2.36	25.25±1.60	23.90±1.48

Tabela 22 – Taxa de reconhecimento da técnica Fast Robust PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	23.64±1.21	24.04±1.65	24.75±0.81	23.79±2.58	23.65±2.44
	500	22.65±1.21	22.48±1.92	23.30±1.54	22.39±1.40	22.13±1.70
	1000	17.44±0.92	17.46±1.19	17.63±1.46	17.00±2.17	16.89±1.52
	2000	17.99±1.28	19.04±1.38	19.48±1.88	19.23±1.69	18.65±1.86
	4000	24.41±1.18	25.10±1.49	26.45±1.32	25.87±0.57	25.61±1.36

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	25.52±2.54	25.67±3.34	27.35±2.36	25.82±4.33	25.87±3.17
	500	25.52±1.99	24.82±3.18	25.72±1.93	25.17±1.98	25.05±2.90
	1000	21.22±1.67	20.77±2.14	20.52±1.55	20.27±3.54	20.05±1.67
	2000	21.17±1.88	20.00±2.40	21.77±2.59	22.37±3.36	21.12±3.21
	4000	26.92±1.33	24.90±2.39	27.70±2.17	28.10±1.56	27.05±2.25

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	25.70±1.85	26.93±2.26	26.61±1.91	25.91±2.51	27.21±2.81
	500	24.38±1.72	25.06±1.78	24.66±2.45	23.93±1.83	24.76±3.14
	1000	19.88±1.77	21.23±1.82	20.60±2.22	20.01±3.44	20.65±2.27
	2000	22.26±2.38	21.90±2.23	23.08±2.86	23.10±2.31	23.06±2.24
	4000	26.56±1.78	26.86±2.25	28.26±1.49	27.80±1.15	28.36±1.53

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	21.58±1.73	21.15±2.49	22.88±2.71	21.66±3.93	20.08±2.63
	500	20.93±2.35	19.90±2.81	21.95±2.35	20.85±1.80	19.50±1.84
	1000	15.00±1.76	13.70±2.12	14.66±1.87	13.98±2.15	13.13±1.25
	2000	13.71±2.61	16.18±2.42	15.88±1.92	15.36±1.44	14.23±2.61
	4000	22.26±1.20	23.33±1.61	24.63±2.15	23.95±1.80	22.86±2.40

Tabela 23 – Taxa de reconhecimento da técnica Gappy PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	59.16±0.83	60.15±1.53	60.58±1.90	59.26±1.03	58.75±2.10
	500	62.34±1.32	62.00±1.53	62.99±1.11	61.93±0.95	60.81±1.27
	1000	53.50±1.44	51.22±1.61	53.40±1.09	51.73±1.13	49.84±0.89
	2000	57.12±1.57	56.50±0.98	57.53±1.22	56.45±1.56	55.23±1.14
	4000	67.87±1.13	67.82±0.66	68.72±0.67	67.44±1.13	66.94±0.66

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	76.52±1.99	76.80±1.93	77.80±1.07	74.82±1.85	75.15±1.69
	500	78.55±1.26	77.32±1.41	78.05±1.05	76.42±1.15	75.32±1.53
	1000	67.40±2.01	64.75±2.16	66.90±2.13	64.92±1.15	62.80±1.63
	2000	71.30±1.35	69.82±1.44	70.87±1.41	68.82±1.80	68.17±1.57
	4000	80.22±1.10	78.52±1.07	79.47±0.78	78.22±1.21	77.87±0.84

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	65.08±2.42	65.78±1.71	66.28±1.80	65.31±0.96	65.21±2.41
	500	68.63±1.42	68.80±1.53	69.23±1.09	68.31±1.23	68.78±1.89
	1000	61.65±2.40	60.65±1.28	62.00±2.41	61.41±1.75	60.13±1.81
	2000	66.05±1.44	66.15±2.03	66.48±2.21	66.96±1.47	65.83±2.43
	4000	76.23±1.22	76.50±0.96	76.60±0.81	76.60±1.27	75.96±0.82

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	53.25±1.77	54.53±2.27	54.88±2.90	53.21±1.49	52.28±2.64
	500	56.05±1.84	55.20±1.94	56.75±2.24	55.55±2.00	52.85±1.71
	1000	45.36±1.76	41.80±2.58	44.80±1.79	42.05±1.73	39.55±1.15
	2000	48.20±2.94	46.85±1.56	48.58±1.50	45.93±1.93	44.63±1.38
	4000	59.51±1.69	59.15±1.01	60.85±0.92	58.28±1.52	57.91±0.88

Tabela 24 – Taxa de reconhecimento da técnica Fast Recursive PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	65.20±1.08	66.01±1.26	66.19±2.17	65.26±1.37	64.31±2.17
	500	74.01±1.26	74.01±1.71	75.17±1.03	73.50±0.99	72.29±0.76
	1000	63.81±1.47	62.20±1.56	62.99±0.85	63.05±1.10	61.36±1.27
	2000	68.23±0.94	68.19±1.34	68.76±1.16	66.92±1.39	67.16±1.13
	4000	81.05±0.81	81.58±0.66	81.85±0.55	80.96±0.81	80.70±0.76

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	82.65±1.39	82.10±2.00	82.40±1.24	81.40±2.57	81.27±1.63
	500	89.27±0.75	87.60±1.74	88.37±0.91	86.55±1.67	85.92±1.13
	1000	79.82±1.72	77.65±1.19	78.37±1.00	77.15±1.91	76.57±2.26
	2000	82.95±2.06	81.22±1.42	82.67±0.91	80.57±1.51	80.70±1.37
	4000	91.57±0.82	89.80±0.46	90.22±1.09	89.82±0.69	89.35±1.10

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	72.50±2.21	73.45±0.96	73.41±1.92	73.13±1.53	71.70±2.74
	500	82.23±1.19	82.00±1.29	82.53±1.17	81.83±1.45	80.75±1.24
	1000	74.26±1.59	73.30±1.37	73.10±1.60	74.83±1.96	73.68±1.97
	2000	78.86±1.15	79.50±1.38	80.25±1.53	80.06±1.17	79.21±1.68
	4000	89.33±0.84	89.76±0.83	89.71±0.72	89.63±0.80	89.36±0.77

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	57.91±1.67	58.58±2.27	58.96±4.00	57.40±1.81	56.93±2.44
	500	65.80±2.03	66.03±2.43	67.81±1.70	65.16±1.77	63.83±1.23
	1000	53.36±2.18	51.10±2.50	52.88±2.54	51.26±1.23	49.05±1.32
	2000	57.60±1.51	56.88±2.12	57.28±1.75	53.78±2.43	55.11±1.85
	4000	72.78±1.17	73.40±1.37	74.00±0.75	72.30±1.47	72.03±1.35

Tabela 25 – Taxa de reconhecimento da técnica Recursive PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	65.25±1.12	66.00±1.28	66.25±2.22	65.24±1.36	64.36±2.15
	500	74.01±1.29	74.06±1.67	75.15±1.05	73.55±0.96	72.36±0.73
	1000	63.82±1.52	62.20±1.60	62.97±0.83	63.05±1.13	61.37±1.33
	2000	68.22±0.96	68.21±1.32	68.75±1.15	66.93±1.36	67.20±1.09
	4000	81.09±0.78	81.59±0.64	81.87±0.54	81.01±0.76	80.70±0.77

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	82.75±1.29	82.10±1.87	82.55±1.32	81.45±2.57	81.32±1.52
	500	89.30±0.79	87.70±1.59	88.37±0.96	86.70±1.61	86.07±1.06
	1000	79.87±1.93	77.65±1.23	78.32±0.95	77.22±1.92	76.62±2.39
	2000	82.90±2.04	81.22±1.34	82.65±0.89	80.62±1.57	80.75±1.30
	4000	91.62±0.78	89.90±0.61	90.30±1.07	89.92±0.71	89.37±1.10

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	72.55±2.23	73.45±0.96	73.48±1.91	73.13±1.53	71.78±2.77
	500	82.28±1.21	82.05±1.25	82.50±1.15	81.91±1.50	80.86±1.23
	1000	74.28±1.61	73.33±1.35	73.10±1.55	74.86±1.94	73.76±2.03
	2000	78.86±1.15	79.51±1.38	80.28±1.50	80.10±1.23	79.36±1.74
	4000	89.36±0.84	89.76±0.86	89.73±0.71	89.61±0.82	89.40±0.79

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	57.95±1.67	58.55±2.30	59.03±4.07	57.35±1.75	56.95±2.38
	500	65.75±2.01	66.08±2.42	67.81±1.70	65.20±1.84	63.86±1.14
	1000	53.36±2.35	51.08±2.56	52.85±2.49	51.25±1.42	48.98±1.35
	2000	57.58±1.56	56.91±2.12	57.21±1.76	53.76±2.34	55.05±1.78
	4000	72.81±1.12	73.41±1.35	74.01±0.75	72.41±1.44	72.01±1.36

Tabela 26 – Taxa de reconhecimento da Representação Esparsa com Fast Recursive PCA na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	87.58±0.42	87.41±0.32	87.66±0.58	87.47±0.50	87.20±0.44
	500	89.10±0.46	88.88±0.24	89.13±0.54	88.75±0.48	88.78±0.38
	1000	87.11±0.39	87.25±0.68	87.46±0.64	87.42±0.53	87.25±0.61
	2000	88.21±0.35	88.45±0.38	88.39±0.50	88.12±0.54	88.23±0.35
	4000	89.83±0.21	89.85±0.23	89.88±0.26	89.72±0.19	89.52±0.16

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	93.52±0.34	93.35±0.48	93.62±0.24	93.05±0.48	93.25±0.39
	500	94.37±0.50	93.92±0.39	94.05±0.28	93.75±0.31	93.75±0.40
	1000	94.17±0.23	93.97±0.34	93.97±0.32	93.95±0.34	94.00±0.23
	2000	94.75±0.35	94.45±0.38	94.17±0.26	94.12±0.37	94.32±0.28
	4000	94.67±0.26	94.65±0.21	94.45±0.22	94.25±0.23	94.35±0.29

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.55±0.26	95.46±0.25	95.46±0.13	95.36±0.21	95.40±0.35
	500	95.70±0.23	95.56±0.21	95.70±0.17	95.58±0.25	95.61±0.28
	1000	95.58±0.18	95.51±0.18	95.43±0.23	95.61±0.34	95.58±0.22
	2000	95.83±0.24	95.78±0.26	95.58±0.25	95.83±0.27	95.78±0.19
	4000	95.88±0.11	95.96±0.17	95.78±0.15	95.96±0.13	96.01±0.12

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
	200	79.61±0.88	79.36±0.52	79.86±1.15	79.58±0.92	79.00±0.87
	500	82.50±0.85	82.20±0.42	82.56±1.18	81.93±0.96	81.95±0.77
	1000	78.65±0.75	78.98±1.32	79.50±1.23	79.23±1.00	78.91±1.17
	2000	80.60±0.65	81.13±0.70	81.20±1.11	80.41±1.08	80.68±0.69
	4000	83.78±0.41	83.73±0.45	83.98±0.49	83.48±0.39	83.03±0.28

Fonte: Jonas Mendonça Targino, 2018

1.2.3 ELM nível 1

Tabela 27 – Taxa de reconhecimento da técnica Asymmetrical PCA com ELM nos quatro grupos da base AR

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	25.40±2.96	23.37±2.64	24.20±1.58	23.91±1.80	26.30±2.63
	500	32.99±2.51	30.66±2.21	30.75±3.31	31.30±4.01	32.74±2.74
	1000	25.93±1.90	25.10±1.84	26.04±2.49	26.68±1.43	25.66±1.85
	2000	31.34±2.71	32.76±2.18	32.23±2.96	32.39±2.95	31.85±2.23
	4000	46.31±2.13	45.31±2.25	47.36±3.02	46.71±2.36	46.44±2.25

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	30.40±3.82	27.97±3.00	28.85±2.34	28.62±2.50	31.05±2.28
	500	39.97±4.13	35.92±3.37	36.90±4.53	37.92±5.35	38.92±3.84
	1000	31.25±2.18	30.65±2.35	31.17±2.76	31.85±2.61	31.32±1.57
	2000	36.60±4.22	38.17±3.01	37.50±4.10	37.17±3.86	37.55±3.92
	4000	52.00±3.63	51.05±3.49	53.75±3.92	53.42±3.12	52.62±3.19

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	29.21±3.24	26.86±4.36	28.75±3.99	28.78±4.58	31.93±5.23
	500	35.48±2.36	33.23±3.46	34.76±3.25	36.00±3.70	35.51±2.17
	1000	27.91±3.51	27.00±2.51	29.08±4.08	29.73±2.56	29.68±2.97
	2000	35.15±3.35	38.06±2.16	36.71±3.97	37.30±4.39	36.28±3.76
	4000	52.46±2.54	51.28±2.58	53.40±4.52	52.83±2.70	53.33±2.52

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	21.60±3.71	19.88±3.22	19.65±4.03	19.05±3.93	20.68±3.93
	500	30.50±3.74	28.10±4.57	26.75±5.73	26.60±5.50	29.96±5.52
	1000	23.95±1.48	23.20±3.06	23.00±3.55	23.63±3.25	21.65±2.17
	2000	27.53±3.94	27.46±3.75	27.75±3.97	27.48±4.32	27.41±2.09
	4000	40.16±4.15	39.35±4.33	41.33±2.95	40.60±4.78	39.55±3.20

Tabela 28 – Taxa de reconhecimento da técnica PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	17.40±2.03	15.80±2.05	16.32±1.74	16.45±1.20	17.58±1.91
	500	18.60±1.17	17.50±2.04	17.00±1.58	17.56±2.00	19.01±2.78
	1000	13.99±1.39	13.52±1.31	13.94±1.05	14.02±1.25	13.60±1.07
	2000	16.16±1.56	14.50±1.57	15.72±1.46	15.79±1.48	15.60±1.34
	4000	19.88±1.07	19.10±1.72	19.90±1.18	18.65±1.12	19.53±1.68

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	21.35±3.00	18.87±3.52	19.92±2.92	19.72±2.47	21.80±2.18
	500	22.90±2.14	21.02±2.84	20.35±2.06	21.70±2.64	23.27±4.58
	1000	17.50±2.56	16.87±2.01	16.50±1.98	17.75±2.45	16.65±1.36
	2000	19.25±2.80	17.22±2.53	18.90±2.29	18.92±2.00	18.85±2.19
	4000	22.95±1.88	21.57±2.55	22.72±2.39	21.17±1.65	22.85±2.47

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	16.71±3.23	15.66±3.30	15.88±1.73	16.73±2.84	18.00±2.81
	500	16.90±2.34	16.23±2.76	16.38±1.87	17.36±2.49	17.60±3.32
	1000	14.18±1.77	12.35±1.97	13.63±2.60	13.50±1.61	12.71±2.32
	2000	15.65±1.41	13.23±2.12	15.73±3.04	15.80±2.86	14.83±2.80
	4000	18.95±1.12	17.38±1.44	18.35±2.42	17.16±2.01	17.81±2.08

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	18.10±2.66	15.93±3.16	16.76±3.13	16.18±3.19	17.16±1.98
	500	20.31±1.85	18.78±4.47	17.61±3.99	17.76±3.30	20.43±4.09
	1000	13.80±1.71	14.70±2.23	14.25±1.83	14.55±2.54	14.48±1.92
	2000	16.68±2.59	15.78±2.33	15.71±1.97	15.78±1.96	16.38±1.79
	4000	20.81±2.45	20.81±2.66	21.46±2.52	20.15±2.09	21.25±2.62

Tabela 29 – Taxa de reconhecimento da técnica Fisherfaces com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	15.67±1.58	14.71±1.23	15.11±1.51	15.14±1.89	15.52±1.58
	500	15.72±1.70	15.68±0.90	15.53±1.31	16.30±1.27	15.85±1.20
	1000	10.99±1.02	10.88±1.07	10.98±1.19	10.84±1.25	10.59±1.31
	2000	12.23±1.43	11.57±1.82	12.95±0.94	12.61±1.06	12.25±1.54
	4000	17.44±1.01	16.93±1.08	17.44±1.09	17.00±1.16	16.56±1.39

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	20.05±1.81	19.20±1.40	19.12±3.05	19.22±1.92	20.22±2.41
	500	19.85±2.87	20.82±2.05	19.55±1.48	20.57±2.27	20.60±2.32
	1000	15.22±1.99	14.17±1.74	14.95±1.70	14.87±1.88	13.17±2.44
	2000	16.15±2.18	14.87±3.56	16.95±2.00	16.52±1.55	16.37±2.93
	4000	23.15±1.48	22.37±1.54	22.57±1.82	21.37±2.72	22.10±1.64

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	10.10±2.24	9.56±3.02	9.96±1.87	10.31±1.51	10.53±1.78
	500	10.43±2.19	9.18±1.09	8.66±1.34	10.48±1.24	10.75±1.51
	1000	7.60±1.12	7.73±1.70	7.38±2.14	7.80±1.40	8.13±2.26
	2000	8.23±1.20	7.21±1.61	8.33±2.00	8.76±1.55	8.71±2.41
	4000	9.30±1.22	8.88±1.02	9.28±1.51	9.48±1.18	9.18±1.06

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	21.25±1.99	19.86±2.30	20.26±2.23	19.96±3.71	20.51±2.65
	500	21.01±1.85	22.18±1.87	22.40±2.19	22.13±2.89	20.95±2.20
	1000	14.38±1.96	14.03±1.50	14.58±1.46	13.88±2.33	13.05±1.87
	2000	16.23±2.58	15.93±3.26	17.58±1.23	16.46±2.36	15.78±1.36
	4000	25.58±1.47	24.98±1.56	25.60±1.54	24.51±2.46	23.95±2.23

Tabela 30 – Taxa de reconhecimento da técnica Fast Robust PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	22.09±1.84	22.08±1.87	22.41±2.00	22.96±2.95	22.03±1.81
	500	21.61±1.55	21.94±1.54	21.53±2.27	23.50±0.93	21.89±1.04
	1000	16.81±1.23	16.37±0.56	16.13±1.63	15.92±1.99	15.90±1.55
	2000	19.13±1.95	19.75±1.49	18.20±0.99	19.53±0.85	19.40±1.68
	4000	25.99±1.64	25.83±1.25	26.03±2.00	26.92±1.72	26.55±1.62

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	25.17±2.80	24.37±2.70	24.10±2.83	25.87±3.77	24.47±2.63
	500	24.32±2.77	24.67±2.46	24.50±3.52	27.02±2.33	24.17±1.49
	1000	20.10±2.21	18.82±0.95	18.82±2.92	18.17±2.98	18.35±2.27
	2000	21.77±2.35	21.30±3.32	21.17±2.00	22.55±1.97	22.00±2.07
	4000	28.42±3.07	27.45±1.54	28.07±3.16	29.95±2.22	28.00±2.05

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	25.06±2.18	24.68±2.18	25.71±3.87	25.16±4.07	25.60±3.16
	500	23.93±2.03	24.35±2.21	23.63±2.39	26.81±2.12	25.83±2.39
	1000	20.41±1.96	19.23±1.29	19.45±2.56	18.98±2.92	19.63±2.79
	2000	23.01±2.70	23.58±1.56	21.41±1.60	22.36±1.67	23.01±2.36
	4000	28.56±1.79	27.65±1.71	27.58±2.85	28.38±2.34	29.05±2.13

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	19.11±2.65	19.48±2.64	19.11±2.91	20.76±3.09	18.46±3.01
	500	19.30±1.98	19.53±2.34	19.43±2.79	20.20±2.48	17.76±2.13
	1000	13.21±1.91	13.51±1.38	12.81±2.11	12.86±1.74	12.35±2.00
	2000	15.25±2.03	15.91±2.21	15.00±1.50	16.70±1.34	15.78±1.501
	4000	23.41±2.35	24.01±1.42	24.48±2.72	25.46±2.37	24.06±2.08

Tabela 31 – Taxa de reconhecimento da técnica Gappy PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	52.82±1.68	52.17±1.23	53.58±1.81	52.79±1.90	53.73±1.16
	500	58.00±1.17	57.95±1.50	57.67±1.35	58.50±1.36	58.25±1.54
	1000	49.97±1.10	50.32±1.82	49.95±1.95	50.15±1.24	49.84±1.20
	2000	57.14±0.97	57.37±1.04	56.89±1.53	56.71±1.55	56.59±0.96
	4000	67.80±0.84	67.99±0.95	67.86±0.97	67.77±0.96	67.76±1.33

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	70.12±2.12	69.10±1.86	69.55±2.08	70.00±2.81	69.87±2.19
	500	74.22±1.65	74.32±1.81	74.60±1.57	75.17±1.34	74.07±2.28
	1000	63.22±2.00	65.35±2.22	65.85±2.63	64.95±2.12	63.80±1.26
	2000	71.40±1.98	72.10±1.20	71.92±1.74	71.47±1.78	70.70±1.37
	4000	81.87±1.44	81.62±1.42	81.72±0.44	81.37±1.35	80.32±1.30

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	59.36±2.79	59.70±2.43	60.40±2.38	60.45±2.32	61.38±2.26
	500	65.65±2.30	65.98±2.14	65.58±1.19	67.68±1.41	66.53±1.85
	1000	59.08±1.94	59.33±2.06	59.28±2.47	59.51±2.03	60.21±1.66
	2000	66.88±1.78	68.06±1.16	66.63±2.60	67.31±2.15	66.80±0.91
	4000	77.21±0.93	77.68±1.12	77.31±0.69	77.25±1.46	76.86±1.82

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	46.28±2.56	44.65±2.94	46.76±2.69	45.13±2.15	46.08±1.52
	500	50.36±2.79	49.91±2.41	49.76±2.37	49.31±2.93	49.96±1.87
	1000	40.86±1.14	41.31±2.43	40.63±2.41	40.78±2.27	39.46±1.94
	2000	47.40±1.09	46.68±2.04	47.15±1.02	46.11±1.69	46.38±1.42
	4000	58.40±1.80	58.30±1.71	58.41±1.87	58.30±1.16	58.66±1.62

Tabela 32 – Taxa de reconhecimento da técnica Fast Recursive PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	56.77±1.73	54.98±1.22	56.85±1.57	55.75±2.29	56.94±1.16
	500	65.67±1.30	65.06±1.43	64.47±1.28	65.11±2.20	65.32±1.30
	1000	56.10±1.51	56.02±2.02	55.99±1.46	56.18±1.44	55.24±1.13
	2000	65.59±1.18	65.53±0.88	65.65±1.34	64.95±1.41	64.81±1.30
	4000	79.89±1.11	79.40±0.95	79.99±0.89	79.34±0.62	79.74±1.06

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	75.15±1.72	73.12±1.37	74.47±1.85	74.30±2.97	74.32±1.33
	500	81.77±1.36	80.75±1.41	81.35±1.97	81.25±1.26	80.90±1.61
	1000	71.32±1.52	72.25±1.67	72.35±1.96	71.70±1.61	70.75±1.82
	2000	79.85±1.51	79.92±1.54	80.10±1.78	79.32±1.36	79.02±1.52
	4000	90.07±0.85	89.52±1.14	90.42±1.09	89.60±0.92	89.60±0.74

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	64.56±2.45	62.51±1.99	64.68±2.86	64.58±2.45	65.71±1.77
	500	74.31±2.33	73.61±1.72	73.51±1.19	75.38±2.02	74.75±1.12
	1000	65.63±2.36	66.06±2.08	65.50±1.91	66.36±2.62	66.30±1.56
	2000	76.76±0.94	77.18±0.77	76.26±1.63	76.93±1.94	75.86±1.48
	4000	88.35±0.91	88.36±0.61	88.63±0.81	88.23±1.17	88.70±1.36

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	48.98±2.68	47.45±3.44	49.01±2.76	46.93±2.78	48.16±2.06
	500	57.03±2.15	56.51±2.50	55.43±2.17	54.85±4.01	55.90±1.92
	1000	46.58±1.27	45.98±2.58	46.48±2.33	46.00±2.23	44.18±1.43
	2000	54.41±2.31	53.88±1.97	55.05±2.65	52.96±1.74	53.76±1.65
	4000	71.43±2.16	70.43±2.09	71.35±1.99	70.45±1.34	70.78±1.65

Tabela 33 – Taxa de reconhecimento da técnica Recursive PCA com ELM na base de dados AR com oclusões

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	56.79±1.74	55.03±1.27	56.81±1.59	55.83±2.28	56.94±1.17
	500	65.70±1.24	65.17±1.38	64.55±1.29	65.15±2.22	65.33±1.31
	1000	56.19±1.51	56.06±2.02	56.03±1.44	56.20±1.42	55.20±1.11
	2000	65.56±1.25	65.55±0.88	65.70±1.38	64.94±1.41	64.85±1.34
	4000	79.92±1.15	79.43±0.97	79.96±0.82	79.30±0.63	79.78±1.10

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	75.12±1.80	73.17±1.53	74.40±1.89	74.52±2.99	74.32±1.38
	500	81.85±1.38	80.95±1.30	81.45±1.98	81.40±1.35	80.85±1.59
	1000	71.52±1.61	72.35±1.67	72.32±1.84	71.80±1.61	70.80±1.90
	2000	79.77±1.57	79.95±1.42	80.22±1.94	79.27±1.45	79.15±1.57
	4000	90.12±0.92	89.65±1.13	90.35±0.89	89.47±0.94	89.55±0.83

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	64.56±2.43	62.63±1.91	64.61±2.93	64.66±2.52	65.66±1.86
	500	74.36±2.31	73.71±1.68	73.60±1.26	75.43±2.00	74.80±1.15
	1000	65.66±2.30	66.08±2.00	65.56±1.84	66.38±2.58	66.33±1.54
	2000	76.75±0.91	77.25±0.75	76.30±1.60	76.93±1.93	75.98±1.53
	4000	88.40±0.86	88.40±0.56	88.65±0.83	88.21±1.16	88.76±1.37

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	49.01±2.72	47.43±3.51	49.01±2.69	47.00±2.69	48.21±2.03
	500	57.03±2.08	56.63±2.46	55.51±2.13	54.86±4.00	55.86±1.89
	1000	46.71±1.36	46.05±2.64	46.50±2.24	46.01±2.18	44.08±1.44
	2000	54.38±2.38	53.85±2.01	55.11±2.72	52.95±1.70	53.73±1.78
	4000	71.45±2.15	70.46±2.11	71.28±1.93	70.38±1.43	70.80±1.70

Tabela 34 – Taxa de reconhecimento da Representação Esparsa com Fast Recursive PCA na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	86.52±0.59	86.44±0.61	86.44±0.56	86.54±0.44	86.37±0.69
	500	88.34±0.53	88.18±0.59	88.40±0.42	88.35±0.45	88.05±0.34
	1000	86.52±0.51	86.97±0.46	86.79±0.43	87.02±0.64	86.51±0.49
	2000	88.32±0.44	88.53±0.34	88.39±0.30	88.50±0.41	88.33±0.41
	4000	89.75±0.25	89.86±0.21	89.83±0.18	89.85±0.26	89.60±0.22

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	93.47±0.49	93.47±0.47	93.22±0.53	93.35±0.41	93.07±0.28
	500	93.82±0.56	93.80±0.43	93.82±0.48	93.82±0.31	93.75±0.33
	1000	93.87±0.51	93.95±0.36	93.82±0.37	93.97±0.34	93.72±0.43
	2000	94.35±0.41	94.17±0.47	94.12±0.31	94.27±0.38	94.05±0.38
	4000	94.37±0.24	94.42±0.12	94.35±0.12	94.37±0.21	94.30±0.19

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.31±0.37	95.43±0.34	95.31±0.35	95.28±0.47	95.23±0.35
	500	95.41±0.30	95.46±0.13	95.68±0.34	95.61±0.29	95.51±0.28
	1000	95.35±0.26	95.41±0.41	95.23±0.33	95.50±0.29	95.38±0.53
	2000	95.63±0.15	95.70±0.21	95.73±0.19	95.81±0.19	95.68±0.24
	4000	95.91±0.14	95.88±0.13	95.98±0.09	95.96±0.07	95.88±0.13

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
cline2-7	200	77.73±0.95	77.45±1.08	77.56±0.93	77.80±0.58	77.51±1.16
	500	81.26±1.08	80.90±1.06	81.13±0.72	81.08±0.91	80.60±0.51
	1000	77.70±0.98	78.53±0.77	78.35±0.83	78.55±1.26	77.65±0.84
	2000	81.01±0.95	81.36±0.70	81.05±0.55	81.18±0.83	80.98±0.76
	4000	83.58±0.45	83.85±0.37	83.68±0.40	83.75±0.51	83.33±0.40

Fonte: Jonas Mendonça Targino, 2018

1.2.4 KNN nível 3

Tabela 35 – Taxa de reconhecimento com KNN na base AR com a técnica Fast Recursive PCA

K-vizinhos		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	53.08	47.83	50.17	42.17	41.42	56.00	50.50	52.00	42.50	42.75
	2	53.08	47.83	50.17	42.17	41.42	56.00	50.50	52.00	42.50	42.75
	4	51.42	47.33	48.42	41.08	40.58	55.25	49.50	49.50	40.75	41.75
	6	51.00	46.42	48.58	40.33	40.67	55.00	48.25	49.50	42.50	41.75
	8	50.00	44.83	48.17	39.50	39.17	55.25	47.00	49.00	41.75	41.75
	10	48.83	43.83	46.42	38.33	37.92	55.00	47.25	49.25	40.75	41.75

K-vizinhos		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	79.83	71.50	75.00	65.50	64.67	26.33	24.17	25.33	18.83	18.17
	2	79.83	71.50	75.00	65.50	64.67	26.33	24.17	25.33	18.83	18.17
	4	76.50	69.00	71.67	63.33	62.17	26.33	25.67	25.17	18.83	19.00
	6	76.83	68.00	72.00	62.00	61.50	25.17	24.83	25.17	18.67	19.83
	8	75.67	65.83	71.00	60.83	59.67	24.33	23.83	25.33	18.17	18.67
	10	72.67	63.33	67.83	58.33	56.83	25.00	24.33	25.00	18.33	19.00

Fonte: Jonas Mendonça Targino, 2018

Tabela 36 – Taxa de reconhecimento com KNN na base AR com a técnica Fisherfaces

K-vizinhos		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	8.17	5.83	6.17	5.00	4.92	8.50	5.25	6.50	5.25	5.50
	2	8.17	5.83	6.17	5.00	4.92	8.50	5.25	6.50	5.25	5.50
	4	8.50	5.83	6.67	5.17	5.25	8.75	5.75	6.50	5.75	6.25
	6	8.67	5.33	6.92	5.17	5.17	9.00	4.75	7.25	5.50	6.50
	8	9.08	5.58	7.00	5.08	4.92	9.50	5.00	7.25	6.00	6.75
	10	8.58	4.92	7.25	5.08	4.42	8.50	4.75	7.25	6.75	6.25

K-vizinhos		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	6.33	4.50	5.67	4.33	4.17	10.00	7.17	6.67	5.67	5.67
	2	6.33	4.50	5.67	4.33	4.17	10.00	7.17	6.67	5.67	5.67
	4	6.67	5.00	6.00	4.50	4.67	10.33	6.67	7.33	5.83	5.83
	6	7.17	4.67	6.00	4.33	4.33	10.17	6.00	7.83	6.00	6.00
	8	8.17	5.17	5.67	4.17	4.17	10.00	6.00	8.33	6.00	5.67
	10	7.83	4.50	5.67	4.83	3.83	9.33	5.33	8.83	5.33	5.00

Fonte: Jonas Mendonça Targino, 2018

Tabela 37 – Taxa de reconhecimento com KNN na base AR com a técnica Fast Robust PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	18.50	14.83	16.33	19.08	18.00	14.00	11.25	11.00	15.50	14.25
	2	18.50	14.83	16.33	19.08	18.00	14.00	11.25	11.00	15.50	14.25
	4	19.08	15.83	16.75	19.25	18.08	14.75	11.50	11.25	15.25	14.25
	6	20.25	16.33	17.08	19.17	18.08	15.75	11.25	11.50	15.25	13.50
	8	18.75	16.50	17.33	18.42	18.17	15.00	11.50	12.00	15.00	14.50
	10	19.67	17.08	17.08	17.92	17.08	15.25	12.75	12.75	14.75	14.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	23,17	20,00	21,33	28,17	26,17	13,83	9,67	11.33	10.00	9.83
	2	23,17	20,00	21,33	28,17	26,17	13,83	9,67	11.33	10.00	9.83
	4	24.00	21.17	22.00	28.83	26.33	14.17	10.50	11.50	9.67	9.83
	6	26.00	22.17	22.00	28.83	26.67	14.50	10.50	12.17	9.50	9.50
	8	24.50	22.67	22.67	27.50	26.67	13.00	10.33	12.00	9.33	9.67
	10	25.67	22.83	22.33	26.50	25.17	13.67	11.33	11.83	9.33	9.00

Fonte: Jonas Mendonça Targino, 2018

Tabela 38 – Taxa de reconhecimento com KNN na base AR com a técnica Gappy PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	49.17	43.58	45.42	38.00	38.17	50.50	42.50	44.25	38.25	38.25
	2	49.17	43.58	45.42	38.00	38.17	50.50	42.50	44.25	38.25	38.25
	4	48.25	43.75	45.33	37.58	37.50	49.00	42.00	44.00	36.25	37.25
	6	48.00	43.75	45.50	37.67	37.42	49.50	41.75	44.00	37.75	37.50
	8	46.75	42.92	45.42	36.42	36.92	48.25	41.75	44.00	36.50	38.25
	10	47.17	42.50	43.83	36.42	36.08	49.75	42.25	43.50	37.25	37.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	72.33	63.50	66.83	57.50	57.00	26.00	23.67	24.00	18.50	19.33
	2	72.33	63.50	66.83	57.50	57.00	26.00	23.67	24.00	18.50	19.33
	4	70.00	62.67	65.50	56.67	55.17	26.50	24.83	25.17	18.50	19.83
	6	69.50	62.17	65.83	55.67	54.00	26.50	25.33	25.17	19.67	20.83
	8	67.67	60.50	65.17	53.00	53.17	25.83	25.33	25.67	19.83	20.67
	10	67.17	58.83	63.00	52.33	51.17	27.17	26.17	24.67	20.50	21.00

Fonte: Jonas Mendonça Targino, 2018

Tabela 39 – Taxa de reconhecimento com KNN na base AR com a técnica PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	14.25	15.67	15.08	13.17	13.50	14.00	17.00	16.50	14.75	14.50
	2	14.25	15.67	15.08	13.17	13.50	14.00	17.00	16.50	14.75	14.50
	4	14.50	15.33	15.17	12.75	13.00	14.75	16.75	16.75	12.75	13.25
	6	14.08	15.92	15.17	13.00	13.17	14.00	17.50	16.25	13.50	13.75
	8	13.83	15.33	15.25	12.83	12.92	14.00	17.00	17.25	13.00	13.50
	10	13.08	15.00	14.75	12.92	14.00	14.00	16.25	16.75	13.75	14.25

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	18.33	19.83	19.00	18.50	18.67	10.17	11.50	11.17	7.83	8.33
	2	18.33	19.83	19.00	18.50	18.67	10.17	11.50	11.17	7.83	8.33
	4	19.67	20.00	19.83	18.33	18.50	9.33	10.67	10.50	7.17	7.50
	6	19.33	20.33	20.00	19.00	19.50	8.83	11.50	10.33	7.00	6.83
	8	19.17	19.83	20.17	19.00	19.17	8.50	10.83	10.33	6.67	6.67
	10	18.00	19.67	19.00	19.17	20.33	8.17	10.33	10.50	6.67	7.67

Fonte: Jonas Mendonça Targino, 2018

Tabela 40 – Taxa de reconhecimento com KNN na base AR com a técnica Recursive PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	53.25	48.00	50,17	42.17	41.25	56.50	50.50	52.00	42.75	42.50
	2	53.25	48.00	50,17	42.17	41.25	56.50	50.50	52.00	42.75	42.50
	4	51.58	47.58	48,67	41.00	40.50	55.75	50.00	50.25	40.75	41.25
	6	51.17	46.67	48,50	40.17	40.33	55.50	48.50	49.50	42.50	41.25
	8	50.00	45.25	47,92	39.67	39.33	55.25	47.50	48.50	42.25	42.25
	10	49.08	43.83	46,58	38.58	38.17	56.25	46.75	49.50	41.25	42.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	80.00	71.67	75.00	65.33	64.67	26.50	24.33	25.33	19.00	17.83
	2	80.00	71.67	75.00	65.33	64.67	26.50	24.33	25.33	19.00	17.83
	4	76.83	69.33	71.83	63.33	62.50	26.33	25.83	25.50	18.67	18.50
	6	76.83	68.00	72.00	61.83	61.33	25.50	25.33	25.00	18.50	19.33
	8	75.50	66.00	70.67	61.00	59.83	24.50	24.50	25.17	18.33	18.83
	10	73.17	63.33	68.17	58.17	57.17	25.00	24.33	25.00	19.00	19.17

Fonte: Jonas Mendonça Targino, 2018

Tabela 41 – Taxa de reconhecimento com KNN na base AR com a técnica Asymmetrical PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	39.17	40.50	39.50	37.33	37.92	39.50	40.50	40.00	39.00	39.75
	2	39.17	40.50	39.50	37.33	37.92	39.50	40.50	40.00	39.00	39.75
	4	38.75	39.58	39.00	37.08	37.42	41.25	40.00	40.75	38.00	38.00
	6	37.33	38.75	38.42	35.92	36.33	40.00	39.00	39.75	35.50	36.75
	8	36.83	37.67	37.83	35.50	36.00	39.75	38.00	39.00	35.00	36.75
	10	36.17	37.67	36.67	34.92	34.67	38.00	39.75	38.75	35.00	35.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	68.50	70.33	68.67	66.83	67.17	9.83	10.67	10.33	7.83	8.67
	2	68.50	70.33	68.67	66.83	67.17	9.83	10.67	10.33	7.83	8.67
	4	68.00	68.17	67.33	67.00	66.83	9.50	11.00	10.67	7.17	8.00
	6	65.33	66.67	65.83	64.67	64.50	9.33	10.83	11.00	7.17	8.17
	8	64.00	65.00	64.50	64.17	64.00	9.67	10.33	11.17	6.83	8.00
	10	62.67	65.33	63.00	62.83	61.50	9.67	10.00	10.33	7.00	7.83

Fonte: Jonas Mendonça Targino, 2018

Tabela 42 – Taxa de reconhecimento da técnica SRC com Fast Recursive PCA com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	84.58	83.33	83.67	80.58	80.08	92.50	90.50	91.50	90.25	90.00
	2	84.58	83.33	83.67	80.58	80.08	92.50	90.50	91.50	90.25	90.00
	4	82.33	80.42	80.92	77.17	76.42	90.50	89.00	89.50	87.75	86.75
	6	80.42	79.17	79.50	75.92	75.50	90.75	90.00	89.50	87.25	86.50
	8	78.33	77.33	77.83	73.83	73.42	89.75	88.25	89.25	85.50	85.00
	10	77.17	76.58	76.83	73.42	72.75	89.00	88.50	89.25	85.75	85.25

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	93.83	93.33	93.50	91.83	91.67	75.33	73.33	73.83	69.33	68.50
	2	93.83	93.33	93.50	91.83	91.67	75.33	73.33	73.83	69.33	68.50
	4	91.00	89.33	90.17	87.33	86.83	73.67	71.50	71.67	67.00	66.00
	6	89.50	88.50	88.17	85.00	85.17	71.33	69.83	70.83	66.83	65.83
	8	87.67	85.67	86.67	81.83	81.83	69.00	69.00	69.00	65.83	65.00
	10	85.67	84.67	85.00	81.67	81.67	68.67	68.50	68.67	65.17	63.83

1.2.5 KNN nível 2

Tabela 43 – Taxa de reconhecimento com KNN na base AR com a técnica Fast Recursive PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	56.33	56.67	56.42	51.25	51.00	63.00	61.75	61.50	55.75	55.50
	2	56.33	56.67	56.42	51.25	51.00	63.00	61.75	61.50	55.75	55.50
	4	55.25	55.42	55.33	50.92	50.08	61.75	61.00	61.75	55.75	54.50
	6	53.67	54.00	54.25	49.67	48.75	63.00	61.25	62.50	55.25	54.25
	8	52.92	53.50	53.00	48.33	47.92	61.25	61.25	60.50	53.75	53.00
	10	51.92	51.42	52.17	47.33	46.75	60.00	59.25	59.25	52.75	51.75

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	83.00	82.00	82.17	76.83	75.67	29.67	31.33	30.67	25.67	26.33
	2	83.00	82.00	82.17	76.83	75.67	29.67	31.33	30.67	25.67	26.33
	4	81.67	79.67	80.50	75.83	74.17	28.83	31.17	30.17	26.00	26.00
	6	79.33	77.67	78.83	73.33	71.83	28.00	30.33	29.67	26.00	25.67
	8	77.00	76.50	75.83	72.83	70.67	28.83	30.50	30.17	23.83	25.17
	10	76.50	73.17	74.50	70.17	68.33	27.33	29.67	29.83	24.50	25.17

Fonte: Jonas Mendonça Targino, 2018

Tabela 44 – Taxa de reconhecimento com KNN na base AR com a técnica Fisherfaces

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	11.00	9.83	10.08	9.25	8.58	11.25	10.25	11.00	9.00	9.25
	2	11.00	9.83	10.08	9.25	8.58	11.25	10.25	11.00	9.00	9.25
	4	10.33	10,25	9.50	9.50	8.50	9.75	10.50	9.75	9.75	9.50
	6	9.92	10.42	10.00	8.58	8.42	9.75	11.00	10.75	9.00	9.50
	8	9.50	9.00	10.08	8.17	8.50	8.75	9.25	10.75	8.50	9.50
	10	9.25	8.83	10.00	7.50	8.08	9.00	9.00	11.00	8.00	9.75

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	8.83	7.33	7.50	7.33	6.83	13.17	12.33	12.67	11.17	10.33
	2	8.83	7.33	7.50	7.33	6.83	13.17	12.33	12.67	11.17	10.33
	4	8.17	7.50	7.17	7.83	7.00	12.50	13.00	11.83	11.17	10.00
	6	8.17	7.83	7.33	7.17	7.33	11.67	13.00	12.67	10.00	9.50
	8	7.67	6.00	7.17	7.17	7.17	11.33	12.00	13.00	9.17	9.83
	10	7.33	5.50	7.00	7.00	6.67	11.17	12.17	13,00	8.00	9.50

Fonte: Jonas Mendonça Targino, 2018

Tabela 45 – Taxa de reconhecimento com KNN na base AR com a técnica Fast Robust PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	21.17	20.00	20.17	22.50	22.08	17.50	14.00	14.50	18.25	17.75
	2	21.17	20.00	20.17	22.50	22.08	17.50	14.00	14.50	18.25	17.75
	4	21.00	20.42	21.00	22.50	21.83	17.75	15.25	16.75	18.25	17.00
	6	21.58	21.17	21.25	23.17	22.25	17.50	15.25	16.75	18.25	17.50
	8	22.00	20.92	20.92	22.33	22.25	19.00	16.00	15.50	17.75	16.75
	10	22.17	21.00	21.33	23.17	22.75	19.25	16.25	17.00	18.75	18.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	27.17	26.67	25.00	31.67	31.17	15.17	13.33	15.33	13.33	13.00
	2	27.17	26.67	25.00	31.67	31.17	15.17	13.33	15.33	13.33	13.00
	4	27.00	27.33	26.50	31.33	30.67	15.00	13.50	15.50	13.67	13.00
	6	28.17	28.67	27.00	32.67	32.33	15.00	13.67	15.50	13.67	12.17
	8	28.50	27.67	26.50	31.00	31.83	15.50	14.17	15.33	13.67	12.67
	10	28.50	27.83	27.00	32.17	32.00	15.83	14.17	15.67	14.17	13.50

Fonte: Jonas Mendonça Targino, 2018

Tabela 46 – Taxa de reconhecimento com KNN na base AR com a técnica Gappy PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	52,75	52.42	52.92	48.33	47.17	57.50	54.50	56.75	50.00	47.25
	2	52,75	52.42	52.92	48.33	47.17	57.50	54.50	56.75	50.00	47.25
	4	52,33	52.08	52.58	47.75	46.58	56.50	54.75	56.25	48.00	47.00
	6	50,67	51.33	51.25	47.17	46.33	56.75	55.00	56.50	50.00	48.75
	8	50,33	50.67	50.92	46.00	46.00	56.50	54.50	56.50	48.75	48.25
	10	49,42	49.75	50.33	44.67	44.42	56.25	54.00	55.00	48.50	47.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	76.50	74.83	75.00	70.83	69.67	29.00	30.00	30.83	25.83	24.67
	2	76.50	74.83	75.00	70.83	69.67	29.00	30.00	30.83	25.83	24.67
	4	74.83	73.17	74.33	69.50	67.83	29.83	31.00	30.83	26.00	25.33
	6	72.67	72.17	72.17	67.67	66.50	28.67	30.50	30.33	26.67	26.17
	8	71.17	70.50	70.50	65.67	66.17	29.50	30.83	31.33	26.33	25.83
	10	70.00	68.17	70.17	64.17	63.67	28.83	31.33	30.50	25.17	25.17

Fonte: Jonas Mendonça Targino, 2018

Tabela 47 – Taxa de reconhecimento com KNN na base AR com a técnica PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	14.08	15.08	14.92	14.25	14.25	14.00	14.75	14.25	14.75	15.00
	2	14.08	15.08	14.92	14.25	14.25	14.00	14.75	14.25	14.75	15.00
	4	14.08	15.58	14.75	13.75	14.00	14.75	15.75	14.50	14.00	14.25
	6	14.00	15.00	14.92	13.83	14.33	14.75	15.50	15.00	14.25	14.50
	8	14.00	15.67	14.42	13.83	14.25	14.50	16.50	15.00	15.00	14.75
	10	13.92	15.08	14.17	14.33	14.25	13.75	16.00	14.50	15.00	15.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	18.83	19.83	19.50	19.17	19.17	9,33	10.33	10.33	9.33	9.33
	2	18.83	19.83	19.50	19.17	19.17	9,33	10.33	10.33	9.33	9.33
	4	20.00	21.17	20.33	19.83	19.83	8,17	10.00	9.17	7.67	8.17
	6	19.83	20.33	20.83	19.83	20.00	8.17	9.67	9.00	7.83	8.67
	8	19.50	21.50	19.83	19.50	20.00	8.50	9.83	9.00	8.17	8.50
	10	19.17	20.67	18.83	19.67	19.33	8.67	9.50	9.50	9.00	9.17

Fonte: Jonas Mendonça Targino, 2018

Tabela 48 – Taxa de reconhecimento com KNN na base AR com a técnica Recursive PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	56.42	56.58	56.50	51.33	51.00	63.25	61.50	61.75	55.75	55.50
	2	56.42	56.58	56.50	51.33	51.00	63.25	61.50	61.75	55.75	55.50
	4	55.17	55.42	55.33	51.00	50.00	61.50	61.00	61.75	56.00	54.25
	6	53.58	53.75	54.33	49.75	49.00	62.75	60.50	62.75	55.50	54.75
	8	53.00	53.42	53.17	48.42	47.58	61.75	61.25	61.25	54.00	52.25
	10	52.00	51.83	52.25	47.25	46.92	60.25	60.25	59.75	52.50	52.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	83.00	82.00	82.67	77.00	76.00	29.83	31.17	30.33	25.67	26.00
	2	83.00	82.00	82.67	77.00	76.00	29.83	31.17	30.33	25.67	26.00
	4	81.67	79.67	80.83	76.00	74.33	28.67	31.17	29.83	26.00	25.67
	6	79.33	77.67	79.17	73.67	72.17	27.83	29.83	29.50	25.83	25.83
	8	77.00	76.50	76.17	73.17	70.33	29.00	30.33	30.17	23.67	24.83
	10	76.50	73.50	74.83	70.50	68.67	27.50	30.17	29.67	24.00	25.17

Fonte: Jonas Mendonça Targino, 2018

Tabela 49 – Taxa de reconhecimento com KNN na base AR com a técnica Asymmetrical PCA

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	39.42	40.33	39.58	39.33	39.33	40.50	40.25	39.50	40.50	41.00
	2	39.42	40.33	39.58	39.33	39.33	40.50	40.25	39.50	40.50	41.00
	4	38.00	39.17	38.50	38.25	38.92	39.50	41.00	39.75	39.00	40.00
	6	36.92	38.92	37.75	37.67	37.75	40.25	40.50	41.25	38.75	38.50
	8	35.67	37.50	37.17	37.42	37.33	38.75	39.00	40.00	39.25	38.50
	10	35.75	37.58	37.08	36.67	36.75	39.25	38.75	40.00	39.00	39.25

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	69.00	70.83	68.00	70.17	69.83	9.83	9.83	11.17	8.50	8.83
	2	69.00	70.83	68.00	70.17	69.83	9.83	9.83	11.17	8.50	8.83
	4	67.67	68.67	67.33	69.00	69.67	8.33	9.67	9.67	7.50	8.17
	6	65.33	68.33	65.17	66.67	66.83	8.50	9.50	10.33	8.67	8.67
	8	62.50	65.67	63.67	66.33	66.33	8.83	9.33	10.67	8.50	8.33
	10	61.83	65.00	63.50	64.83	64.50	9.67	10.17	10.67	8.50	9.00

Fonte: Jonas Mendonça Targino, 2018

Tabela 50 – Taxa de reconhecimento da técnica SRC com Fast Recursive PCA com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	86.00	86.08	86.08	84.92	84.75	92.50	93.00	92.75	92.50	92.25
	2	86.00	86.08	86.08	84.92	84.75	92.50	93.00	92.75	92.50	92.25
	4	83.58	83.58	83.33	82.50	82.00	90.75	90.25	90.50	91.00	91.00
	6	81.67	82.75	82.33	80.42	80.33	90.50	90.75	90.75	89.75	89.75
	8	80.33	80.33	81.00	78.42	77.92	90.50	90.25	90.75	89.25	88.75
	10	79.83	77.83	79.08	77.33	76.75	90.75	89.25	90.00	88.75	88.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	94.83	94.83	94.83	94.00	93.67	77.17	77.33	77.33	75.83	75.83
	2	94.83	94.83	94.83	94.00	93.67	77.17	77.33	77.33	75.83	75.83
	4	92.17	91.83	91.50	90.83	91.00	75.00	75.33	75.17	74.17	73.00
	6	90.67	91.17	90.50	88.50	89.00	72.67	74.33	74.17	72.33	71.67
	8	89.33	88.83	89.50	87.33	86.50	71.33	71.83	72.50	69.50	69.33
	10	88.67	85.83	87.33	85.50	84.83	71.00	69.83	70.83	69.17	68.67

1.2.6 KNN nível 1 falta

1.2.7 SVM nível 3 falta

1.2.8 SVM nível 2 falta

1.3 Resultados de reconstrução com técnicas baseadas em modelo

1.3.1 ELM nível 3

Tabela 51 – Taxa de reconhecimento da Representação Esparsa com modelagem matemática do GL e topologia do grafo de Poisson na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	70.42±0.31	70.40±0.53691	70.05±0.42	69.77±0.29	70.02±0.40
	500	70.09±0.41	70.20±0.31975	70.05±0.23	69.67±0.44	69.56±0.49
	1000	68.32±0.44	68.27±0.27513	68.09±0.40	67.92±0.48	67.75±0.41
	2000	68.31±0.30	68.55±0.56819	68.30±0.37	67.90±0.20	67.99±0.52
	4000	69.74±0.27	69.79±0.31732	69.81±0.25	69.11±0.20	68.96±0.34

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	83.17±0.26	83.10±0.21	82.90±0.21	82.97±0.29	82.97±0.32
	500	82.87±0.17	82.92±0.23	82.50±0.11	82.47±0.07	82.85±0.24
	1000	82.72±0.27	82.72±0.14	82.62±0.37	82.45±0.19	82.75±0.33
	2000	82.72±0.27	82.72±0.24	82.65±0.21	82.47±0.21	82.60±0.17
	4000	82.70±0.15	82.70±0.15	82.50±0.00	82.47±0.07	82.52±0.07

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	83.81±0.28	83.71±0.23	83.85±0.24	83.88±0.28	83.81±0.27
	500	83.60±0.25	83.63±0.20	83.50±0.15	83.55±0.15	83.51±0.22
	1000	83.65±0.27	83.40±0.52	83.38±0.24	83.40±0.22	83.26±0.25
	2000	83.43±0.27	83.41±0.36	83.48±0.18	83.16±0.11	83.30±0.29
	4000	83.46±0.13	83.45±0.15	83.50±0.22	83.20±0.07	83.21±0.08

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	57.03±0.64	57.08±1.06	56.26±0.89	55.66±0.46	56.23±0.94
	500	56.58±0.68	56.78±0.59	56.60±0.41	55.80±0.81	55.61±0.85
	1000	53.00±0.81	53.15±0.67	52.80±0.83	52.45±1.05	52.25±0.88
	2000	53.20±0.56	53.68±1.02	53.13±0.64	52.65±0.43	52.68±0.89
	4000	56.01±0.50	56.13±0.53	56.13±0.34	55.03±0.40	54.71±0.62

Tabela 52 – Taxa de reconhecimento da Representação Esparsa com modelagem matemática do GL e topologia do grafo Laplaciano na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	71.94±0.38	72.09±0.40	71.58±0.43	71.45±0.39	71.75±0.49
	500	71.72±0.23	71.85±0.51	71.55±0.26	71.41±0.47	71.24±0.40
	1000	69.76±0.55	69.67±0.27	69.58±0.47	69.54±0.44	69.11±0.40
	2000	69.87±0.43	69.86±0.47	69.76±0.39	69.43±0.28	69.52±0.49
	4000	71.30±0.28	71.45±0.22	71.27±0.27	70.43±0.18	70.58±0.40

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	84.02±0.07	84.12±0.35	83.85±0.24	83.80±0.25	83.87±0.27
	500	83.90±0.21	83.90±0.21	83.52±0.18	83.47±0.07	83.70±0.25
	1000	83.82±0.28	83.85±0.24	83.55±0.34	83.40±0.24	83.65±0.29
	2000	83.87±0.31	83.70±0.22	83.65±0.21	83.45±0.19	83.60±0.17
	4000	83.77±0.14	83.65±0.17	83.52±0.07	83.47±0.07	83.60±0.12

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	85.58±0.26	85.65±0.25	85.65±0.31	85.73±0.23	85.75±0.28
	500	85.55±0.15	85.71±0.20	85.45±0.19	85.58±0.21	85.48±0.25
	1000	85.55±0.31	85.28±0.56	85.33±0.35	85.35±0.30	85.10±0.32
	2000	85.43±0.33	85.31±0.44	85.50±0.23	85.06±0.14	85.26±0.17
	4000	85.53±0.15	85.63±0.17	85.55±0.27	85.06±0.11	85.18±0.16

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	58.30±0.75	58.53±0.87	57.51±0.82	57.18±0.61	57.76±1.00
	500	57.90±0.42	57.98±0.95	57.66±0.47	57.25±0.82	57.00±0.63
	1000	53.98±1.01	54.06±0.67	53.83±0.77	53.73±0.99	53.13±0.85
	2000	54.31±0.75	54.41±0.83	54.03±0.71	53.80±0.51	53.78±0.85
	4000	57.06±0.52	57.26±0.38	57.00±0.38	55.80±0.33	55.98±0.76

Fonte: Jonas Mendonça Targino, 2018

Tabela 53 – Taxa de reconhecimento da técnica SSIMGL na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	92.27±0.41	92.40±0.60	91.98±0.84	92.16±0.44	91.55±0.66
	500	92.90±0.27	93.01±0.58	92.80±0.40	93.00±0.49	92.45±0.58
	1000	87.00±0.75	87.54±0.45	87.43±0.54	87.25±0.59	86.33±0.89
	2000	87.90±0.74	88.54±0.38	88.15±0.54	88.08±0.79	87.66±0.66
	40000	93.00±0.60	93.12±0.32	93.38±0.35	92.83±0.25	92.49±0.34

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.27±0.21	95.35±0.24	95.35±0.29	95.50±0.28	95.50±0.20
	500	95.52±0.14	95.55±0.15	95.45±0.10	95.55±0.15	95.40±0.12
	1000	95.05±0.36	94.90±0.21	94.82±0.35	95.05±0.30	95.05±0.30
	2000	94.80±0.25	94.87±0.29	94.80±0.32	95.12±0.21	95.00±0.33
	40000	95.00±0.20	95.15±0.17	95.15±0.12	95.30±0.10	95.25±0.11

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.83±0.34	95.96±0.24	96.05±0.37	96.11±0.30	96.00±0.26
	500	96.01±0.14	96.25±0.23	96.23±0.31	96.35±0.31	95.93±0.27
	1000	95.56±0.42	95.23±0.23	95.46±0.43	95.48±0.31	95.05±0.38
	2000	95.70±0.17	95.48±0.49	95.48±0.28	95.46±0.32	95.31±0.32
	4000	96.23±0.21	96.13±0.15	96.25±0.19	96.10±0.16	96.13±0.17

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
	200	88.71±0.80	88.83±1.03	87.91±1.42	88.21±0.76	87.10±1.27
	500	89.78±0.58	89.78±1.07	89.38±0.68	89.65±0.93	88.96±1.04
	1000	78.45±1.41	79.85±0.80	79.40±1.21	79.01±1.28	77.61±1.96
	2000	80.10±1.46	81.60±0.83	80.83±1.13	80.7±1.54	80.01±1.32
	4000	89.76±1.16	90.11±0.59	90.51±0.64	89.56±0.47	88.85±0.66

Fonte: Jonas Mendonça Targino, 2018

Tabela 54 – Taxa de reconhecimento da similaridade estrutural com Grafo Laplaciano na base de dados Yale com ELM

		Yale#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	99.33±2.10	98.66±2.81	100.00±0.00	98.66±2.81	99.33±2.10
	500	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00
	1000	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00
	2000	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00
	4000	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00

		Yale#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	99.33±2.10	98.66±2.81	100.00±0.00	97.33±3.44	100.00±0.00
	500	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00
	1000	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00
	2000	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00
	4000	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00	100.00±0.00

Fonte: Jonas Mendonça Targino, 2018

1.3.2 ELM nível 2

Tabela 55 – Taxa de reconhecimento SRC com Grafo de Poisson na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	70.10±0.44	70.29±0.33	70.28±0.54	69.96±0.52	70.15±0.40
	500	70.78±0.43	70.54±0.29	71.09±0.40	70.33±0.34	70.66±0.23
	1000	69.75±0.25	70.01±0.42	70.25±0.48	69.54±0.21	69.32±0.46
	2000	70.14±0.32	69.99±0.50	70.13±0.70	69.50±0.30	69.75±0.33
	4000	70.40±0.20	70.53±0.30	70.65±0.20	70.18±0.30	70.12±0.13

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	82.82±0.26	82.77±0.18	82.92±0.35	82.80±0.30	82.80±0.25
	500	82.82±0.31	82.65±0.17	82.87±0.13	82.80±0.15	82.82±0.26
	1000	83.02±0.38	82.77±0.18	82.90±0.29	82.82±0.26	83.02±0.36
	2000	82.90±0.21	82.95±0.15	82.92±0.20	82.77±0.18	82.90±0.17
	4000	82.77±0.21	82.90±0.17	82.72±0.18	82.85±0.17	82.82±0.16

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	83.61±0.31	83.71±0.23	83.58±0.18	83.58±0.25	83.60±0.19
	500	83.55±0.23	83.48±0.16	83.35±0.12	83.41±0.08	83.46±0.17
	1000	83.46±0.29	83.43±0.11	83.45±0.19	83.43±0.26	83.53±0.18
	2000	83.48±0.22	83.48±0.24	83.38±0.22	83.36±0.15	83.40±0.23
	4000	83.26±0.08	83.26±0.08	83.21±0.08	83.20±0.07	83.21±0.08

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	56.58±0.91	56.86±0.64	56.98±1.00	56.35±1.04	56.71±0.62
	500	58.01±0.83	57.60±0.65	58.83±0.79	57.25±0.69	57.86±0.44
	1000	56.03±0.56	56.60±0.82	57.06±1.01	55.65±0.44	55.11±1.04
	2000	56.80±0.78	56.50±1.05	56.88±1.39	55.63±0.53	56.11±0.81
	4000	57.55±0.40	57.80±0.65	58.08±0.41	57.16±0.62	57.03±0.30

Tabela 56 – Taxa de reconhecimento da SRC com grafo Laplaciano base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	71.50±0.37	71.79±0.40	71.74±0.39	71.52±0.35	71.40±0.36
	500	72.26±0.37	71.80±0.24	72.39±0.39	71.85±0.30	72.08±0.22
	1000	71.22±0.25	71.49±0.43	71.63±0.52	71.10±0.28	70.86±0.49
	2000	71.45±0.35	71.56±0.46	71.43±0.61	71.05±0.37	71.36±0.46
	4000	71.79±0.21	71.93±0.21	72.00±0.31	71.50±0.22	71.58±0.20

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	83.75±0.23	83.82±0.12	83.85±0.31	83.77±0.34	83.67±0.16
	500	83.75±0.35	83.57±0.12	83.62±0.13	83.60±0.12	83.70±0.15
	1000	83.97±0.32	83.75±0.23	83.80±0.30	83.77±0.14	83.95±0.28
	2000	83.95±0.15	83.85±0.12	83.90±0.26	83.75±0.16	83.90±0.17
	4000	83.72±0.14	83.87±0.13	83.57±0.12	83.75±0.15	83.77±0.14

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	85.50±0.27	85.61±0.26	85.38±0.17	85.48±0.18	85.41±0.22
	500	85.45±0.19	85.35±0.09	85.35±0.12	85.38±0.20	85.43±0.11
	1000	85.43±0.27	85.35±0.12	85.45±0.22	85.33±0.22	85.51±0.27
	2000	85.46±0.21	85.45±0.23	85.38±0.23	85.36±0.15	85.36±0.15
	4000	85.30±0.10	85.26±0.08	85.25±0.11	85.20±0.07	85.21±0.08

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	57.50±0.81	57.78±0.67	58.10±0.74	57.56±0.72	57.38±0.63
	500	59.08±0.75	58.46±0.54	59.43±0.82	58.33±0.69	58.73±0.45
	1000	57.01±0.47	57.63±0.83	57.81±1.04	56.88±0.58	56.21±0.99
	2000	57.43±0.79	57.68±0.95	57.48±1.22	56.75±0.66	57.36±0.96
	4000	58.28±0.44	58.60±0.48	58.76±0.60	57.81±0.45	57.95±0.43

Fonte: Jonas Mendonça Targino, 2018

Tabela 57 – Taxa de reconhecimento da técnica SSIMGL na base de dados AR com ELM

		AR#1				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	91.97±0.60	92.65±0.36	92.43±0.78	92.35±0.57	92.19±0.56
	500	94.00±0.45	94.09±0.27	94.35±0.25	94.22±0.42	93.74±0.33
	1000	91.62±0.38	92.08±0.61	92.05±0.51	92.11±0.33	91.11±0.61
	2000	93.09±0.55	93.23±0.47	93.02±0.37	92.62±0.69	92.74±0.48
	4000	94.86±0.11	94.92±0.21	94.96±0.18	95.02±0.13	94.70±0.22

		AR#2				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.47±0.18	95.45±0.28	95.40±0.12	95.50±0.20	95.42±0.20
	500	95.50±0.00	95.50±0.11	95.60±0.12	95.57±0.12	95.55±0.10
	1000	95.45±0.15	95.40±0.26	95.50±0.16	95.47±0.14	95.47±0.21
	2000	95.50±0.11	95.47±0.14	95.50±0.00	95.45±0.10	95.47±0.14
	4000	95.50±0.00	95.50±0.00	95.50±0.00	95.50±0.00	95.50±0.00

		AR#3				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
Neurônios	200	95.93±0.34	96.03±0.18	95.88±0.29	95.98±0.21	96.08±0.29
	500	96.05±0.15	96.13±0.15	96.11±0.15	96.20±0.20	96.13±0.17
	1000	95.86±0.18	95.96±0.30	95.91±0.30	95.90±0.25	96.03±0.32
	2000	96.06±0.17	96.05±0.13	96.08±0.18	96.01±0.26	96.16±0.31
	4000	96.03±0.07	96.18±0.12	96.13±0.10	96.20±0.07	96.23±0.11

		AR#4				
		db2	db4	sym3	sym4	sym5
		$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$	$\mu \pm \sigma$
	200	88.01±1.21	89.26±0.76	88.98±1.61	88.71±1.10	88.30±1.07
	500	91.96±0.89	92.05±0.52	92.58±0.58	92.25±0.78	91.35±0.65
	1000	87.38±0.88	88.20±1.15	88.18±1.27	88.33±0.82	86.20±1.16
	2000	90.11±1.06	90.41±0.91	89.96±0.66	89.23±1.24	89.31±0.95
	4000	93.70±0.25	93.66±0.41	93.80±0.34	93.85±0.24	93.18±0.44

Fonte: Jonas Mendonça Targino, 2018

Tabela 58 – Taxa de reconhecimento da técnica SRC com grafo de Poisson com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	68.00	68.17	67.92	66.25	66.67	82.50	82.50	82.50	81.50	81.75
	2	68.00	68.17	67.92	66.25	66.67	82.50	82.50	82.50	81.50	81.75
	4	66.08	65.58	65.67	63.92	64.50	80.75	80.25	80.75	78.50	79.00
	6	64.83	64.17	63.00	61.50	61.42	80.75	79.50	80.00	77.50	77.25
	8	63.92	62.08	61.83	58.33	59.58	79.75	78.25	78.75	75.75	76.25
	10	62.42	60.75	61.17	57.33	57.67	79.50	76.75	78.50	75.00	75.25

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	83.33	83.17	83.50	82.00	82.50	52.67	53.17	52.33	50.50	50.83
	2	83.33	83.17	83.50	82.00	82.50	52.67	53.17	52.33	50.50	50.83
	4	80.50	79.00	79.83	77.67	78.50	51.67	52.17	51.50	50.17	50.50
	6	78.33	76.33	74.83	73.83	73.83	51.33	52.00	51.17	49.17	49.00
	8	77.00	73.83	73.83	69.33	70.83	50.83	50.33	49.83	47.33	48.33
	10	74.67	72.50	72.83	68.50	69.33	50.17	49.00	49.50	46.17	46.00

Tabela 59 – Taxa de reconhecimento da técnica SRC com grafo de Laplace com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	69.58	69.33	69.50	67.58	67.83	83.50	83.25	83.25	82.25	82.25
	2	69.58	69.33	69.50	67.58	67.83	83.50	83.25	83.25	82.25	82.25
	4	67.58	66.67	66.67	65.00	65.42	82.50	80.50	81.00	78.50	79.25
	6	65.67	64.58	64.25	62.25	61.58	81.75	79.50	80.75	77.25	76.75
	8	64.92	63.25	63.42	59.42	60.00	80.50	77.50	79.00	75.50	75.75
	10	63.00	61.83	62.75	57.67	58.00	79.25	76.50	79.00	74.25	74.75

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	85.33	84.83	85.17	83.50	83.67	53.83	53.83	53.83	51.67	52,00
	2	85.33	84.83	85.17	83.50	83.67	53.83	53.83	53.83	51.67	52,00
	4	82.50	80.67	80.83	78.50	79.33	52.67	52.67	52.50	51.50	51,50
	6	79.50	77.50	77.17	75.17	74.17	51.83	51.67	51.33	49.33	49,00
	8	78.50	75.83	76.33	70.83	71.33	51.33	50.67	50.50	48.00	48,67
	10	76.17	73.67	74.83	68.67	69.67	49.83	50.00	50.67	46.67	46,33

1.3.3 ELM nível 1 falta

1.3.4 KNN nível 3

Tabela 60 – Taxa de reconhecimento com KNN na base AR com a técnica SSIMGL

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	87.00	85.83	86.08	81.83	81.50	93.75	93.50	93.50	90.25	90.00
	2	87.00	85.83	86.08	81.83	81.50	93.75	93.50	93.50	90.25	90.00
	4	83.75	81.75	82.75	78.50	77.75	92.00	90.00	90.25	85.00	85.25
	6	81.08	79.42	80.00	75.58	75.42	91.00	89.50	90.25	84.50	84.75
	8	79.83	77.33	77.67	72.50	73.08	90.25	88.00	89.00	83.50	83.75
	10	78.33	75.25	77.17	70.17	71.33	89.25	85.50	88.75	82.75	83.00
		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	94.67	92.67	93.17	88.67	89.00	79.33	79.00	79.00	75.00	74,00
	2	94.67	92.67	93.17	88.67	89.00	79.33	79.00	79.00	75.00	74,00
	4	91.17	87.67	88.50	84.50	84.67	76.33	75.83	77.00	72.50	70,83
	6	87.00	84.67	84.67	79.83	81.33	75.17	74.17	75.33	71.33	69,50
	8	85.67	81.33	82.67	76.83	77.33	74.00	73.33	72.67	68.17	68,83
	10	83.50	78.83	81.50	74.83	75.67	73.17	71.67	72.83	65.50	67,00

Fonte: Jonas Mendonça Targino, 2018

Tabela 61 – Taxa de reconhecimento com KNN na base de dados Yale após reconstrução com SSIMGL

		Yale#1				
		db2	db4	sym3	sym4	sym5
K-vizinhos	1	100.00	100.00	100.00	100.00	100.00
	2	100.00	100.00	100.00	100.00	100.00
	4	100.00	100.00	100.00	100.00	100.00
	6	100.00	100.00	100.00	100.00	100.00
	8	100.00	93.33	100.00	93.33	93.33
	10	93.33	93.33	93.33	93.33	93.33
		Yale#2				
		db2	db4	sym3	sym4	sym5
K-vizinhos	1	100.00	100.00	100.00	100.00	100.00
	2	100.00	100.00	100.00	100.00	100.00
	4	100.00	100.00	100.00	100.00	100.00
	6	100.00	100.00	100.00	100.00	100.00
	8	100.00	93.33	100.00	93.33	93.33
	10	93.33	93.33	93.33	93.33	93.33

Fonte: Jonas Mendonça Targino, 2018

1.3.5 KNN nível 2

Tabela 62 – Taxa de reconhecimento da técnica SRC com grafo de Poisson com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	68.17	68.75	68.42	67.92	67.92	82.50	82.75	82.50	82.50	82.50
	2	68.17	68.75	68.42	67.92	67.92	82.50	82.75	82.50	82.50	82.50
	4	66.92	67.00	66.83	65.83	65.75	81.50	81.50	81.50	80.00	80.00
	6	65.58	65.25	65.50	64.25	63.83	81.25	81.25	81.25	80.00	80.00
	8	64.42	63.83	64.17	62.58	61.83	80.25	80.25	79.50	79.25	78.25
	10	63.67	63.33	63.50	61.50	61.58	79.50	80.00	79.50	78.50	78.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	83.17	83.50	83.17	83.00	83.17	53.17	54.00	53.67	52.83	52.67
	2	83.17	83.50	83.17	83.00	83.17	53.17	54.00	53.67	52.83	52.67
	4	81.50	81.00	80.83	79.50	79.67	52.33	53.00	52.83	52.17	51.83
	6	79.67	77.67	79.00	77.67	76.50	51.50	52.83	52.00	50.83	51.17
	8	77.33	75.83	77.00	74.67	74.00	51.50	51.83	51.33	50.50	49.67
	10	76.17	75.00	76.33	73.00	73.50	51.17	51.67	50.67	50.00	49.67

Tabela 64 – Taxa de reconhecimento com KNN na base AR com a técnica SSIMGL

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	87.92	88.67	88.25	87.58	87.00	94.00	94.00	94.25	94.00	94.00
	2	87.92	88.67	88.25	87.58	87.00	94.00	94.00	94.25	94.00	94.00
	4	85.42	85.75	85.50	84.75	84.17	92.50	92.00	93.25	91.50	91.50
	6	84.25	83.33	83.67	82.33	80.83	93.00	91.75	93.00	90.50	90.00
	8	81.75	81.58	82.00	79.58	78.58	90.25	89.75	90.75	88.75	88.00
	10	80.75	81.08	81.17	78.42	77.75	90.50	90.00	91.00	88.25	87.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
	K-vizinhos										
	1	94.67	94.50	94.67	93.67	93.83	81.17	82.83	81.83	81.50	80.17
	2	94.67	94.50	94.67	93.67	93.83	81.17	82.83	81.83	81.50	80.17
	4	92.50	91.83	92.33	90.50	90.67	78.33	79.67	78.67	79.00	77.67
	6	91.33	88.33	89.83	88.00	86.33	77.17	78.33	77.50	76.67	75.33
	8	88.33	85.67	86.83	83.17	83.50	75.17	77.50	77.17	76.00	73.67
	10	86.00	85.67	85.33	83.00	82.33	75.50	76.50	77.00	73.83	73.17

Fonte: Jonas Mendonça Targino, 2018

Tabela 63 – Taxa de reconhecimento da técnica SRC com grafo de Laplace com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	69.83	70.42	70.08	69.42	69.33	83.50	83.75	83.50	83.25	83.25
	2	69.83	70.42	70.08	69.42	69.33	83.50	83.75	83.50	83.25	83.25
	4	68.58	68.42	68.42	67.33	67.25	82.75	82.75	82.75	81.00	80.75
	6	67.50	66.75	67.33	65.33	65.00	82.75	82.00	82.50	80.50	80.25
	8	65.92	64.92	65.83	63.25	62.83	81.00	80.50	81.00	79.25	78.00
	10	65.25	64.08	64.83	62.75	62.67	80.75	80.50	80.75	78.75	78.50

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	85.17	85.67	85.17	84.67	84.83	54.50	55.17	55.00	54.17	53.83
	2	85.17	85.67	85.17	84.67	84.83	54.50	55.17	55.00	54.17	53.83
	4	83.50	83.00	83.00	81.17	81.50	53.67	53.83	53.83	53.50	53.00
	6	82.33	80.17	81.33	79.17	78.33	52.67	53.33	53.33	51.50	51.67
	8	79.83	77.83	79.50	75.83	75.50	52.00	52.00	52.17	50.67	50.17
	10	78.67	76.50	78.17	74.50	74.67	51.83	51.67	51.50	51.00	50.67

1.3.6 KNN nível 1

Tabela 65 – Taxa de reconhecimento da técnica SRC com grafo de Poisson com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	68.17	68.25	68.17	68.25	68.25	82.50	82.50	82.50	82.50	82.50
	2	68.17	68.25	68.17	68.25	68.25	82.50	82.50	82.50	82.50	82.50
	4	66.67	67.08	66.75	66.58	66.50	81.25	81.25	81.25	81.25	81.25
	6	65.33	65.58	65.33	64.75	65.00	81.00	80.75	80.75	80.75	81.00
	8	64.00	64.25	63.92	63.92	63.33	80.00	80.00	80.00	79.25	78.50
	10	63.75	63.75	63.67	63.17	63.00	80.00	80.00	79.75	78.75	78.75

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	83.17	83.17	83.17	83.17	83.17	53.17	53.33	53.17	53.33	53.33
	2	83.17	83.17	83.17	83.17	83.17	53.17	53.33	53.17	53.33	53.33
	4	81.33	81.33	81.17	81.17	80.83	52.00	52.83	52.33	52.00	52.17
	6	79.83	79.50	79.67	78.50	79.17	50.83	51.67	51.00	51.00	50.83
	8	78.00	77.83	77.83	77.50	76.50	50.00	50.67	50.00	50.33	50.17
	10	76.67	76.50	76.50	76.00	75.50	50.83	51.00	50.83	50.33	50.50

Tabela 66 – Taxa de reconhecimento da técnica SRC com grafo de Laplace com classificador KNN

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	69.83	70.08	69.83	70.00	69.92	83.50	83.50	83.50	83.50	83.50
	2	69.83	70.08	69.83	70.00	69.92	83.50	83.50	83.50	83.50	83.50
	4	67.92	68.58	68.17	67.83	68.00	82.25	82.50	82.50	82.25	82.25
	6	67.08	67.50	66.92	66.75	67.00	82.50	82.00	82.00	82.00	82.00
	8	65.67	66.08	65.58	65.67	65.17	81.25	81.25	81.25	80.25	79.25
	10	65.42	65.25	65.33	64.92	64.92	81.50	81.00	81.25	80.00	80.00

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	85.17	85.17	85.17	85.17	85.17	54.50	55.00	54.50	54.83	54.67
	2	85.17	85.17	85.17	85.17	85.17	54.50	55.00	54.50	54.83	54.67
	4	82.83	83.17	82.83	82.33	82.67	53.00	54.00	53.50	53.33	53.33
	6	82.33	82.00	81.83	81.50	81.33	51.83	53.00	52.00	52.00	52.67
	8	80.33	80.33	80.17	79.50	79.17	51.00	51.83	51.00	51.83	51.17
	10	79.17	78.83	78.83	78.17	78.00	51.67	51.67	51.83	51.67	51.83

Tabela 67 – Taxa de reconhecimento com KNN na base AR com a técnica SSIMGL

		AR#1					AR#2				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	87.92	88.58	88.33	88.25	88.17	94.25	94.25	94.50	94.50	94.50
	2	87.92	88.58	88.33	88.25	88.17	94.25	94.25	94.50	94.50	94.50
	4	85.58	85.83	85.58	86.00	85.83	93.00	93.25	93.00	93.75	93.75
	6	83.75	84.08	84.00	84.17	84.08	92.25	92.25	92.50	92.25	92.00
	8	81.75	82.33	82.17	82.17	81.83	91.75	91.25	91.75	89.50	89.50
	10	81.08	81.08	81.50	80.50	80.42	91.25	90.75	91.25	89.25	88.75

		AR#3					AR#4				
		db2	db4	sym3	sym4	sym5	db2	db4	sym3	sym4	sym5
K-vizinhos	1	94.67	94.50	94.67	94.67	94.67	81.17	82.67	82.00	81.83	81.67
	2	94.67	94.50	94.67	94.67	94.67	81.17	82.67	82.00	81.83	81.67
	4	92.83	92.50	92.67	93.00	93.17	78.33	79.17	78.50	79.00	78.50
	6	91.00	90.17	90.83	90.67	90.50	76.50	78.00	77.17	77.67	77.67
	8	88.83	88.33	88.83	89.00	88.33	74.67	76.33	75.50	75.33	75.33
	10	87.33	86.67	87.33	86.17	86.17	74.83	75.50	75.67	74.83	74.67

Fonte: Jonas Mendonça Targino, 2018